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The Reading Comprehension Skills of Key Stage 2 Learners: Their Influence in Mathematical Word Problem Performance

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Abstract: This research examined the reading comprehension abilities of Key Stage 2 learners and their impact on proficiency in mathematics word problems. The study sought to evaluate the learners' reading comprehension proficiency, assess their capability in solving word problems, and ascertain the degree to which understanding impacts problem-solving results. The study employed a descriptive research approach, involving selected Key Stage 2 learners who participated in reading comprehension assessments and arithmetic word problem assessments. The results showed that how well learners understand what they read has a big impact on how well they do at problem-solving. The most important things that helped learners solve word problems are knowing the words, being able to pick out important details, being able to make inferences, and being able to spot issue situations. Learners who understood the material better are able to understand the issues, choose the right operations, and get the right answers. The results showed how important reading comprehension is in problem solving. The study suggests that teachers include literacy tactics into Math lessons, offer guided practice in breaking down problem statements, and create interventions that focus on both reading and numeracy skills. To help Key Stage 2 learners do better in Math, they need to work on their understanding process in reading.

Keywords: *Reading Comprehension, Word Problem Performance, Key Stage 2 Learners, Integrated Literacy and Numeracy Plan.*

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I. INTRODUCTION

Many people agree that being able to solve mathematical word problems is one of the most important abilities learners need to learn. In addition to knowing how to do basic math like adding, subtracting, multiplying, and dividing, word problems need you to understand, reason, and use what you know in real life (Frutas, 2019). This means that problem-solving is not merely a math skill, but also a higher-order thinking skill that combines reading comprehension and logical analysis. Nonetheless, despite its importance, learners worldwide still struggle with word difficulties (Organization for Economic Co-operation and Development [OECD], 2023).

International large-scale assessments highlight this worldwide challenge. The Trends in International Mathematics and Science Study (TIMSS) 2022 showed that a lot of Grade 4 and Grade 8 students from different countries couldn't even meet the lowest standard for math performance. The hardest problems were those that required multiple steps (Mullis et al., 2023). Likewise, the Program for International Student Assessment (PISA) 2018 underscored the significance of mathematical literacy, characterized as the ability to utilize mathematics in quotidian contexts, including budgeting and measurement. Results showed that word problems that needed critical thinking, reasoning, and planning were the hardest, even for pupils from countries with high scores (OECD, 2019).

One reason that scholars commonly give is that you need to be good at both arithmetic and language to solve word problems. Students who have trouble understanding what they read are more likely to have trouble figuring out the context of issues, no matter how good they are at math (Frutas, 2019). This problem is much worse in places like the Philippines, where math is mostly taught in English, which isn't the first language for many students (Misanes & Pascual, 2023).

The situation in the Philippines is identical. The Philippines came in last in math in PISA 2018, with only 19% of students meeting the required competency level. A significant percentage of Filipino students struggled with understanding word problems, discerning the inquiries posed, and selecting the correct procedures for resolution (OECD, 2019). These findings are confirmed by national assessments. The National Achievement Test (NAT) consistently indicates that learners in Key Stage 2 (Grades 4–6) exhibit fundamental computational skills but demonstrate inferior proficiency in

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problem-solving problems (Department of Education [DepEd], 2020).

Regional assessments make this problem worse. The Albay Numeracy Assessment Tool (ALNAT) used in the Bicol Region from 2022 to 2025 always revealed that a lot of Key Stage 2 learners needed a lot of help. Word problems were shown to be the hardest part. Post-test results show some improvement after treatments, but mastery is still a long way off (DepEd, 2024).

Recent years have also shown that those who don't understand what they read tend to do poorly in math. Data from the Philippine Informal Reading Inventory (Phil-IRI) regularly indicate that a substantial proportion of Filipino learners operate at the "Frustration" level. From the school years 2022–2023 to 2024–2025, most learners in the Schools Division of Sorsogon were categorized in this group, signifying significant challenges in comprehending texts across several grade levels and languages (Casingal, 2022; Tampus, 2024). Studies highlighted the necessity for reading interventions that facilitate the progression of learners from the "Frustration" level to the "Instructional" and "Independent" levels, as reading comprehension is essential for academic achievement across all disciplines (Misanes & Pascual, 2023).

Togawe Elementary School has a similar problem at the school level. According to ALNAT, almost 98% of Key Stage 2 learners stayed in the "Needs Major Support" group for math problem-solving throughout the last three school years. Teachers said that learners often don't understand the context of problems, get crucial information wrong, and have trouble choosing the right operations. Local Phil-IRI results also show that most learners are still at the "Frustration" level in reading, which makes it hard for them to understand and work through math word problems. There is some improvement in post-assessments, but development is gradual, and the goal of full mastery has not been reached.

Teachers also point out that learners often feel scared or frustrated when they must tackle arithmetic word problems, and they often give up before they even try to solve them. This shows that there are both cognitive and emotional impediments to learning. These issues highlight the pressing necessity for effective pedagogical approaches that bring together reading comprehension and problem-solving abilities, thereby rendering Mathematics more accessible and relevant for students.

The results of worldwide tests, national tests, regional studies, and school-level tests all point to the same conclusion: solving word problems is not only a math problem; it is also a reading and comprehension problem. To solve these problems, we need to help students improve both their reading comprehension and their problem-solving skills at the same time.

This study, called The Reading Comprehension Skills of Key Stage 2 Learners: Their Influence in Mathematical Word Problem Performance, looks at the specific problems that Togawe Elementary School learners have. It also wants to investigate and suggest teaching methods that are easy to use, useful, and work. The study's goal is to develop integrated literacy and numeracy learning plan that help learners gain confidence, love learning, and learn skills that will be useful for the rest of their lives, not just for getting better exam scores.

➢ *Objectives*

This study aimed to examine the influence of reading comprehension skills on the mathematical word problem performance of Key Stage 2 learners at Togawe Elementary School and find ways to help them improve. The specific objectives of this research are:

- To determine the level of reading comprehension skills of Key Stage 2 learners.
- To assess the performance of Key Stage 2 learners in solving mathematical word problems.
- To analyze the influence of reading comprehension skills on learners' performance in solving mathematical word problems.
- To identify the reading comprehension-related challenges encountered by Key Stage 2 learners in solving mathematical word problems.
- To propose an integrated literacy and numeracy plan that will enhance the performance of Key Stage 2 learners in mathematical word problem solving.

II. METHODS

This study employed a mixed-methods research design that integrated both quantitative and qualitative methodologies. The quantitative segment concentrated on the collection of measurable data via reading comprehension and mathematics word problem assessments, whereas the qualitative segment examined teachers' perceptions on learners' reading and problem-solving abilities. This approach was selected due to its capacity to offer a more thorough insight into the impact of reading comprehension on learners' proficiency in solving mathematical word problems.

The design adhered to a descriptive research framework. The descriptive component delineated the present state of learners' reading comprehension and problem-solving abilities, while the correlational component investigated the existence of a meaningful relationship between the two variables. The incorporation of qualitative interviews enhanced the study by elucidating the patterns identified in the quantitative findings. This methodology enabled the study to delineate, and elucidate the interaction between literacy and numeracy among Key Stage 2 learners.

The majority participants in this study were Key Stage 2 learners (30 or 91%), equally distributed across Grades IV, V, and VI, with 10 learners from each grade level at Togawe Elementary School for the academic year 2025–2026. They were selected using purposive sampling, guaranteeing that the sample comprised learners with diverse levels of reading

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comprehension and mathematics proficiency, as shown by their recent assessment outcomes.

Only 3 participants (9%) Key Stage 2 Teachers are responsible for Grades 4, 5, and 6 also served as key informants. They are questioned to shed light on the reading comprehension challenges faced by learners and their impact on problem-solving in mathematics. Before collecting data, parents, learners, and teachers all gave their permission to make sure that the process was ethical and that everyone was willing to take part.

III. RESULTS

To provide a comprehensive analysis, the qualitative data were explored using thematic presentations, which allowed for the identification and examination of key patterns, themes, and insights emerging from the participants' responses. This approach facilitated a deeper understanding of the underlying perspectives and experiences relevant to the research questions.

In addition to the qualitative analysis, the quantitative data were systematically analyzed using appropriate statistical methods. Descriptive and inferential statistics were applied to interpret numerical data and identify significant trends, relationships, and differences among variables. This dual approach ensured a robust and well-rounded interpretation of the data, thereby enhancing the reliability and validity of the study's findings.

- *Reading Comprehension Skills of Key Stage 2 Learners*

Table 1 shows how well Key Stage 2 learners did in reading comprehension in three important areas: literal comprehension, inferential comprehension, and critical understanding. The total mean proficiency level of 60.89%, which is described as Average, showed that the learners have a fair understanding of the material. They can understand simple ideas in a book, but they still have trouble figuring out and judging information that goes beyond the literal level.

Among the comprehension skills that were tested, learners did the best at literal comprehension, with an average score of 64%. This means that they can easily find, remember, and understand information that is clearly described in a text. This kind of performance showed that learners can understand facts and information that is delivered directly, which is necessary for understanding written material.

Table 1 Reading Comprehension Skills of Key Stage 2 Learners

Comprehension Skills	Proficiency Level	Description
Demonstrating understanding by identifying recalling, and interpreting explicitly stated information in a text (Literal Comprehension Skills)	64%	Average
Drawing conclusions by interpreting implied meanings, making logical connections, and predicting outcomes based on textual evidence (Inferential Conclusion)	60.67%	Average
Evaluating texts by analyzing arguments, assessing credibility, and forming judgements based on evidence and reasoning (Critical Comprehension)	58%	Average
Average	**60.89%**	**Average**

Nonetheless, a diminished proficiency was noted in inferential comprehension, with an average of 60.67%. This finding showed that learners have trouble making conclusions, figuring out what implicit meanings are, making logical connections, and using text evidence to guess what will happen next. The results indicate that learners can understand material that is clearly provided, but they have difficulty inferring or reasoning beyond what is explicitly stated.

Critical comprehension had the lowest average score, at 58%, but it was still called "Average." This shows that learners don't have a lot of experience with analyzing arguments, judging the reliability of information, and making good decisions based on facts and logic. This kind of performance shows how important it is to learn higher-order thinking skills that are needed for critical reading and understanding.

The results show that Key Stage 2 students understand literal information well, but they need more help with their inferential and critical reading skills. To help children better process, analyze, and use information in math, science, and other topics, it is important to strengthen these higher-level comprehension skills.

These findings underscore the necessity of addressing reading comprehension and mathematical problem-solving skills in a comprehensive manner, in connection to the Proposed Integrated Literacy and Numeracy Intervention Plan. By combining literacy and numeracy activities, teachers can help learners understand word problems better, follow directions more closely, and use reasoning abilities in different subjects. The intervention plan's goal is to connect reading comprehension and problem-solving skills so that learners can become both literate and numerate. This means they are able to think critically, reason logically, and use what they know in real-life circumstances.

- *Performance of Key Stage 2 Learners in Solving Mathematical Word Problems*

Table 2 shows how Key Stage 2 learners performed in solving mathematical word problems based on three key skills: understanding the problem (problem analysis), expressing it in mathematical form (mathematical representation), and choosing the right operation (operation selection). The overall average score is 43.22%, which falls under the Low Proficient level. This result means that many learners still find it difficult to understand and solve problems that involve both reading and mathematical reasoning.

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Table 2 Performance of Key Stage 2 Learners in Solving Mathematical Word Problems

Competencies	Proficiency Level	Description
Identifying the given information and the question being asked in a word problem (Problem Analysis)	47%	Low Proficient
Formulating the mathematical expression or equation (Mathematical Representation)	38.33%	Low Proficient
Determine and perform the correct operation aligns with the problem's requirements (Operation Selection)	44.33%	Low Proficient
Average	**43.22%**	**Low Proficient**

Among the three areas, identifying the given information and the question being asked get the highest score of 47%**,** but it is still considered Low Proficient**.** This tells us that while some learners can recognize the important parts of a word problem, many still have trouble understanding the situation and identifying exactly what the problem is asking them to find.

On the other hand, formulating the mathematical expression or equation get the lowest score of 38.33%**,** which also falls under the Low Proficient category. This indicates that learners find it difficult to turn words into numbers or equations. Many of them cannot easily represent what they read in a mathematical way, showing that they struggle to connect language with mathematical concepts.

Meanwhile, in determining and performing the correct operation**,** learners scored 44.33%**,** which again is in the Low Proficient range. This suggests that they are often unsure which operation to use whether to add, subtract, multiply, or divide and how to correctly apply it in solving the problem.

➢ *How the Reading Comprehension Skills Influence the Key Stage 2 Learners' Performance in Solving Mathematical Word Problems*

- *Reading Comprehension Skills Help Learners Find and Focus on Key Ideas of Word Problems*

Participant 1 claimed the importance of developed comprehension in learners for them to understand the ideas in word problems, when she shared, "Most of my Grade 4 learners are still in the stage of developing their basic problem-solving skills. Many of them can add, subtract, multiply, or divide when the numbers are presented directly, but they struggle when these operations are placed in story form." Likewise, Participant 2 emphasized that "learners' performance in problem-solving depends largely on their level of comprehension. Learners who can fully understand the problem can identify the correct operation and arrive at the right answer, whereas those who fail to grasp the meaning of the problem are more likely to provide incorrect responses". In a similar observation, Participant 3 stated that "Many learners continue to find problem-solving tasks challenging. Although they can carry out computations correctly when numerical data are explicitly given, they often struggle when the problem is expressed verbally. These learners tend to guess which operation to use without carefully analyzing the situation. Furthermore, many have difficulty identifying what is asked, what information is given, and what mathematical process should be applied. As a result, they frequently produce incomplete or incorrect solutions despite possessing basic computational skills."

Overall, the respondents agreed that the primary difficulty among learners lies not in performing mathematical operations but in comprehending, analyzing, and translating verbal problems into mathematical representations. This suggests a need for instructional interventions that strengthen learners' reading comprehension and analytical skills as essential components of effective problem-solving in Mathematics.

- *Relating the Story in the Word Problem to the Mathematical Steps*

The interview data uncovered three primary themes regarding the learners' challenges in comprehending mathematical word problems: (1) issues in reading comprehension, (2) the impact of basic reading skills, and (3) the relationship between reading and problem-solving. These themes regularly appeared in the respondents' remarks, emphasizing the interconnectedness of reading and numeracy in students' academic performance. The teachers' observations suggest that the difficulties students encounter in mathematics are not solely computational but also stem from their insufficient capacity to understand the language, structure, and contextual information inherent in problem statements. The next parts go into further information about these themes and talk about them.

A common worry among the Key Stage 2 Teachers who answered is that learners don't understand what they read very well. Respondent 1 said that "Some students can read words quickly, but they don't always understand what they mean. They can't figure out what the most important parts of a text are since they don't understand it, especially when the sentences are extensive or have words they don't know". Respondent 3, an English and Mathematics teacher for sixth graders, noticed the same thing and said that "Even if students can read individual words, they have a hard time understanding the whole chapter or problem. Consequently, they frequently overlook essential details or misinterpret inquiries, resulting in erroneous responses". These observations indicate that reading fluency does not inherently correspond to comprehension, underscoring a persisting disparity between word recognition and understanding among learners.

Respondent 2 claimed that "How well students understand what they read depends a lot on the basic reading abilities they learned in the past. People who have learned the basics of reading can understand texts better than others who

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haven't had enough practice with these skills". The respondent reiterated that inadequate or inconsistent instruction in core literacy skills hinders learners' advancement to higher-order comprehension tasks. This research highlights the need of structured reading instruction and early literacy development to guarantee that students get the essential skills to comprehend intricate texts and problem scenarios in subsequent grades.

Respondent 1 also pointed out how closely reading comprehension and solving word problems are related. The respondent said that "learners have trouble figuring out what math operation to use when they don't fully understand the meaning of a word problem. They can't connect the reading part to the math part because they don't understand the context or pick out the important facts". This shows that being able to read and understand the problem is very important for doing well in solving word problems, since you need to understand the material to come up with correct answers. It also shows that we need teaching methods that combine reading and writing with arithmetic so that learners may better understand and solve math problems.

The answers show that reading comprehension is a big element of how well learners do in school, especially in solving word problems. It is clear from all three themes that many learners can read fluently, but they don't really understand what they read. They have trouble understanding both narrative and problem-based texts because they have trouble with long phrases, new words, and not having all the basic abilities they need. Because of this, their poor understanding makes it harder for them to correctly evaluate and solve math word problems. The results show that reading and math skills are closely related, which means that programs that help students improve their reading comprehension may also help them solve problems better. Encouraging combined literacy and numeracy teaching could be a good way to help learners get better in both reading and math.

- *Ability to Analyze the Events in the Word Problems Helps Learners Solve them*

There was a unanimous agreement among the three participants that reading comprehension is an essential component in the process of answering mathematical word problems. Learners can expand their understanding of the problem beyond the manipulation of numbers and gain a deeper comprehension of the narrative or circumstance that lies behind the issue. Learners that have good comprehension skills can recognize what is being presented, what is being requested, and what actions are required to arrive at the appropriate solution. An important ability in mathematical thinking is the ability to differentiate between information that is relevant and information that is not relevant, as well as to recognize correlations between quantities. On the other hand, a lack of comprehension frequently results in confusion, inaccurate interpretation, and improper answers. Even when students are aware of how to perform computations, they frequently select the incorrect operation or produce responses that are inadequate if they are unable to comprehend the context of the problem. An additional observation made by Respondent 1 is that a high level of comprehension helps to cultivate confidence and accuracy, since students who have a thorough understanding of the problem are more likely to solve it successfully. All the participants agreed that reading comprehension has a considerable impact on the performance of learners in word problems, making it an essential component of mathematical achievement. This was the consensus across all grade levels, from fourth grade to sixth grade.

➢ *Reading Comprehension Challenges Faced by the Key Stage 2 Learners in Solving Mathematical Word Problems*

The results in Table 3 indicate the reading comprehension obstacles encountered by Key Stage 2 learners in completing mathematical word problems. The results show that several factors that are connected to each other affect how well students can understand and solve math issues.

Table 3 Reading Comprehension Challenges Faced by the Key Stage 2 Learners in Solving Mathematical Word Problems

Challenges	Frequency	Rank
Learners' limited or poor vocabulary	3	3
Learners struggle with long or complex sentences	3	3
Difficulty in representing the problem into mathematical expressions	3	3
Passivity of some learners to work on with word problems	3	3
Learners often make guess instead of carefully reading the word problems	3	3
Some learners had difficulty in identifying relevant information	2	6

The most mentioned problems, each with a frequency of 3 and a rank of 3, are: learners limited or poor vocabulary, trouble with long or complicated sentences, trouble turning the problem into math problems, being passive when working on word problems, and making guesses instead of reading the problems carefully. These results indicate that numerous learners encounter both language and motivational obstacles that impede their problem-solving efficacy.

The least common challenge, with a frequency of 2 and a rank of 6, is having trouble finding useful information. Even though fewer learners said they have this problem, it is still an important skill for problem-solving because finding important features is vital to make acceptable mathematical representations and answers.

In general, the results show that being able to read and understand is very important for solving word problems. The learners' problems are not just with arithmetic problems; they

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are also strongly linked to their ability to read, understand, and interpret math materials. This research underscores the necessity for a cohesive literacy and numeracy intervention strategy that concurrently enhances comprehension, vocabulary, and problem-solving skills to elevate learners' overall mathematics performance.

- *Proposed Integrated Literacy and Numeracy Intervention Plan to Enhance Key Stage 2 Learners' Performance in Mathematical Word Problem Solving*

Solving math word problems is an important skill that needs both reading comprehension and math skills. Many Key Stage 2 learners have trouble solving word problems not because they can't do Math, but because they don't understand the problem's language and context. This shows how closely reading and writing skills are linked to learning math. The Proposed Integrated Literacy and Numeracy Intervention Plan seeks to enhance learners' reading comprehension and problem-solving abilities in response to this challenge. The method aims to help students understand issues better, choose the right operations, and do better overall on math word problems by using literacy strategies in math lessons.

IV. DISCUSSION

This section gives an analysis and interpretation of the results considering the study's goals. It talks about how the results are like or different from what other studies and literature have shown on how well learners understand what they read and how well they solve problems. The discussion then examines the ramifications of the findings for classroom instruction, curriculum development, and learner assistance, especially in relation to the planned Integrated Literacy and Numeracy Intervention Plan. The chapter also talks about the problems that came up during the study, which could have affected the results and give ideas for future research.

- *Reading Comprehension Skills of Key Stage 2 Learners*

The results indicate that Key Stage 2 learners demonstrated an average level of proficiency across the three major components of reading comprehension: Literal Comprehension**,** Inferential Comprehension, and Critical Comprehension. This overall performance suggests that learners possess foundational literacy skills that allow them to understand and interact with texts, but they still face challenges in higher-order comprehension and critical thinking. These limitations may affect not only their reading development but also their performance in other academic areas, particularly in solving mathematical word problems, where the ability to interpret textual information is crucial (Abedi & Lord, 2001).

In terms of Literal Comprehension Skills, learners showed an average level of proficiency, demonstrating a moderate ability to identify, recall, and interpret explicitly stated information in a text. This indicates that while learners can extract direct information and answer questions based on explicit details, they may have trouble when required to integrate multiple pieces of information or read for detail under time constraints. The findings are consistent with Abad and Torres (2021)**,** who reported that many elementary learners can recall information from texts but often require additional scaffolding to comprehend complex or multi-step passages. This skill is foundational, as accurate literal comprehension is necessary before learners can engage in inferential or critical thinking processes (Clement, 2017).

Regarding Inferential Comprehension Skills, learners were again at an average level of proficiency, showing moderate capability in drawing conclusions, interpreting implied meanings, making logical connections, and predicting outcomes based on textual evidence. This reflects the learners' emerging ability to go beyond the surface meaning of the text and engage in higher-order thinking. However, moderate proficiency suggests that learners may struggle with texts that require abstract reasoning or integration of prior knowledge. These findings align with Alonzo (2019)**,** who emphasized that inferential comprehension depends on both reading proficiency and cognitive reasoning, and learners who lack sufficient background knowledge or practice in making logical inferences often perform below expectations in this area. Developing inferential comprehension is critical, as it underpins the ability to solve word problems in mathematics, where students must infer relationships and understand context that is not explicitly stated (Verschaffel, Greer, & De Corte, 2000).

In the area of Critical Comprehension Skills, learners also demonstrated an average level of proficiency, suggesting that they can analyze arguments, assess the credibility of information, and form judgments based on textual evidence to a moderate degree. This skill reflects learners' initial development of evaluative and reasoning abilities, which are essential for independent learning and decision-making. However, their moderate performance implies that learners may struggle with texts that require complex critical thinking, argument evaluation, or synthesis of multiple perspectives. This finding is supported by Montague (2017)**,** who highlighted that critical reading requires explicit instruction, guided practice, and scaffolding, as learners often lack the metacognitive strategies needed to assess the reliability and relevance of information independently.

Overall, the learners' average proficiency in reading comprehension indicates a foundational competence in literacy that can support academic learning but is insufficient for consistent success in tasks requiring higher-order thinking. Studies consistently show that reading comprehension is closely linked to mathematical problem-solving, as learners must understand textual information before translating it into mathematical representations (Abedi & Lord, 2001; Verschaffel, Greer, & De Corte, 2000). Cognitive Load Theory (Sweller, 1988)**,** showed that learners who struggle to process and integrate textual information may experience cognitive overload, making it difficult to solve complex problems effectively. Therefore, improving reading comprehension, particularly inferential and critical skills, is essential for enhancing learners' overall academic performance.

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The findings underscore the importance of integrating reading strategies into content-area instruction, including mathematics. Teachers can employ scaffolding techniques, guided reading sessions, and questioning strategies to develop learners' literal, inferential, and critical comprehension skills, as suggested by Polya (1957) and Vygotsky (1978). By strengthening these literacy skills, learners are better equipped to understand complex texts, reason logically, and make informed judgments, which in turn supports their ability to tackle mathematical word problems and other cognitively demanding tasks effectively.

- *Performance of Key Stage 2 Learners in Solving Mathematical Word Problems*

The results showed that learners demonstrated a low level of proficiency in the three essential elements of mathematical word problem-solving: problem analysis, mathematical representation, and operation selection. This finding implies that the students have generally poor problem-solving skills, which may hinder their ability to efficiently comprehend, evaluate, and interpret mathematical problems.

In Problem Analysis, learners were found to have a low proficiency level, indicating that they struggled to recognize the given facts and understand the question posed by the problem. This difficulty is consistent with the findings of Abad and Torres (2021), who discovered that a lack of reading comprehension skills causes many elementary students to have trouble understanding the vocabulary and context of mathematical word problems. Similarly, Abedi and Lord (2001) emphasized that language proficiency plays a crucial role in mathematical understanding, as learners often misinterpret problems when they cannot fully comprehend the text. Clement (2017) also asserted that poor comprehension at this stage hinders students from forming an accurate mental picture of the problem, which is essential for effective problem-solving. Therefore, both linguistic and cognitive challenges appear to contribute to the learners' poor performance in problem analysis, as these difficulties limit their ability to extract relevant information from mathematical problems.

In Mathematical Representation, learners again showed a low level of proficiency, revealing that they struggled to translate word problems into suitable equations or mathematical expressions. This finding supported Verschaffel, Greer, and De Corte (2000), who observed that many learners find it difficult to connect real-world situations with corresponding mathematical symbols and representations. Furthermore, Kariuki and Peterson (2020) noted that students who lack conceptual understanding of mathematical operations often encounter challenges in converting verbal problems into mathematical form. Polya's (1957) stated that Problem-Solving Theory, expressing a problem through an equation or model is a critical step following comprehension; failure at this stage may hinder learners from arriving at a correct solution. Hence, the learners' poor performance in mathematical representation highlights the need for guided practice, visual modeling, and strengthened conceptual understanding to improve their ability to represent problems mathematically.

Regarding Operation Selection, learners also performed at a low proficiency level, suggesting that many struggled to identify and carry out the appropriate operation that corresponds to the requirements of the problem. This finding is consistent with Alonzo (2019), who discovered that students frequently apply incorrect operations because of misconceptions about the relationships between quantities in a problem. Montague (2017) further explained that students with limited metacognitive strategies often perform mathematical operations mechanically without assessing whether their chosen procedure is suitable for the given situation. Therefore, the learners' weak performance in this area may stem from insufficient reasoning skills and a lack of exposure to varied problem types that require analytical and critical thinking.

Overall, the learners' low proficiency across the three indicators confirms that they have not yet developed mastery of the fundamental skills necessary for solving mathematical word problems. This conclusion is supported by the Organization for Economic Co-operation and Development (OECD, 2019), which reported that deficits in conceptual knowledge and reasoning lead to low problem-solving proficiency among students globally. The findings are also in line with Cognitive Load Theory (Sweller, 1988), which posits that learners may struggle to process multiple pieces of information simultaneously, particularly when tasks demand reading comprehension, symbolic translation, and computation.

These findings underscore the need for targeted instructional interventions to strengthen students' analytical and representational abilities. Guided by Polya's (1957) and Vygotsky's (1978) theories of scaffolding, teachers should incorporate instructional strategies such as contextualized examples, visual aids, and step-by-step guided problem-solving to enhance learners' understanding. Additionally, Abedi and Lord (2001) suggested that integrating reading comprehension activities into mathematics instruction can improve learners' ability to interpret and solve word problems. By addressing these skill gaps, learners can gradually develop the linguistic, cognitive, and reasoning abilities necessary for improved mathematical problem-solving performance.

- *How the Reading Comprehension Skills Influence the Key Stage 2 Learners' Performance in Solving Mathematical Word Problems*

The third objective of this study was to investigate how reading comprehension affects the performance of Key Stage 2 learners in solving mathematical word problems. The results revealed a positive relationship between reading comprehension and problem-solving performance, suggesting that learners with stronger reading comprehension skills are more likely to succeed in word-problem tasks. This relationship highlights the critical role of literacy in mathematics: learners must not only understand numerical

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operations but also interpret the language, context, and structure of problem statements to solve them accurately.

Teachers' observations support these findings, noting that learners who can decode text, identify key information, and infer relationships are better able to determine the appropriate mathematical operations and arrive at correct solutions. Conversely, learners who struggle with comprehension often misinterpret problem statements, overlook essential details, and apply inappropriate operations, resulting in incomplete or incorrect answers. This aligns with research by Villegas and Santos (2020) and Nicolas and Cruz (2022), who emphasized that reading comprehension is a strong predictor of success in mathematical problem-solving. Their studies found that students who could understand implicit cues, recognize relevant information, and connect contextual details were more likely to perform well in word problems, whereas poor comprehension often led to errors in representation and computation.

Further support comes from Bernardo (2019) and De Dios (2021), who highlighted that the ability to decode and comprehend mathematical language including numerical relationships, comparative expressions, and problem contexts is essential for effective problem-solving. Their findings indicate that mathematical problem-solving encompasses not only computation but also the evaluation of language and contextual understanding, which underscores the cognitive demands involved in translating textual information into mathematical reasoning. The present study corroborates these conclusions, confirming that learners' performance in word problems depends on both linguistic comprehension and numerical reasoning.

The observed association between reading comprehension and mathematical problem-solving also illustrates the interdependence of literacy and numeracy, which is a foundational principle of the Revised K-12 Curriculum. Integrated literacy-numeracy approaches emphasize that learners develop stronger mathematical reasoning skills when reading and comprehension abilities are simultaneously nurtured. By understanding what they read more effectively, learners can more accurately evaluate, analyze, and solve complex mathematical problems. This observation further validates the Proposed Integrated Literacy and Numeracy Intervention Plan, which seeks to bridge the gap between understanding language and applying numerical reasoning in problem-solving contexts.

Pedagogically, the findings suggest that teachers should adopt integrated instructional strategies that simultaneously foster literacy and numeracy skills. Contextualized reading activities can help learners recognize mathematical concepts within real-life narratives, while guided problem analysis encourages them to identify key information, organize their reasoning, and map textual content to mathematical operations. Real-life math books, story problems, and collaborative problem-solving tasks can further enhance learners' ability to synthesize textual and numerical information. Studies by Supontawanit and Lertlit (2021) and Valenzuela et al. (2024) indicate that such integrated approaches lead to improved performance in both reading comprehension and mathematical problem-solving, providing empirical support for the intervention strategies recommended by this study.

Moreover, developing reading comprehension skills in tandem with mathematical reasoning encourages critical thinking and analytical skills beyond mathematics. Learners trained to carefully read, interpret, and analyze textual information are better equipped to tackle complex problem-solving tasks in multiple subjects, promoting holistic cognitive development. Cognitive Load Theory (Sweller, 1988) said that scaffolding learners' reading and reasoning processes reduces the cognitive burden when translating word problems into mathematical representations, making problem-solving more manageable and effective. Similarly, Vygotsky's (1978) showed that social constructivist framework supports the use of guided interactions and collaborative learning to enhance comprehension and reasoning abilities.

In conclusion, the study's findings underscore that reading comprehension is not merely an auxiliary skill for mathematics; it is a core determinant of learners' success in solving word problems. Instructional interventions that integrate literacy and numeracy through contextualized reading, guided analysis, and real-life problem-solving can enhance learners' ability to understand, evaluate, and solve mathematical problems, ultimately fostering stronger critical thinking, analytical reasoning, and academic achievement.

- *Reading Comprehension Challenges Faced by the Key Stage 2 Learners in Solving Mathematical Word Problems*

Table 3 highlights the multiple reading comprehension challenges faced by Key Stage 2 learners when solving mathematical word problems. These challenges ranging from limited vocabulary, difficulties with complex sentences, and issues in representing problems mathematically, to learner passivity, guessing, and struggles with identifying relevant information are deeply interconnected and corroborated by recent research.

- *Limited or Poor Vocabulary and Struggles with Complex Sentences*

One of the most prominent obstacles is learners limited or poor vocabulary, alongside their struggle to decode long or complex sentences. This aligns with the findings of O'Reilly and Sabatini (2019), who emphasized that vocabulary knowledge is a strong predictor of students' ability to comprehend mathematical texts. Similarly, research by Wilkinson et al. (2020) showed that students who lack command of academic language often fail to grasp key components of word problems, leading to misunderstandings of mathematical tasks.

- *Representing Problems Mathematically*

The difficulty learners face in translating verbal problems into mathematical expressions is well-documented. Verschaffel, Van Dooren, and Star (2020) said that the

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process of re-representing a text problem into mathematical symbols requires both linguistic and procedural knowledge. Learners who struggle to bridge this gap often misinterpret the problem or overlook essential operations. The interplay between reading comprehension and mathematical reasoning was also highlighted by Salas, Van Den Broeck, and Swanson (2022), who found that interventions focusing on both reading and math skills improved students' performance more than math-only approaches.

- *Learner Passivity and Guessing*

The passivity observed among some learners where students are reluctant to engage with or persist on word problems is another significant barrier. Research by Montague, Enders, and Dietz (2018) points out that metacognitive strategies, such as self-questioning and active engagement, are crucial for successful problem-solving. Students who lack these strategies may resort to guessing, as also noted by Shin and Bryant (2017), who found that learners often guess answers when they cannot decode the problem, leading to systematic errors.

- *Identifying Relevant Information*

Finally, the difficulty in identifying relevant information from a word problem is a recurring theme in the literature. According to a study by Vilenius-Tuohimaa, Aunola, and Nurmi (2018), the ability to filter out irrelevant information and focus on the mathematical core is a skill that differentiates proficient problem solvers from struggling ones. This skill is closely linked to both reading comprehension and executive functioning, as learners must hold information in working memory while making judgments about its relevance.

The findings from Table 3 and the reviewed literature underscore the intertwined nature of linguistic and cognitive factors in mathematical problem-solving. As highlighted by Fuchs et al. (2016), interventions targeting both vocabulary development and reading comprehension strategies hold promise for improving students' abilities to solve word problems. Teachers are encouraged to scaffold vocabulary, break down complex sentences, model the translation process from words to equations, and explicitly teach strategies for identifying key information.

In summary, the challenges outlined in Table 3 are consistent with current research, which emphasizes the critical role of language and reading comprehension in mathematical problem-solving. Addressing these interconnected factors through targeted instructional strategies is essential to support Key Stage 2 learners in overcoming obstacles in mathematical word problems.

➢ *Proposed Integrated Literacy and Numeracy Intervention Plan to Enhance Key Stage 2 Learners' Performance in Mathematical Word Problem Solving*

The fifth goal of this study was to come up with a Proposed Integrated Literacy and Numeracy Intervention Plan that addresses the problems that were found and tries to help learners do better at solving math word problems. The intervention strategy is based on the idea that literacy and numeracy are abilities that depend on each other and should be taught at the same time to encourage meaningful learning and higher-order thinking.

The suggested plan uses contextualized, learner-centered, and activity-based methods to improve both reading comprehension and problem-solving skills. It is built on three main parts: Literacy Development is a program that helps students improve their reading, understanding, and interpretation of problem statements through activities including guided reading, vocabulary building, and text analysis. Numeracy Enhancement, which incorporates planned exercises that assist learners translate words into mathematical representations, pick relevant operations, and apply problem-solving strategies using Polya's four-step approach (understand, plan, solve, and check).

Integration and Application, where learners do real-world tasks, story-based challenges, and group activities that demand them to understand and use math, which helps them understand things better and use what they learn in real life. The strategy also puts a lot of emphasis on strengthening teachers' skills through professional development sessions on how to combine literacy and math instruction, use teaching materials that are relevant to the learners' lives, and employ diverse tactics for students who are having trouble. Also, assessment for learning is used to keep track of students' development and change the way they are taught as needed.

This proposed solution is in line with the Revised K-10 Curriculum's goal of helping Filipino learners become more functional in reading and math. It attempts to increase not only grades but also skills that are important for lifetime learning, such as critical thinking, problem-solving, and communication. The Integrated Literacy and Numeracy Intervention Plan is a direct response to the study's findings. It connects reading comprehension with numerical thinking. The approach aims to create learners who can think logically, read with understanding, and solve problems with confidence and accuracy by combining language and math study.

V. CONCLUSION AND RECOMMENDATIONS

Based on the findings the researcher drew the following conclusions: Learners showed average reading comprehension, performing better on literal tasks but struggling with inferential and evaluative skills necessary for critical understanding of word problems.; Key Stage 2 learners exhibit low proficiency in analyzing problems, translating verbal statements into mathematical expression, and selecting correct operation indicating challenges beyond computation.; Reading comprehension influences problem-solving accuracy, correct interpretation and application of operation.; Learners face difficulties such as limited vocabulary, complex sentence structure, poor problem representation and low engagement reflecting intertwined linguistic and cognitive challenges.; An integrated literacy and numeracy intervention plan combining contextual reading activities, guided problem analysis, visual modeling, and scaffolded exercises.

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Based on the results and conclusions, some suggestions are made: (1) Imbed reading strategies in math lessons focusing on keyword identification, summarization and contextual understanding to strengthen higher order comprehension. (2) Provide structured progressive practice in analyzing and solving word problems to build problem representation and operational accuracy. (3) Enhance vocabulary and teach methods for breaking down complex sentences and translating texts into mathematical expressions to reduce misinterpretation. (4) Implement literacy and numeracy approaches using real-life examples, visual aids, and scaffolded exercises to address linguistic and cognitive challenges. (5) Design teacher training on combining literacy and numeracy instruction and use formative assessment to monitor progress and refine strategies.

REFERENCES

[1]. Abad, M., & Torres, J. (2021). *Parent involvement and mathematics performance among elementary learners.* Philippine Journal of Educational Studies, 15(2), 55–68.

[2]. Abedi, J., & Lord, C. (2001). The language factor in mathematics tests. *Applied Measurement in Education, 14*(3), 219–234.

[3]. Alonzo, R. (2019). *Mathematica l problem-solving performance of intermediate learners: Basis for intervention program.* Journal of Basic Education Studies, 10(1), 45–56.

[4]. Bandura, A. (2016). *Self-efficacy: The exercise of control*. W.H. Freeman and Company.

[5]. Barmby, P., & Bolden, D. (2017). Understanding learners' difficulties with multi-step word problems. *Journal of Modern Education, 6*(2), 35–41.

[6]. Best, J. W., & Kahn, J. V. (2018). *Research in education* (12th ed.). Pearson Education.

[7]. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

[8]. Castillo, J. (2021). Problem-solving performance of Grade 6 learners in Laguna. *Basic Education Research Journal, 8*(1), 45–52.

[9]. Clement, J. (2017). *Creative model construction in scientists and students: The role ofimagery, analogy, and mental simulation.* Springer.

[10]. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

[11]. Cruz, M., & Mendoza, J. (2020). Reading difficulties and math problem-solving of Filipino learners. *Mindanao Journal of Education, 13*(1), 98–105.

[12]. Dela Cruz, L. (2017). The effect of mother tongue-based instruction on word problem-solving skills of elementary pupils. *Asia Pacific Journal of Multidisciplinary Research, 5*(4), 66 73.

[13]. Dizon, J., & Francisco, M. (2020). Enhancing numeracy skills through educational apps. *Philippine Mathematics Review, 13*(2), 33–48.

[14]. Domingo, M., & Fabros, R. (2018). Reading comprehension as a factor in problem-solving performance. *Journal of Educational Research and Innovation, 7*(1), 15–26.

[15]. Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1–4.

[16]. Fan, W., & Williams, C. M. (2010). The effects of parental involvement on students' academic self-efficacy, engagement, and intrinsic motivation. *Educational Psychology Review, 27*(2), 261–271.

[17]. Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill Education.

[18]. Fuchs, L. S., Fuchs, D., & Compton, D. L. (2016). Intervention effects for students with comorbid forms of learning disability: Understanding the needs of nonresponders. Journal of Learning Disabilities, 49(6), 648-654.Giofrè, D., Donolato, E., & Caviola, S. (2022). Working memory and mathematical problem-solving in primary school students. *Journal of Cognitive Psychology, 34*(2), 170–184.

[19]. Hijada Jr., M. V., & Dela Cruz, M. L. (2022). *The gap between comprehension level and problem-solving skills in learning mathematics.* Universal Journal of Educational Research, 1(1), 35-43.

[20]. Jones, R., Smith, A., & Thomas, L. (2019). Enhancing mathematical reasoning through technology. *International Journal of Mathematics Education, 15*(3), 101–116.

[21]. Kariuki, S., & Peterson, J. (2020). Conceptual understanding and learners' performance in mathematical word problems. *International Journal of Educational Research and Innovation, 13*, 90–104.

[22]. Lazo, M. (2019). Math anxiety and its impact on the academic performance of Grade 5 pupils. *The Educator's Voice, 12*(1), 61–73.

[23]. Lin, C., & Lin, Y. (2018). Effects of instructional clarity on students' mathematical understanding. *International Journal of Instruction, 11*(4), 221–234.

[24]. Miller, D., & Calfee, R. (2020). Reading comprehension and problem-solving in elementary mathematics: A cognitive perspective. *Journal of Educational Psychology, 112*(3), 411–425.

[25]. Montague, M., Enders, C., & Dietz, S. (2018). The effects of cognitive strategy instruction on math problem solving of middle-school students of varying ability. Journal of Educational Psychology, 110(3), 413-428.

[26]. Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2019). *TIMSS 2019 International Results in Mathematics and Science.* TIMSS & PIRLS International Study Center.

[27]. Noor, N. M., & Ahmad, A. R. (2020). Understanding Malaysian pupils' difficulties in contextual math word problems. *Indonesian Journal of Mathematics Education, 9*(2), 134–140.

[28]. Noriega, L. B., Mendoza, A. G., & Cadag, C. (2024). *Enhancing the word problem-solving skills through strengthening reading comprehension skills of Grade 11 learners: An action research study.* International Journal of Latest Technology in

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan444

Engineering Management & Applied Science, 13(7), 208-211.

[29]. O'Reilly, T., & Sabatini, J. (2019). Reading for understanding: How reading apprenticeship improves disciplinary learning in secondary and college classrooms. Reading Research Quarterly, 54(1), 49-71.

[30]. Organisation for Economic Co-operation and Development (OECD). (2019). *PISA 2018 results (Volume I): What students know and can do.* OECD Publishing.

[31]. Pfannenstiel, K. H., Schumaker, R., & Lang, M. (2015). Using worked examples in problem solving: A cognitive strategy instruction model. *Learning Disabilities Research & Practice, 35*(2), 103–113.

[32]. Philippine Department of Education (DepEd). (2023). *MATATAG K to 10 Mathematics Curriculum Guide.* Department of Education.

[33]. Polya, G. (1957). *How to solve it: A new aspect of mathematical method* (2nd ed.). Princeton University Press.

[34]. Prasetyo, R., & Susanto, H. (2021). Cultural influences on students' performance in solving mathematical word problems. *International Journal of Educational Research, 81*, 128–138.

[35]. Reyes, J., Tan, M., & Daguio, C. (2020). Comparative analysis of learners' performance in drills and application-based problem-solving. *Mindanao Education Journal, 3*(1), 55–64.

[36]. Salas, N., Van Den Broeck, L., & Swanson, H. L. (2022). The effects of reading comprehension and math word-problem interventions. Learning and Instruction, 77, 101520.

[37]. Santos, G. (2018). Challenges in reading comprehension and math problem-solving among intermediate learners in Cavite. *Journal of Educational Studies and Research, 14*(1), 61–73.

[38]. Santos, R. E., & Dela Cruz, P. J. (2020). Reading comprehension and its impact on solving mathematical word problems. *Philippine Journal of Math Education, 14*(2), 112–120.

[39]. Shin, N., & Bryant, D. P. (2017). A synthesis of mathematical and cognitive performances of students with mathematics learning disabilities. Learning Disabilities Research & Practice, 32(4), 245-255.

[40]. Supontawanit, P., & Lertlit, S. (2021). *Usage of reading comprehension to enhance word problem solving skills in mathematics.* JEES (Journal of English Educators Society), 6(2), 260-266.https://doi.org/10.21070/jees.v6i2.1380

[41]. Valenzuela, M. E., Mollasgo, H. J., Corcolon, G. C., Junio, J., Estrella, R. L. S., & Zotomayor, J. J. P. (2024). *Students' skills in mathematical word problems and their reading comprehension level: Basis for intervention program.* International Journal of Science and Research Archive, 11(2), 1189-1197.

[42]. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*(2), 257–285.

[43]. Torres, G., & Evangelista, M. (2020). Self-efficacy and mathematical performance of elementary learners. *Philippine Journal of Basic Education Research, 10*(2), 130.

[44]. Turner, J. E., & Thomas, G. (2021). Integrating literacy and numeracy skills in the elementary classroom. *International Journal of Instruction, 11*(4), 221–234.

[45]. Van Garderen, D., Scheuermann, A. M., & Jackson, C. (2020). Reading comprehension in math problem solving: A cognitive perspective. *Psychology, 30*(1), 53–74.

[46]. Verschaffel, L., Van Dooren, W., & Star, J. R. (2020). Word problem solving: A review of research and a look ahead. ZDM Mathematics Education, 52(1), 1-12.

[47]. Vilenius-Tuohimaa, P. M., Aunola, K., & Nurmi, J. E. (2018). The association between mathematical word problems and reading comprehension. Educational Psychology, 38(2), 234-247.

[48]. Villanueva, D. (2016). Enhancing math problem-solving through visual strategies. *Philippine Normal University Education Journal, 7*(3), 75–84.

[49]. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

[50]. Wang, Z., Lukowski, S. L., Hart, S. A., & Mulligan, K. (2017). The role of math anxiety in children's problem-solving. *Journal of Educational Psychology, 109*(4), 527–540.

[51]. Widia Nur Jannah, T. Herman, M. Agustin, & Vismaia S. Damaianti. (2023). *Literacy of mathematical story problems on problem-solving skills of elementary school students.* Jurnal Cakrawala Pendas, 11(1). https://doi.org/10.31949/jcp.v11i1.12426

[52]. Wilkinson, I. A. G., Kim, M.-Y., & Acevedo, C. (2020). Academic language in mathematics: Exploring the role of language in learning mathematics. Mathematics Education Research Journal, 32(4), 587-601.

[53]. Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE