International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Mathematics Vocabulary and Problem-Solving Skills Of Grade 4 Pupils in Narvacan North District

Desiree M. Cabotage

Graduate School, Ilocos Sur Polytechnic State College, Santa Maria, Ilocos Sur, Philippines

ABSTRACT:
This study assessed the levels of mathematics vocabulary and problem-solving skills among Grade IV learners in public elementary schools in Narvacan North District. The primary aim is to assess how well students understand and use mathematical terminology and their ability to apply this knowledge to solve mathematical problems. The research involved a sample of 366 Grade IV students, utilizing validated tests and problem-solving assessments to gather the needed data.
Results indicate that moderate grasp of mathematical terms, there is notable variability and room for improvement. Furthermore, parents' educational attainment and learners' vocabulary levels are significantly related implying that higher parental education is modestly associated with better vocabulary outcomes. In terms of problem-solving skills, the findings show that learners also demonstrate moderate proficiency. Importantly, the analysis reveals that demographic factors such as age, and gender, and significantly related to problem-solving abilities, indicating that these skills are influenced more by other factors.
The study concludes that enhancing instructional strategies and providing targeted support can significantly improve both vocabulary and problem-solving skills. Engaging parents in their children's education and offering additional resources can further bolster these efforts. Future research should explore other influential factors and effective interventions to support the mathematical development of Grade IV learners, thereby laying a stronger foundation for their continued academic success.

Keywords: Mathematics vocabulary, problem-solving, Polya

INTRODUCTION

Two essential components of mathematical competence are problem-solving strategies and mathematical vocabulary. As students progress from basic arithmetic to more complex mathematical concepts and applications, the ability to understand and use mathematical language becomes increasingly crucial. Comparably, problem-solving skills let students apply their mathematical knowledge in a range of contexts, fostering the development of analytical, critical thinking, and reasoning skills that are essential for success in math and other courses. For fourth-graders to be proficient in mathematics and achieve academic success, they need to have a solid foundation in the language and methods of problem-solving. By assisting students in gaining a solid understanding of mathematical vocabulary and developing strong problem-solving skills, teachers can help them thrive in mathematics as well as in an increasingly complex and linked world.

Material and context of mathematics, Compared to younger pupils, older students are exposed to a greater variety of mathematical material and settings. Research is required to determine how students' success in various mathematical contexts, such as algebra, geometry, and calculus, is impacted by their mathematical vocabulary abilities, and how these skills contribute to students' overall performance in these areas.

In terms of mathematical reasoning and problem-solving abilities, older students are supposed to exhibit more sophisticated abilities than younger ones. To find out how students' mathematical vocabulary affects their capacity for mathematical reasoning and problem-solving in complicated mathematical contexts, more research is required.

Considering the possible challenge of learning mathematics vocabulary in upper elementary grades. Powell and Nelson (2017) demonstrated that first graders' performance on mathematics vocabulary tasks varied as the time (e.g., kindergarten, first grade, second W much worse performance on mathematical vocabulary taught in later grades when it was first introduced. Furthermore, the mathematics vocabulary introduced in later grades is far less used in everyday language (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010) than the vocabulary introduced in early grades, which is relatively more accessible in daily language use of mathematics (Powell & Nelson, 2017). All of these results point to the possibility that language related to mathematics may get more difficult as students advance in their education, which could make it more difficult for older students to learn and use this vocabulary when working on mathematical problems. On the other hand, Powell et al. (2017) contended that older pupils may have a deeper vocabulary in mathematics due to more schooling than younger students. As a result, older pupils may rely more on mathematics vocabulary (i.e., mathematics language) rather than general language when doing mathematical tasks, indicating the significance of mathematics vocabulary for mathematical achievement in upper primary grades. In the fourth grade, mathematics is more than just numbers and calculations; it's a tool for comprehending relationships, structures, and patterns that are necessary to address challenging real-world issues. There is a connection across all topics and endeavors. Additionally, students are taught high school math in a way that can support the development of their critical thinking and problem-solving abilities as well as their technological, collaboration, and communication abilities—all of which are essential 21st century skills. It's critical to understand the factors influencing students' performance in order to assist them in developing their problem-solving skills. This study's primary goal was to identify the variables that affect Grade 4 pupils' ability to solve problems. Similar to language, mathematics is the foundation of communication. Both daily living and advanced research in the fields of science and technology require it. In general, understanding mathematics aids in one's ability to comprehend and analyze every significant quantitative facet of both natural and living events. Acknowledging that mathematics is essential for human.

Mathematical literacy is highly valued in Asia, where students are encouraged to pursue the field (Leatham & Peterson, 2010; Ronis, 2008). According to this theory, the majority of Asian nations have considerably more rigorous guidance procedures regarding their children's mathematical accomplishments (Wei & Dzeng, 2014). Etcuban and Pantinople (2018) have demonstrated that there was a pleasing shift in the way that learning was conducted. According to the K–12 Basic Education Curriculum, mathematics is taught as a general education subject in primary and higher education in the Philippines. Students are expected to gain an appreciation of and understanding of the subject's principles as they apply them to problem-solving, critical thinking, communication, reasoning, making

connections, representations, and decisions in real life by using appropriate technology. Blömeke and Delaney (2014) state that it isThe research will be guided by the Path-smoothing model designed by Alan (2008). The model stresses the essential methodology of making a smooth path for the learner to learn Mathematics. In this model the teacher should state the kind of problem of a learner in a classroom. Furthermore, when instructing, the instructor ought to make an effort to group the material into a small number of categories and deliver each one individually. This paradigm implicitly assumes that students will recognize and identify with the nature of the problem being posed when it is explained to them. Creating safe routes for children with vision impairments is the main tenet of this concept. As a result, it is significant since models offer methods for resolving issues in the shortest amount of time feasible, and frequently, just one strategy is given careful consideration. The approach also emphasizes that students must work on exercises to put the strategies they are taught—which are meant to include students—into practice. Teachers typically classify and assess these approaches based on their level of difficulty. According to the model, recurrent exposure to the same or related material is how longer-term failure is addressed within the course. The model consists of the following elements: visually impaired students, teaching resources and methods for teaching mathematics, lecturer attitudes, and visually impaired students' academic success.

According to Kaushar (2013), a number of factors, including greater competition, pressure from extracurricular activities, and the availability of technology that offers rapid gratification, are causing most students to spend less time studying mathematics these days. This pattern is alarming since it could have a detrimental effect on kids' long-term progress in arithmetic as well as their mathematical achievement. Teachers should think about implementing the following tactics to deal with this issue:

Promoting autonomous learning: Teachers can give students access to online tutorials, practice questions, and interactive math games, among other tools and chances for independent study. Even if students are unable or unable to devote as much time to typical classroom settings, this can still help them get a deeper knowledge of mathematical concepts and principles.

Stressing conceptual knowledge: Rather than only instructing pupils in mathematical methods, teachers might concentrate on helping them build a conceptual understanding of mathematical topics. This can make mathematics more interesting and meaningful for pupils by demonstrating the relevance and application of mathematical ideas in practical settings.

Encouraging teamwork and communication: Teachers can motivate students to collaborate with one another and effectively convey their mathematical concepts. Even if they are unable or unable to devote as much time to typical classroom settings, this can still help students improve their mathematical language abilities and learn from their classmates. A significant percentage of them don't follow any calendar and are unaware of the bosses' idea's timeline. However, contemplative tendencies seem to be a significant factor in determining academic performance (Cerna & Pavliushchenko, 2015).

Findings by Bashir and Mattoo (2012) revealed an extremely important relationship between several aspects of study habits and academic performance. The findings of the Khurshid et al. (2012) investigation proved that there was a clear relationship between study habits and academic success. On the other hand, because it affects the amount of effort students put into comprehending and applying mathematical concepts and skills, study attitude can decide how much and to what extent learning occurs. A low level of achievement in mathematics may result from students having bad study habits. Students' academic performance is significantly correlated with their orientation level (Bong, 2004; Horstmanshof & Zimitat, 2007).

Mutai (2011) states that a pupil is likely to accomplish well if, regardless of gender, they have a strong report introduction. On the other hand, an understudy is likely to perform poorly if their report introduction is unfavorable. Based on this premise, the study intends to compare data regarding the study orientations of students enrolled in mathematics programs and examine the relationship between each group's study orientation and academic achievement. Knowing these will make it easier to build research-based study techniques and, in turn, help students adopt the proper study habits.

Hungary-born American mathematician George Polya (1887–1985) made significant contributions to number theory, combinations, and complex analysis, among other mathematical fields. However, what has made him most famous are his contributions to heuristics—methods or techniques to solve problems more successfully—and mathematical problem-solving. Most of Polya's work on problem-solving methods is contained in the four volume book series "How to Solve It," which was written by Polya and published between 1945 and 1973. In this paper, he introduced the Polya's Theory of Problem Solving, a set of rules and strategies to help people approach and solve mathematical problems methodically.Polya was a Hungarian mathematician and professor who made significant contributions to mathematics and mathematics education. One of his most famous works is a four-step problem-solving method, known as Polya's Four-Step Method, which is widely used in mathematics education to help students solve mathematical problems.

In the context of Polya's problem-solving process, the theoretical framework refers to the overarching principles and strategies that guide problem-solving. George Polya, a Hungarian mathematician, outlined a four-step process for solving mathematical problems in his book "How to Solve It: A New Aspect of Mathematical Method" published in 1945.

The theoretical framework in Polya's problem-solving process consists of the following four steps:

Understanding the problem: This phase entails carefully reading the problem, figuring out what the unknowns are, and comprehending the limitations or restrictions the problem specifies. It also entails figuring out what the problem is asking and locating any pertinent information.

Creating a plan: This stage entails creating a strategy or plan to address the issue. This could entail organizing information and determining potential avenues to resolution through the use of a systematic approach, a list, a table, or the drafting of a diagram.

Putting the plan into action: The plan or strategy developed in step 2 must be put into action in this stage. To solve the problem, this could entail running computations, drawing logical conclusions, or experimenting with various strategies.

Looking back: This step entails evaluating how the problem was solved, looking for mistakes, and confirming that the answer was accurate. It also entails assessing the efficacy of the employed problem-solving methodology and taking into account alternate approaches to solving the problem.

All things considered, Polya's approach to problem-solving offers a methodical and disciplined way to tackle mathematical issues.

LITERATURE REVIEW

Given the fundamental importance that mathematics vocabulary and problem-solving abilities play in students' general academic development and future success in more advanced mathematics, studying these skills in Grade IV pupils is an important field of educational research. It is crucial to comprehend how language in mathematics and problem-solving skills interact when creating curriculum and teaching methods that would improve students' mathematical competency.

Filipino students perform exceptionally well in subjects that require higher-order thinking skills, while they struggle miserably in those that do not (Dinglasan & Patena, 2013; Ganal & Guiab, 2014). The difficulties in learning and mastering mathematics are not limited to college students (Americans, 2009; Presmeg, 2006). Numerous factors influence how well students succeed in mathematics as measured by their grades. This study will mainly address affective features of students, specifically their study habits and study attitudes, which Biswas (2015) refers to as study orientations, among other things. Gaining control over time management and developing good study habits are two of the biggest issues facing college students.

The total impact of language education on math problem-solving abilities across multiple grade levels, including Grade 4, is examined by Chen & Liu (2019). The research integrates results from several experimental and quasi-experimental investigations to offer valuable perspectives on the efficacy of diverse vocabulary instruction approaches and their influence on students' problem-solving abilities.

Furthermore, Lee and Kim (2017) investigated the connection between problem-solving performance and mathematical vocabulary knowledge. Through longitudinal monitoring of students' vocabulary expansion and problem-solving skills, the researchers investigate how vocabulary acquisition changes impact students' capacity to solve more complicated mathematical problems.

Lastly, Smith & Johnson (2019) examined how incorporating technology can improve students' language acquisition and problem-solving abilities in mathematics. It was discovered that the application of technology-based treatments had a major impact on elementary pupils' improvement of their problem-solving skills and their acquisition of mathematical vocabulary. Thus, in order to enhance students' comprehension of important mathematical ideas and vocabulary phrases, the researchers create and execute interactive digital learning activities. They then evaluate the effects of these interventions on students' ability to solve problems.

Mathematics Vocabulary. To read math textbooks, comprehend communications between teachers and students, and solve problems on arithmetic tests, students must become proficient in the academic language of arithmetic. Vocabulary is a crucial component of academic language. The numbers and symbols employed in computations give mathematics the appearance of being a universal language, but Cavanagh (2005) clarified that mathematics is not a universal language because it requires reading and language understanding. Schleppegrell (2010) asserts that academic language in mathematics should be taught with the same emphasis as academic language in other subject areas. According to Ernst-Slavit and Mason (2011), Moschkovich (2015), Yore et al. (2007), oral and written exposure, oral production, written output within the subject area (e.g., mathematics), and written exposure are all necessary for becoming proficient in academic language. Schleppegrell (2012) pointed out that many educators are unaware of the academic language proficiency or classroom language use of their students. Many educators overlook the mathematical language when instructing students in mathematics (Riccomini, Smith, Hughes, & Fries, 2015). It is not unexpected that many students find the academic language of mathematics difficult to understand, since it not only introduces new vocabulary but also repurposes many existing terms to have a mathematical meaning (Bay-Williams and Livers, 2009, Schleppegrell, 2007).

Problem- Solving. It has long been believed that solving mathematical puzzles is an essential part of learning mathematics, including both instruction and acquisition. Its worldwide mathematics curriculum is jam-packed with assignments that call for problem-solving skills training and the application of problem-solving techniques in math education. Solving mathematical puzzles is essential, and students

in years K–12 ought to be heavily emphasized in it. It is possible, nevertheless, that math teachers are not always aware of the best strategies to include problem solving into the curriculum. The term "problem solving" refers to mathematical tasks that may present intellectual challenges to enhance students' mathematical understanding and competency. Mathematical problem-solving is one of the primary goals of mathematics education, as it is essential to preparing students to live and work in the modern world (Gravemeijer et al., 2017).

Mathematics Vocabulary and Problem Solving. The degree of learners' ability to solve problems and their vocabulary in mathematics are significantly correlated. There are several ways to observe this relationship. Understanding, Students who have a larger vocabulary in mathematics are better able to understand difficulties. They are able to comprehend the situation, pinpoint important ideas, and establish connections between the various components of the issue. Communication, learners who have a strong vocabulary in mathematics are better able to articulate their ideas both orally and in writing. They may discuss issues, ask questions, and get feedback thanks to this straightforward communication, which improves their ability to solve challenges. Formulation of issues, Learners who possess a greater vocabulary in mathematics are able to formulate issues precisely. They are able to find the pertinent mathematical ideas and methods required to solve complicated issues by dissecting them into smaller, more manageable components. Reasoning and Logical Thinking, Students who have a solid vocabulary in mathematics are better able to analyze issues, spot patterns, and use the right techniques for solving them. They possess the critical thinking and logical reasoning abilities that are necessary for efficient problem-solving. Application of information, Learners are better able to apply their information when they have a greater vocabulary in mathematics. Their ability to discern when to apply particular mathematical ideas and methods is essential for problem-solving.

METHODOLOGY

This study involved the 366 Grade 4 mathematics learners in the public elementary school in Narvacan North District, Narvacan Ilocos Sur. The table below shows the distribution of respondents when grouped according to their sex.

Total enumeration was used to determine the sample size of the study. Three sets of instruments were used to gather the needed data in the study. Part I is an information sheet that the gathered the profile of the respondents in terms of sex, age, parent educational attainment and the time spent in studying mathematics. Part II is a 30-item multiple choice and a 5-item problem-solving researcher-made test. The instruments were content validated with a computed mean of 4.88 and pilot tested resulting to a reliability coefficient of 0.74. Hence, the instruments are deemed valid and reliable. Before the survey was administered, the researcher secured a letter from the Schools Division Superintendent of Ilocos Sur. After the approval, the researcher also requested permission from the Coordinating Principals of Narvacan North District Schools for the conduct of the study. After all the necessary letters and requests have been secured and approved, the researcher administered the survey-questionnaire among the respondents. To treat and analyze the data gathered, the following statistical tools were utilized:

These were utilized to describe the profile of the pupils-respondents as to their age, sex, highest educational attainment of their parents, and the amount of time they study in mathematics.

Were utilized to describe the level of performance of the respondents in mathematics vocabulary and problem-solving skills. This was utilized to look into the relationship between age, educational attainment of their parents, and the amount of time in studying mathematics to the level of performance

in mathematics in-terms of vocabulary and problem-solving skills. It was used to look into the relationship between the sex and the level of vocabulary and the level of problem-solving skills of the learners.

Table 1. Profile of the Respondents

Profile	Frequency	Percentage (%)
Age		
10 years old	92	25.14
11 years old	274	74.86
Total	366	100.00
Sex		
Male	186	50.82
Female	180	49.18
Total	366	100.00
Educational Attainment of Parents		
1 (elementary undergraduate)		
2 (Elementary graduate)	27	7.38
3 (high school undergraduate)	23	6.28
4 (high school graduate)	34	9.29
5 (college undergraduate)	103	28.14
6 (college graduate)	132	36.07
Total	47	12.84
	366	100.00
Time Spent		
50 minutes	366.0	100.00

In terms of age, 274 or 74.86% of the respondents are 11 years old, while 92 or 25.14% of the respondents are 10 years old. This implies that most Grade 4 learners are 11 years old. In the Philippines, Grade 4 learners are 10 to 11 years old. The findings support the research made by Susan, etal. (2010) that almost of the elementary learners are all normal ages to their grade level.

In terms of sex, 186 or 50.8% are male while 180 or 49.18% are female. It implies that there is an almost equal distribution of sexes among the respondents. This means that there are more females who give importance of education. Young males are more focused to earning money using their physical strength even at an early age. Moreover, Escalona (2015) Mubeen, Saeed and Arif (2013) said that there are more girls than boys in school.

In terms of educational attainment of parents, 132 or 36.07% of the respondents' parents are college undergraduates while 23 or 6.28% of the respondents' parents are elementary graduates. This implies that the respondents' parents can support the education of their children since most of them have achieved higher education.

A study by Fan & Chen (2020) found a positive association between parental involvement in children's math education and math achievement in grade 4 students. Parents who are more educated tend to be more actively involved in their children's education, providing them with better support and resources for learning math.

In addition, Davis-Kean (2005) agreed that the parental expectations for their children's educational attainment significantly influenced their children's math achievement in fourth grade. Parents with higher levels of education tend to have higher expectations for their children's academic success, which can motivate children to perform better in math.

In terms of time spent studying in mathematics at school, all respondents are studying 50 minutes since the allotted time for mathematics at school is 50 minutes. The class Program, Teacher's Schedule and summary of loads of teachers have to be referred first to the PSDS In-Charge for checking/ review to ensure that DepEd Order No. 31. s. 2012 is strictly observed particularly on timeslot for each learning area, as well as DepEd Memorandum No. 291, s. 2008 for the working hours of teacher.

RESULTS AND DISCUSSION

This study is conducted to determine the relationship between the level of motivation of the respondents and their job satisfaction.

Specifically, it aimed to answer the following questions:

Problem 1. The study aimed to assess the level of vocabulary and problem-solving skills of the Grade 4 Pupils in Narvacan North District during the Academic Year 2023-2024.

Specifically, it sought to answer the following:

1. What is the profile of the pupil-respondents in terms of:

a. Age;
b. Sex;
c. Highest Educational Attainment of Parents; and
d. Amount of time in Studying?

Profile	Frequency	Percentage (%)
Age		
10 years old	92	25.14
11 years old	274	74.86
Total	366	100.00
Sex		
Male	186	50.82
Female	180	49.18
Total	366	100.00
Educational Attainment of Parents		
1 (elementary undergraduate)	27	7.38
2 (Elementary graduate)	23	6.28
3 (high school undergraduate)	34	9.29
4 (high school graduate)	103	28.14
	132	36.07
	47	12.84

5 (college undergraduate) 6 (college graduate) Total	366	100.00
Time Spent 50 minutes	366.0	100.00

Table 2 presents the profile of the respondents in terms of age, sex, civil status, salary, highest educational attainment, length of service and number of trainings and seminars attended.

Age. In terms of age, 274 or 74.86% of the respondents are 11 years old, while 92 or 25.14% of the respondents are 10 years old. This implies that most Grade 4 learners are 11 years old. In the Philippines, Grade 4 learners are 10 to 11 years old. The findings support the research made by Susan, etal. (2010) that almost of the elementary learners are all normal ages to their grade level.

Sex. In terms of sex, 186 or 50.8% are male while 180 or 49.18% are female. It implies that there is an almost equal distribution of sexes among the respondents. This means that there are more females who give importance of education. Young males are more focused to earning money using their physical strength even at an early age. Moreover, Escalona (2015) Mubeen, Saeed and Arif (2013) said that there are more girls than boys in school.

Educational Attainment. In terms of educational attainment of parents, 132 or 36.07% of the respondents' parents are college undergraduates while 23 or 6.28% of the respondents' parents are elementary graduates. This implies that the respondents' parents can support the education of their children since most of them have achieved higher education.

A study by Fan & Chen (2020) found a positive association between parental involvement in children's math education and math achievement in grade 4 students. Parents who are more educated tend to be more actively involved in their children's education, providing them with better support and resources for learning math.

In addition, Davis-Kean (2005) agreed that the parental expectations for their children's educational attainment significantly influenced their children's math achievement in fourth grade. Parents with higher levels of education tend to have higher expectations for their children's academic success, which can motivate children to perform better in math.

Time to Spent. In terms of time spent studying in mathematics at school, all respondents are studying 50 minutes since the allotted time for mathematics at school is 50 minutes. The class Program, Teacher's Schedule and summary of loads of teachers have to be referred first to the PSDS In-Charge for checking/ review to ensure that DepEd Order No. 31. s. 2012 is strictly observed particularly on timeslot for each learning area, as well as DepEd Memorandum No. 291, s. 2008 for the working hours of teacher.

Problem 2. What is the level of vocabulary in Mathematics of Grade 4 learners in Narvacan North District?

Table 2. Level of Vocabulary of Grade 4 Learners

	Frequency	Percentage	Mean	SD	DR
25-30 (Very High)	0	0.00	18.24	2.947	Moderate
19-24 (High)	174	47.54			
13-18 (Moderate)	182	49.73			
7-12 (Fair)	10	2.73			
1-6 (Low)	0	0.00			
Total	366	100.00			

Table 2 indicates the level of vocabulary of Grade 4 learners. The table shows that 182 or 49.73% of the respondents have moderate levels of vocabulary skills in mathematics, while 10 or 2.73% of the respondents have fair levels of vocabulary skills in mathematics.

In general, the mean score of 18.24 indicates the average level of mathematics vocabulary among the learners. This figure suggests that, on average, the learners possess a moderate understanding of mathematical terms relevant to their grade level.

According to Núñez et al. (2016) focused on the relationship between vocabulary development and math learning in elementary students. The study found that vocabulary knowledge played a crucial role in students' mathematical reasoning and problem-solving abilities. Grade 4 learners who had a deeper understanding of math vocabulary showed greater improvement in math performance over time.

In addition to, Cirino et al. (2015) investigated the effects of vocabulary instruction on math performance in elementary students, including those in grade 4. The study found that explicit instruction in math vocabulary improved students' math achievement scores. Teaching math-specific vocabulary terms and concepts helped students better understand mathematical language and problem-solving strategies.

Problem 3. What is the level of problem-solving skills in Mathematics of Grade 4 learners in Narvacan North District?

Table 3. Level of Problem-Solving Skills of Grade 4 Learners

Indicators	High	Moderate	Low	Mean	SD	DR
1. Identification of the Problem	96 (26.2)	188 (51.4)	82 (22.4)	1.96	0.697	Moderate
2. Analysis of the Problem	126 (34.4)	186 (50.8)	54 (14.8)	1.80	0.674	Moderate
3. Generation of Possible Solutions	156 (42.6)	172 (47.0)	38 (10.4)	1.68	0.654	Moderate
4. Evaluation of Solution	180 (49.2)	164 (44.8)	22 (6.0)	1.57	0.605	Low
5. Selection of the Best Solution	180 (49.2)	172 (47.0)	14 (3.8)	1.55	0.570	Low
OVERALL						

Table 3 reveals the level of problem-solving skills of grade 4 learners. The table shows that 188 or 51.4% have moderate skills while 82 or 22.4% have low skills in identifying the problem. In analyzing the problem, 186 or 50.8% have moderate skills and 54 or 14.8% have low skills. In generating possible solutions, 172 or 47% have moderate skills while 38 or 10.4% have low skills. In evaluating the solution, 180 or 49.2% have high skills while 22 or 6% have low skills. Lastly, in selecting the best solution, 180 or 49.2% have high skills while 14 or 3.8% have low skills.

A study by De Corte et al. (2019) explored the development of problem-solving skills in elementary school students, including those in grade 4. The research emphasized the importance of early intervention and targeted instruction to enhance problem-solving abilities. Grade 4 learners who received explicit instruction in problem-solving strategies showed greater improvement in their ability to solve complex problems.

A Research by Beckmann et al. (2020) evaluated the effectiveness of intervention programs designed to improve problem-solving skills in elementary students. The study found that targeted interventions, such as problem-solving workshops and collaborative learning activities, were successful in enhancing problem-solving abilities among grade 4 learners. These programs provided students with opportunities to practice problem-solving strategies in real-world contexts.

Problem 4. Is there a significant relationship between the profile of the respondent and the level of mathematics vocabulary?

Table 4. Relationship Between Profile and Level of Vocabulary of Grade 4 Learners

Profile	Correlation Coefficient	p-value
Age	0.070	0.179
Sex	0.009	0.871
Highest Educational Attainment of Parents	0.112	0.032*
Time	a	a

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed).

The study reveals a statistically significant relationship between the highest educational attainment of parents and the level of mathematics vocabulary among Grade IV learners. The correlation coefficient (r) is 0.112, with a p-value of 0.032. This positive correlation suggests that as the educational level of parents increases, there is a slight tendency for the learners' vocabulary levels to improve.

The positive correlation implies the potential influence of parents' educational backgrounds on their children's mathematics vocabulary. Parents with higher educational attainment may be more equipped to provide academic support, resources, and an enriched learning environment that fosters vocabulary development. Schools could consider engaging parents through workshops or resources that equip them to support their children's learning effectively.

According to Santos, & Tavares, (2023) the relationship between the profile of Grade 4 learners and their level of mathematics vocabulary is on how the understanding how students' demographic characteristics, cognitive abilities, and educational experiences relate to their mathematical vocabulary knowledge is crucial for effective instruction and intervention strategies.

Santos and Tavares, investigated the relationship between various learner profiles, including factors such as socioeconomic status, language background, and academic achievement, and their level of mathematics vocabulary in Grade 4. The study utilized a mixed-methods approach, incorporating quantitative analysis of vocabulary assessments and qualitative data from interviews or observations.
Santos and Tavares found that learners from higher socioeconomic backgrounds tend to have larger mathematics vocabularies compared to those from lower socioeconomic backgrounds. Additionally, they observed that students with stronger language proficiency in the language of instruction typically demonstrate better mathematics vocabulary knowledge. Moreover, they noted that prior academic achievement, particularly in mathematics, was positively correlated with mathematics vocabulary proficiency.

Problem 5. Is there a significant relationship between the profile of the respondent and the level of problem-solving skills of the learners?

Table 5. Relationship Between Profile and Overall Problem-Solving Skills of Grade 4 Learners

Profile	Correlation Coefficient	p-value
Age	0.072	0.167
Sex	-0.010	0.854
Education	0.037	0.478
Time	a	A

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed).
Table 5 shows the relationship between the profile and problem-solving skills of grade 4 learners. Since none of the p-values are below 0.05, we can infer that these profile characteristics do not have a significant relationship on the problem-solving skills of Grade 4 learners. This suggests that other factors not listed in the table may be more influential in determining problem-solving abilities.
Kroesbergen, Van 't Noordende, & Kolkman, (2020), provides valuable insights into the relationship between grade 4 learners' profiles and their overall problem-solving skills in mathematics, highlighting the need for personalized instruction and intervention strategies to address students' specific strengths and weaknesses in mathematical competencies.

Problem 6. Is there a significant relationship between the level of mathematics vocabulary and the level of problem-solving skills of the learners?

Table 6. Relationship Between Level of Vocabulary and Problem-Solving Skills of Grade 4 Learners

Problem-Solving Indicators	Correlation Coefficient	p-value
1. Identification of the Problem	0.626**	0.000
2. Analysis of the Problem	0.636**	0.000
3. Generation of Possible Solutions	0.647**	0.000
4. Evaluation of Solution	0.595**	0.000

5. Selection of the Best Solution	0.547**	0.000
Overall	0.696**	0.000

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed).

It can be noted that the skills of learners in identifying the problem have a significant relationship with problem-solving skills as supported by the computed r=0.626 with a p-value of 0.000. This means that learners with a high level of vocabulary have higher skills in terms of identification of problems

The skills of the learners in analyzing of the problem have a significant relationship with problem-solving skills as supported by the computed r=0.636 with a p-value of 0.000. This means that the learner with a high level of vocabulary have a higher skill in terms of analyzing the problem.

The skills of the learner in generating a possible solution have a significant relationship with a problem-solving as supported by the computed r=0.647 with a p-value of 0.000. This means that the learner with high level of vocabulary have the higher skills in terms of generating the possible solution.

The skills of the learner in Evaluating the solution have a significant relationship with a problem-solving as supported by the computed r=0.595 with a p-value of 0.000. This means that the learner with a high level of vocabulary have the higher skills in terms of evaluating the solution.

The skills of the learner in selecting the best solution and answer have a significant relationship with a problem-solving as supported by the computed r=0.696 with a p-value of 0.000. This means that the learner with a high level of vocabulary have the higher skills in terms of selecting the best solution and answer. It further implies that a rich vocabulary enables students to comprehend problem statements more fully. They can decipher complex language, discern nuances, and extract essential information effectively. This clarity in understanding the problem is crucial for devising appropriate problem-solving strategies.

According to Dela Cruz (2019), mathematics often involves specific terminology and symbols. Students with a strong vocabulary are better equipped to interpret mathematical terms accurately, reducing the likelihood of misinterpretation and errors in problem-solving. In addition, Corpuz (2020) confirmed that problem-solving in mathematics often requires the ability to translate real-world situations into mathematical expressions or equations. A broad vocabulary aids in this translation process, allowing students to articulate their thoughts and devise effective problem-solving strategies more efficiently

A study conducted by Johnson and Smith (2023) found that students with a deeper understanding of mathematical terminology tended to demonstrate better problem-solving abilities. This correlation underscores the importance of vocabulary acquisition in mathematics education, as it enhances students' ability to comprehend and tackle complex problems effectively.

A study by Chen et al. (2022) conducted with a large sample size revealed that students who possessed a richer mathematics vocabulary exhibited more proficient problem-solving abilities. The researchers concluded that a comprehensive understanding of mathematical terminology facilitates students' comprehension of problem statements and enhances their capacity to apply appropriate strategies to solve mathematical problems effectively.

In addition, Smith et al. (2023) presented the role of Mathematics Vocabulary in Grade 4 Problem Solving. The study indicated a significant positive correlation between the two variables, suggesting that a higher level of mathematics vocabulary was associated with better problem-solving skills.

In addition to, Johnson and Garcia (2022) posted the effects of explicit mathematics vocabulary instruction on problem-solving abilities in fourth-grade students. The findings revealed that students who received targeted vocabulary instruction demonstrated greater improvement in problem-solving tasks compared to those who did not receive such instruction.

CONCLUSIONS

Base on the findings of the study, the following conclusion are drawn:

1. The learner in the twenty-one (21) schools of Narvacan North District are of verifying profile of the respondents, including factors such as age, gender, parent educational attainment and time to study mathematics have different level of mathematics vocabulary and problem-solving skills in mathematics
2. The Grade 4 learners demonstrated a satisfactory understanding of mathematical terminology appropriate for their grade, though there remains significant room for improvement.
3. The Grade 4 learners possesses to some extent a foundational understanding of problem-solving strategies and are capable of tackling mathematical problems to a certain extent.
4. Parents with higher educational attainment are likely to provide a more enriched learning environment, greater academic support, and more educational resources, which collectively contribute to their children's vocabulary development.
5. The profile characteristics do not have a significant impact on the problem-solving skills of Grade 4 learners.
6. There is a strong positive relationship between vocabulary level and problem-solving skills. The strong association implies that improving vocabulary may enhance problem-solving abilities.

RECOMMENDATIONS

These suggestions are based on the study's findings and are meant to help students in Grade 4 improve their vocabulary and problem-solving abilities in mathematics :

1. Learners should be encouraged to actively practice and apply mathematical vocabulary when explaining and debating various approaches to problem-solving. To improve proficiency in mathematics, it is advisable to allocate additional time for dedicated study and practice of mathematical concepts and problem-solving techniques.
2. Teachers shall provide pupils enough chances to fully understand basic mathematical ideas and hone procedural abilities would greatly improve their ability to handle challenging problem-solving assignments.
3. To assist students in applying their problem-solving abilities in real-world contexts, include word problems and scenarios from real-world circumstances into math classes and teachers may adopt differentiated instruction tailored to individual learning needs and provide more opportunities for hands-on problem-solving activities.
4. Encourage parents to assist with their children's math education at home by offering them tools, advice, and ideas for strengthening vocabulary and problem-solving techniques through routine activities and conversations.
5. Make useful visual aids and manipulatives, to help pupils comprehend and solve mathematical problems.

6. Utilize formative and summative exams to regularly gauge students' comprehension of mathematical terminology and their problem-solving abilities in order to monitor their development and offer tailored assistance as required.

REFERENCES

1. Beckman, S., Gaspard, H., Tuason< M. T., & Kuntze, S. (2020). Enhacing problem-solving skills in Elementary school: A review of international programs. Educationla Psychology Review, 32(3), 535-562.
2. Chen, L., Wang, Y., & Li, S. (2022). The Relationship Between Mathematics Vocabulary and Problem-Solving Skills Among Grade 4 Learners. Journal of Education Psychology, 114(3), 321-335
3. Cirino et al. (2015) investigated the effects of vocabulary instruction on math performance in elementary students
4. Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. Journal of Family Psychology, 19(2), 294–304.Bona, (2020). Job Satisfaction among Public School Teachers. Sci.Int.(Lahore), Volume 32 Issue 2, page 215- 219. Retrieved from http://www.sci-int.com
5. De Corte, E., Verschaffel, L., & Op't Eynde, P. (2019). The growth of mathematical problem-solving skills from primary to secondary school. Learning and Instruction, 60, 271–278
6. Fan, X., & Chen, M. (2020). The Role of Parental Involvement in Mathematics Achievement in Fourth Grade. International Journal of Science and Mathematics Education, 18(8), 1501–1517.
7. Johnson, D. W., Johnson, R. T., and Johnson Holubec, E. (2009). Circle of Learning: Cooperation in the Classroom. Gurgaon: Interaction Book Company.
8. Johnson, A., & Smith, B. (2023). The Impact of Mathematics Vocabulary on Problem-Solving Skills in Grade 4 Learners. *Journal of Educational Research*, 45(2), 123-136.
9. Kroesbergen, E. H., Van 't Noordende, J. E., & Kolkman, M. E. (2020). Profiles of Mathematical Competencies and Their Relation to Mathematical Problem-Solving Skills in Elementary School Children. Frontiers in Psychology, 11, 1312. https://doi.org/10.3389/fpsyg.2020.01312
10. Núñez, J. C., Rosário, P., Vallejo, G., Cunha, J., Nunes, A. R., Suárez, N., ... & Valle, A. (2016). Teachers' feedback on homework, homework-related behaviors, and academic achievement. Journal of Educational Psychology, 108(5), 788–797.
11. Powell and Nelson (2017) demonstrated that first graders' performance on mathematics vocabulary tasks varied as the time (e.g., kindergarten, first grade, second grade)
12. Santos, & Tavares, (2023) the relationship between the profile of Grade 4 learners and their level of mathematics vocabulary
13. Schoenfeld, A. H. (2016). Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics (reprint). J. Edu. 196 (2), 1–38. doi:10.1177/002205741619600202.ss