

PROJECT 5³: Improving the Level of Performance in Answering Mathematical Word Problems of Grade-10 Love Learners

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ABSTRACT

This study focused on improving the mathematical word problem skills of Grade 10 Love Learners through Project 53 (5 words to spell, 5 questions to answer and 5 words to use in a sentence). Twenty-four (24) Grade 10 Love learners participated in this study's conduct using non-randomized sampling for seven (7) weeks. The session runs for twenty (20) minutes and is conducted before introducing the new lesson. This serve as a recall of the previous lesson and priming activity wherein learners haven't noticed that they were practiced solving word problems. Consent from the parents and approval from the School head was ensured before the implementation of the project. The study used a descriptive research method to determine Project 53 on the mathematical skills of solving word problems that lead to increased Mean Percentage Scores of the learners in mathematics after it was being implemented. The study revealed that students have low Mean Percentage Scores (MPS) of 71.58 during the first grading period for the 40-item test, which can be attributed to their level of understanding and comprehension on the items with word problems. The implementation of the Project 53 significantly increased the Mean Percentage Scores of students by 5.82% gaining 77.40 or near above-average range during the Second grading period. The computed t-value of 2.987 exceeds the critical t-value of 2.069. Thus, the null hypothesis has been rejected at 0.05 level using the two-tailed test, therefore, the Project 53 significantly improved the word problem skills of the learners. The 53 Project was not limited to teaching mathematics in Junior High School but is also applicable in Elementary and Senior High School learners since the strategies used can be modified according to grade level.

Keywords: *Mathematical Word Problem, Performance, Project 5*

Introduction

Numbers are all around us, and working with them quickly and efficiently is a great life skill to have. From the researchers' observation and experiences, being fast at arithmetic is also quite practical in many professions, especially its function in one's simplest to the most complex daily life endeavors. However, math is more than arithmetic. A lot of what goes into solving multi-step word problems is identifying the problem, selecting an appropriate approach to solving it

(there may be more than one), and following the right order of operations. In short, understanding and analyzing what the problem is all about is very important in arriving at an accurate solution.

The hardest thing about doing word problems is using the part where you need to take the English words and translate them into Mathematics. Usually, once you get the math equation, you're fine; the actual math involved is often fairly simple. But figuring out the actual equation can seem nearly impossible. (Mathhelp.com) The math section is made up of multiple-choice word problems and computational questions (Blint, 2018).

Being in teaching Mathematics, the researchers experienced many difficulties in adopting effective strategies in teaching and letting answering mathematical word problems be done accurately by the students. The researchers observed that students easily answered questions expressed in symbols and formulas, but expressing the same question to words make it hard for them to answer it correctly. The researchers also observed in their daily classroom discussions and activities, Grade 10- Love learners perform and participate very well specially if the given question is using a specific formula or mathematical symbol, but, when it comes to answering questions express in words, they fail to get the correct answer. Because of these observations, the researchers became interested in conducting this research.

This action research aims to determine whether PROJECT 5³ help students develop their skills in solving mathematical word problems integrated to the intended learning competencies. Project 5³ was adopted from one of the Department of Education's Innovation projects as stated in DepEd-4A-RM-04-17-567. The study was based on the result of the item analysis conducted during the first grading period that reveals answering mathematical word problem is one of their least mastered competencies. The ability to solve word problems correctly was a strong foundation in answering more complicated questions especially problem-solving questions. Twenty-four (24) Grade 10-Love students first periodical exam results show that they have a mean of 28.6 and an MPS of 71.58 % which is below average using the 75% passing/cut-off score set by the Department of Education and as included in the DECS order no. 43, s.1983.

In lieu of the above data, the researchers proposed the PROJECT 5³ (5 words to spell, 5 questions to answer, and 5 words to use in a sentence) to address the least mastered learning competencies and improve the learners' mathematical skills in solving word problems.

Literature Review

This part shows the related literature of the previous study of researchers related to word problems and literacy as part of students learning:

Chapman (2013), discussed that word problems can be defined as verbal descriptions of problem situations wherein one or more questions are raised, the answer to which can be obtained by applying mathematical operations to numerical data available in the problem statement.

Shelley (2011), explained that in mathematics education, the term word problem is often used to refer to any mathematical exercise where significant background information on the problem is presented as text rather than in mathematical notation. As word problems often involve a narrative of some sort, they are occasionally also referred to as story problems and may vary in the amount of language used

Masullo (2017), claimed that word problems tend to be complicated because of their descriptive language. Students often don't understand what they're being asked, especially when the problem includes abstract concepts. Other issues arise when students lack the fundamentals of mathematics and cannot formulate a plan for solving or separate an equation's steps.

Thiagarajan (2018), studied that multiple-choice math answers can be determined using a bit of logic and process of elimination. But word problems require more than simply looking at a math problem and figuring out the solution based on similar equations your child has solved before. To conquer a word problem, students must read the problem, pull out the pertinent information, solve the math equation and then think about how the answer makes sense in the context of the problem. Many students get stuck because they have an idea of why they need to perform certain steps to answer, but they lack a true understanding of the concepts necessary for solving them in all forms like word problems. Word problems can be confusing because, unlike equations, they contain extra words, numbers, and descriptions that have seemingly no relevance to the question. When a student becomes a math word problem solver, teachers and tutors know that he or she has reached the right level of understanding. They have demonstrated an ability to apply math concepts to handle difficult problems in the real world. Word problems are an important assessment tool for teachers because they show a complete understanding of math.

Purplemath (2019), considered that the hardest thing about doing word problems is using the part where you need to take the English words and translate them into mathematics. Usually, once you get the math equation, you're fine; the actual math involved is often fairly simple. But figuring out the actual equation can seem nearly impossible.

Say (2006), research shows that the ability to solve word problems successfully is related to the students' literacy activities. Literacy activities refer to writing and reading with comprehension. However, it is not very clear in literature whether reading is only factor in improving to solve word problems

Reed (1999) as cited by Say (2006) supported the existence of a relationship between the comprehension of language and the development of mathematical ideas and skills at elementary (early secondary) level. He defined three categories of language development: language comprehension, concept formation and mathematical symbolism. He argued that comprehension of the text becomes more important during the early stages of mathematical development. In other words, comprehension of English decreases at more advanced levels requires the language of mathematical systems.

NCTM (1989), encouraged teachers to integrate the domains of reading into mathematics classes with the inclusion of Standard 2: "Use the skills of reading, listening, and viewing to interpret and evaluate mathematical ideas" (p.78). It seems clear that with systematic structure and instruction, integrating literacy and mathematics keeps students motivated and successful. However, the literature does not say exactly how the literacy activities and mathematics can be integrated at all levels as students write, read and discuss word problems. Especially, in terms of teachers' perspectives and practices in the classroom environment, it is unclear how problem writing and problem reading can provide stimulating learning situations in mathematics classrooms for students' success.

Melser & Leitze (1999); Souviney (1984) suggested that while mathematics teachers present the word problems, it is crucial to set up a dynamic support that enables students' success in solving them.

Malasari et.al (2018), tackled that students of junior high school should have mathematical literacy ability to formulate, apply, and interpret mathematics in problem solving of daily life. Teaching these students are not enough by giving them ordinary mathematics problems. Teaching activities for these students brings consequences for teacher to construct mathematical literacy problems.

Methodology

Research Design

The researcher used the quantitative-descriptive research design to determine the effect of Project 5³ in the level of understanding and comprehension of students in the topic before and after implementing the intervention program. This method helps the researchers to determine the improvement of mathematical skills of the learners in solving word problems with the aid of the project.

Research Site

The study was conducted in San Isidro National High School, with the twenty-four (24) Grade 10- Love learners for seven (7) weeks. Non-randomized sampling was used in this study since all the Grade 10-Love learners regularly attending the Project 5³ sessions were used as the respondents. Consent from the parents and students was secured for the ethical considerations.

Instrumentation

The result of the First Periodical Examination, a 40-item test question, checked and validated by the Principal, with a mean of 28.6 and an MPS of 71.58, was used as the basis of the respondent's performance before the implementation of Project 5³(5 words to spell, 5 questions to answer and 5 words to use in a sentence).

Through the First Periodical Examination conducted, 40-item multiple-choice mathematical word problems based on the learning competencies intended for the grading, the researchers identified those students who belong to the upper average group, average group and lower average group.

Data Collection

Project 5³ (5 words to spell, 5 words to use in a sentence, and 5 questions to answer) is an intervention program adopted from the DepEd's Project 555, that aims develop the literacy level of the students. The researchers integrated the program by implementing it once a week. During the implementation, the teachers allotted twenty (20) minutes of the time for these activities intended for the project. Articles/ topics, words and questions given to the students were based on the learning competencies for the second grading.

The learners' scores during the first and second grading period were compared, tabulated, categorized, analyzed, and interpreted through statistical tables. The following statistical treatments were used: mean, mean percentage scores, and T-test to determine the significant difference of the Mean Percentage Scores in mathematics and determine whether the Project 5³ help learners increase their mathematical ability to solve word problems.

Results and Discussion

Throughout this study, students participated in a once-a-week implementation of Project 53. The students were given five (5) words to spell, five (5) words to use in a sentence, and five (5) questions to answer, correspondingly related to the topic/competencies for the day. The researchers used mathematical articles/paragraphs as the material for the project, which was checked and validated by the principal. After checking the result, further discussion was made to correct or clarify students' answer leading them to realize the correctness or incorrectness of their answer. All in all, the researchers conducted 7 sessions of project 53, before the Second Periodical Test.

The results revealed that students have low Mean Percentage Scores (MPS) of 71.58 with below-average range during the first grading period for the 40-item test. It can be attributed to their level of understanding and comprehension on the items consisting of word problems. In this regard, most of these items got the lowest number of correct answers based on the item analysis conducted by the proponents. Thus, the least mastered competencies relating to this serve as the basis for the conduct of the intervention program through Project 53 to fill in the gap and help students improve their cognitive skills in understanding and solving mathematical word problems.

Project 53 significantly increased the Mean Percentage Scores of students by 5.82% gaining 77.40 or near above-average range during the Second grading period. This indicates that the intervention made by the proponents contributes to the word problem solving skills, thus

leading to improved scores in the 40-item test administered during the second quarter. The initiation of Project 53 exemplifies cognitive skills, specifically the level of understanding and comprehension of the learners toward answering mathematical word problems.

There was a significant difference in the Mean Percentage Scores of the Students in Mathematics subject before and after implementing the Project 53. The computed t-value of 2.987 exceeds the critical t-value of 2.069. Thus, the null hypothesis has been rejected at 0.05 level using the two-tailed test. First grading scores has a mean of 28.6 while second grading has a 30.96 mean rate which 2.36% increase in the mean scores. Therefore, the Project 53 significantly improved students' performance in solving mathematical word problems, and the intervention program was found to be contributory to the increased Mean Percentage Scores of students. It is noteworthy that Project 53 was effective and help students better understand solving mathematical word problems aside from the usual mathematical operations that provide a specific formula for solving the answer.

Thiagarajan (2018), studied that word problems require more than simply looking at a math problem and figuring out the solution based on similar equations your child has solved before. To conquer a word problem, students must read the problem, pull out the pertinent information, solve the math equation and then think about how the answer makes sense in the context of the problem. Many students get stuck because they have an idea of why they need to perform certain steps to get an answer, but they lack a true understanding of the concepts necessary for solving them in all forms like word problems. Word problems can be confusing because, unlike equations, they contain extra words, numbers, and descriptions that have seemingly no relevance to the question. When a student becomes a math word problem solver, teachers and tutors know that he or she has reached the right level of understanding. They have demonstrated an ability to apply math concepts to handle difficult problems in the real world. Word problems are an important assessment tool for teachers because they show a complete understanding of math.

This study implies that conducting an intervention program specially in solving word problem in mathematics increase the level of understanding and comprehension of learners. The 53 Project was not limited to teaching mathematics in Junior High School but is also applicable in Elementary and Senior High School learners since the strategies used can be modified according to grade level. In this regard, secondary mathematics teachers greatly benefited from this project once elementary teachers adopted this strategy to teach learners to solve mathematical word problems. Learners will easily grasp higher-level problem-solving questions since they learned the techniques being introduced at the elementary level. The learners were the primary beneficiaries of this project because it makes them mathematically literate and excellent word problems manipulator.

Reed (1999) as cited by Say (2006) supported the existence of a relationship between the comprehension of language and the development of mathematical ideas and skills at elementary (early secondary) level. He defined three categories of language development: language

comprehension, concept formation and mathematical symbolism. He argued that comprehension of the text becomes more important during the early stages of mathematical development. In other words, comprehension of English decreases at more advanced levels requires the language of mathematical systems.

Conclusion

The Grade 10- Love students have below-average performance in answering mathematical word problems before implementing Project 53.

The Grade 10- Love students reached the near-average level of performance in answering mathematical word problems after implementing Project 53.

There is a significant difference between the level of performance in answering Mathematical word problems of Grade 10- Love students before and after the implementation of Project 53.

The implications of the findings of this action research for improving the level of performance of Grade 10- Love students in answering Mathematical word problems are the following :

Mathematics teachers, both in elementary and secondary, who can read this action research, can adapt the method used that can be an effective approach in letting the students answer Mathematical word problems accurately and one of the effective tools in improving students' literacy level.

Junior high school teachers will also benefit, since excellent knowledge in answering word problems when they enter Junior High School will mean an easier grasp of higher-level problem-solving questions and contribute to a more effective teaching-learning process.

As the center of the educational system, the students will benefit from these effective strategies in teaching since they will be equipped with knowledge and skills that can make them mathematically literate and excellent world problems manipulator.

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