Connecting the Mastery Level in Translating Verbal Statements to Mathematical Symbols with Vocabulary Enhancement

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Abstract

Translation from words to symbols is undeniably one of the solution processes in solving word problems that can be considered critical (Bardillion, Jr. 2004) cited by Dela Cruz, et.al (2014). Failure to translate the verbal statement to mathematical symbols can lead to incorrect solution. This study aimed at giving remedy to the least mastered competency in translating verbal phrases to mathematical symbols and improving the academic performance of the Grade 7 students at Tabuk City National High School, Tabuk City Division, School Year 2017-2018 using the Strategic Intervention Material developed by Ms. Apple Jean G. Yecyec (n.d.). This study focused on the fifteen (15) identified students having a score of 1-5 on a given formative test. A teacher-made pretest and posttest was utilized. The participants had a "Very Low" performance on the pre-test at 24.65% level of mastery with regards to translating verbal phrases to mathematical symbols. Results showed there was a significant difference between the pretest and posttest of the participants. It implies that the strategic intervention material by Yecyec on translating verbal phrase to mathematical symbols is effective in improving the mastery level on the least learning competency. Thus, the Strategic Intervention Material (SIM) by Yecyec on translating verbal phrases to mathematical symbols is strongly recommended for dissemination and utilization.

Keywords: mathematical symbols, translation of mathematical phrases, vocabulary enhancement

1. Introduction

Students must speak the language of Mathematics to be successful in learning mathematics according to Pimm (1987) and Moschkovich (2012) cited by Vula. Word problem solving in mathematics is an important aspect of learning mathematics and mathematical thinking. Unfortunately, the major battle cry of Math teachers all over the world is not on how to make the students love the subject but it is on how they can master the lessons which they can significantly use in their everyday encounter.

Problem solving has been and will be a necessary skill not only in Mathematics but in everyday living. Part and parcel of problem solving is to translate word problems into mathematical equation. However, students especially in grade school have difficulties in analyzing and interpreting word problems.

Translation from words to symbols is undeniably one of the solution processes in solving word problems that can be considered critical (Bardillion, Jr. 2004) cited by Dela Cruz, et.al (2014). The study of Bardillion Jr. embarked on symbolic translation of the students exposed to Filipino verbal translation is directly related to problem solving ability and attitude of first year high school students.

According to Krulik & Rudnick (1996) cite by Dela Cruz, et.al (2014), many students encountered difficulties in problem solving because they misinterpret some words that have multiple meanings and overlook its context. This difficulty usually happened when problems are presented in written form.

Krulik & Rudnick (1996), on their book about teaching reasoning and problem solving, found that the ability of students to recognize words is fundamental to reading. Being able to visualize the problem can lead to a successful problem solving.

In the study conducted by Aniano (2010) cited by Dela Cruz, et.al. (2014), the level of difficulties in translating phrases to symbols was one of the factors that determine the problem solving skills of students. It was seconded by Vista (2010) that students' comprehension in translating phrases into symbols affects the students' performance in problem solving.

According to researchers, a particularly difficult part of solving word problems is the understanding of the problem, especially the words that are included in some problems. Not understanding certain words presents the first difficulties in word problem solving, causing misapplication of appropriate mathematical operations. Sharma (2001) cited by Vula also compares mathematics with language: "mathematics is a kind of language where communication takes place through the symbols, it has its letters, symbols, vocabulary and grammar" (p. 66). Students cannot be successful in mathematics if they do not know the meaning of essential vocabulary words. If students know the meaning of terms they can learn mathematical concepts and develop necessary skills in mathematics. This is true for all subjects, students must know the essential vocabulary of a subject to successfully learn the content.

Yeo (2009) cited by Dela Cruz, et.al (2014) found that some students have slow progress in solving the problem due to inability to translate the problem into mathematical form. Some students also have difficulties in solving the problem because they do not comprehend the problem as they found the problem confusing.

As cited by Ballinan (2017), the Spiral approach of the K-12 Curriculum leads to the expectations wherein students have mastered the different competencies for the grade level before going to the higher level. They should be able to master the basic concepts since these are prerequisites to a more complicated one. Otherwise, the teacher will find difficulty in delivering the lessons and addressing the needs of their students.

In every Mathematics examination, problem solving is not a strange item to all students. Sometimes, they consider the worded test item a difficult one. It is not a common sentiment coming from a student saying to the teacher, "Sir, can we write 45 apples as the answer instead of 'There are forty-five apples left'." Students tend to skip the long and comprehension-demanding item which lead them to give if not a guessed answer, an accident answer.

In 10-item formative test given to the 72 students of the researcher about translation of verbal statements to mathematical expressions, there were 42 students who scored 1-5 while there are 30 who got 6-10.

For these reasons, the researcher proposed to adopt the Strategic Intervention Material in Mathematics 7 made by Apple Jean G. Yecyec (n.d.) which links the lesson of the translating verbal statements to mathematical symbols with vocabulary enhancement. It is by this study where word meanings play a vital role in the success of formulating symbolic expressions (Mathematical expressions), enhance their learning, raise the students' performance on basic translation of worded problems to symbolic math which may lead them to the mastery of the learning competency and change their attitude towards the subject.

The researcher is positive that adopting the Strategic Intervention Material (SIM) is the solution for this specific problem. This is a tool designed for teachers to address the demand of students needing support to make good change. It is a way of connection wherein the students and the teacher will have an interaction. It means re-teaching of the considered least mastered concepts and skills to help the learners master a competency-based skill which they were not able to develop during classroom teaching.

In the study conducted by Ballinan (2017), she concluded that SIM was effective in teaching competency-based skills. Students performed better with the aid of the strategic intervention material (SIM). Likewise, Gultiano (2012) as cited by Ballinan (2017), concluded that SIM made the students have

better retention of facts and concepts and were better in applying their knowledge in problem-solving exercises.

1.1 Action Research Questions

This study aimed at giving remedy to the least mastered competency and improve the academic performance of the Grade 7 students at Tabuk City National High School, Tabuk City Division, School Year 2017-2018 using the Strategic Intervention Material created by Ms. Apple Jean G. Yecyec (n.d.).

Specifically, the study aimed to seek answers to the following questions:

1. What is the mastery level of the participants in translating verbal phrases to mathematical symbols in the pre-test?
2. Is there a significant difference between the performance of the students in the pre-test and post-test?

1.2 Innovation, Intervention, And Strategy

Giving remedy to lessen the rate of the least mastered learning competency which is translating verbal statements to mathematical expressions is the main goal of adopting the SIM created by Yecyec (n.d.). It is a process to reconnect teaching and learning. It is a material given to students needing mastery on competency-based skills which were not developed during regular meetings. It is basically to re-teach the considered least mastered concepts and skills considered by the students.

Thus, the adoption of the SIM made by Ms. Apple Jean G. Yecyec (n.d.) for Grade 7 students enhanced the learning and remedied the least mastered skill of students in translating verbal phrases to mathematical symbols.

1.3. Action Research Methods

a. Participants

The purposive sampling was employed in identifying the student-participants. The study was conducted at Tabuk City National High School, Division of Tabuk City for S.Y. 2017-2018. The participants was identified based on their academic performance in relation to the topic covered by this research. Using the result of a formative test given to students, the researcher identified the participants needing remediation/intervention. This study planned to focus on 15 students having a score of 1-5 from the given formative test on translating verbal statements to mathematical expressions.

b. Data Collection

Pretest/Posttest. A 20-item teacher-made test was designed to measure the mastery of the students in translating verbal statements to mathematical symbols. (please see attached Pretest/Posttest) Results of the test will be analyzed and percentage of low, average and high scores will be taken. The validated test was finalized and a pretest was administered to the participants. After the pre-test was administered, it was scored, recorded and tabulated for easy statistical treatment. The same procedure was done in the data gathered from the post-test.

Below were the scheduled activities administered using the SIM:

Day 1: Pretest was administered.

Day 2: Guide cards was introduced to the learners, as well as the flow of the lesson.

Day 3: Activity cards was given to the learners.

Day 4: Learners was given time to review their answers. The assessment cards

Day 5: Enrichment was given applying their learning in real life situations.

Day 6: Learners was given time to go over the SIM to assess themselves how far have they learned the lesson.

Day 7: Posttest was administered and results was analyzed.

c. Data Analysis

The researcher utilized the t-test for correlated sample to determine if there is a significant difference on the result of the pre-test and post-test.

d. Ethical Issues

To observe and uphold ethical standards in the conduct of the study, permissions and approval was secured from concerned agencies and involved parties in the study especially to the proponent of the adopted SIM.

The student-participants was given letter of parental consent which informed the objective of this study and were motivated, so they welcomed the whole process. (please see attached consent)

The participants were not harmed when securing the needed data for the study and their names were mentioned in any part of this research. Likewise, their answers were treated with the utmost confidentiality and were used for this study only.

2. Results and Discussion

Table 1. Mastery level of the participants in translating verbal phrases to mathematical symbols in the pre-test

Performance Level	Mean Percentage Score	Descriptive Value
Mastery Level	24.65%	Very Poor

Table 1 shows the mastery level of the participants in translating verbal phrases to mathematical symbols in the pretest.

The mastery level of the participants in translating verbal phrases to mathematical symbols is 24.65% which means that they have a “Very Poor Performance”.

The result corroborates with the study conducted by Vista (2010) that students’ comprehension in translating phrases into symbols affects the students’ performance in problem solving. Moreover, it was found by Yeo (2009) cited by Dela Cruz, et.al (2004) that some students have slow progress in solving the problem due to inability to translate the problem into mathematical form.

In addition, Krulik & Rudnick (1996) cited by Dela Cruz, et.al (2014) found that many students encountered difficulties in problem solving because they misinterpret some words that have multiple meaning and overlook its context.

Table 2. Students’ pretest and posttest mean scores on the use of SIM in translating verbal statement to mathematical symbols.

Type of Test	Mean Score
Pretest	4.93
Posttest	8.87

t_{cal} -4.33 significant/ Ho rejected

t_{tab} 2.145

Table 2 presents the students' pretest and posttest means scores on the use of SIM by Yecyec in translating verbal statement to mathematical symbols.

The pretest mean score is 4.93 and the posttest mean score is 8.87. Since the t-computed value of -4.33 is beyond the t-tabular value of 2.145 at .05 level of significance, the hypothesis is rejected. This indicates that the posttest results are better than the pretest. This means that there is a significant difference on the pretest and posttest results before and after the intervention. It implies that the use of the Strategic Intervention Material by Yecyec is effective.

In consonance to the above-stated result, Ballinan (2017) concluded that SIM was effective in teaching competency-based skills. Students performed better with the aid of the strategic intervention material (SIM). Moreover, Gultiano (2012) as cited by Ballinan (2017), concluded that SIM made the students have better retention of facts and concepts and were better in applying their knowledge in problem-solving exercises.

3. Conclusion and Recommendation

Based on the finding, the following conclusions are drawn.

The participants have a "Very Low" performance with 24.65% level of mastery with regards to translating verbal phrases to mathematical symbols. It can be concluded that there is a need to conduct an intervention to address the aforementioned lapses.

There is a significant difference between the performance of the students in the pretest and posttest. The scores of the participants in the posttest is significantly different from the pretest results. It can be concluded that the strategic intervention material by Yecyec on translating verbal phrase to mathematical symbols is effective in improving the mastery level on aforementioned least learning competency.

Based on the conclusions, the following are recommended:

1. The Strategic Intervention Material (SIM) by Yecyec on translating verbal phrases to mathematical symbols is strongly recommended for dissemination and utilization, not only to address the least learning competency but also as formative test given to students after the discussion of the said leaning competency.
2. Teachers who wishes to address learning-teaching difficulties encountered in the delivery of the learning competency are hereby recommended to craft a Strategic Intervention Material on that specific learning competency.

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