

Students' Attitude and Performance Towards Solving Word Problems in Mathematics

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Abstract

The study focused on how to find out if there is a significant relationship between the students attitude and performance of college students in solving towards word problems in Mathematics. It also aimed to find out if there is a significant relationship between the students' attitude and performance in solving word problems in algebra.

A random sample of 85 students were drawn using from the total population of 523 freshmen students at the College of Development Communication, Arts and Sciences, who were enrolled during the first semester of the school year 2011 – 2012. The stratified random sampling method with proportional allocation was used after determining the sample size through the Slovincs formula.

A ten-word problem test on number, age, coin, work and investment and an attitude inventory were used to gather students' performance and attitude towards word problems, respectively.

Results of the study led to the findings that the students had low performance in solving word problems and that their lowest performance was in solving investment problems. However, they performed considerably better in solving number, age and coin problems. Analysis of students' incorrect responses revealed that there is a consistent error pattern in all problems in the representation of mathematical statements into algebraic symbols, formulation of equation and analysis of equations. Majority of the students have fair attitude towards solving word problems; some have favorable attitude, very few have very favorable attitude, and very few also have unfavorable attitude towards solving algebraic word problems. The T-test pointed out that there is a highly significant positive relationship between the students' attitude and performance in solving word problems, that is, students who have favorable attitude towards word problem solving have the tendency to perform better than those who have less favorable attitude.

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I. INTRODUCTION

Mathematics has been one of the basic general education subjects offered in all degree programs in college. Its importance is emphasized as the ability to use it in solving problems is necessary for success in all the sciences and technical occupations. In economics, statistics, chemistry, physics, information technology and other computer courses, for example, one must be able to analyze problems and apply appropriate mathematical operations in order to reach solutions. Much of the required mathematics is not at the advanced levels but

involves instead the intelligent use of fraction, percent, ratio, basic algebra, and fundamental geometry. Nevertheless, analyzing problems and correctly applying these concepts presents much difficulty to a high percentage of people.

The importance of Mathematics cannot be denied. However, it has been considered by the majority as one of the most difficult subjects in school at all levels of education, that is, in the elementary, secondary and tertiary levels. Doronilla (1999) pointed out based on the Third International Mathematics and Science Study (TIMSS) that the

Mathematics performance of Filipino children is low as compared to many of their international peers. This has triggered authorities in education to launch trainings and other remedial programs to address the extremely low percentile rank of Filipino students in Mathematics.

Research findings along Mathematics performance, proficiency and achievement still point to the fact that weaknesses on said subject still prevail. Despite the numerous studies already conducted on students' performance on the different aspects of Mathematics, problems related to said subject still exist and it has been recommended that similar investigations be conducted along this line. Mastropieri & Scruggs (2002), Fuchs, Fuchs, & Hamlett, (1994), Salvia & Hughes (1990), Salvia & Ysseldyke, (2004), and (Woodward & Howard, 1994), as cited by Riccomini, pointed out that although educators and researchers debate the numerous types of errors and their causes, as well as instructional approaches and procedures to correct errors, extensive research, including computer analysis of students' work indicates that large majorities of students' errors are consistent and systematic. Hence, this study on students' performance and error patterns in solving word problems in Algebra was deemed necessary and important.

II. METHODOLOGY

The descriptive correlation method of research was used as the study aimed to determine the performance, error patterns and attitude of students in solving word problems in Algebra and the relationship between their attitude and performance.

Respondents of the Study

The respondents of the study were the eighty five (85) freshmen students of the College of Development Communication and Arts and Sciences, Isabela State University, Cabagan, Isabela

who are taking College Algebra during the first semester, SY 2011-2012.

Sampling Method

There was a total of five hundred twenty three (523) freshmen students at the College of Development Communication Arts & Sciences (CDCAS) with five courses namely Bachelor of Science in Information Technology (5-sections with 149 students), Bachelor of Science in Computer Science (1-section with 49 students), Bachelor of Science in Criminology (5-section with 199 students), Bachelor of Science in Development Communication (1-section with 34 students), Bachelor of Arts in Sociology (2-section with 72 students) & Bachelor of Science in Biology (1-section with 20 students) students per course from which the sample was drawn. Stratified random sampling was employed using proportional allocation from each course, using the Slovin's formula, given below with an error margin of 0.10 and a population size (N) of 523. The sample size based on the Slovin's formula is 85.

Data-Gathering Instruments

The Attitude Inventory consisting of twenty (20) items was used to elicit students' attitude towards solving word problems in Algebra.

The Word Problem-Solving Test prepared by the researcher, consisted of ten (10) word problems in one unknown involving number, age, coin, work, and investment problems, wherein two (2) problems for every type are represented.

Data-Gathering Procedure

The attitude inventory and the word problem-solving test were administered by the researcher himself to the respondents.

Data Analysis

To describe the data of the study, frequency, percentage, and the arithmetic mean were used.

The Pearson product moment correlation coefficient was used to determine the correlation value between students' performance in solving word problems and their attitude towards solving word problems. The t-test was used to test the significance of the computed correlation value.

III. RESULTS AND DISCUSSION

This chapter presents the students' performance, error patterns and attitude towards solving word problems in Algebra. It also presents the relationship between the students' performance and attitude towards solving word problems.

Overall Performance

The students' performance in solving word problems in Algebra is shown in Table 1. As indicated in the table, majority of the students, that is, 45 out of 85 or 52.94% had low performance in the word problem test in Algebra. Only 21 out of 85 students or 24.71% had fair performance while 19 or 22.35% had very low performance in the said test.

On the whole, the students' performance in solving word problems in Algebra is low as indicated by the overall mean rating of 29.39. This confirms the findings of Riccomini (2005) in his math research and Zakaria (2002) in her study on the relationship between learning approach and students' problem-solving skills, as cited by Zakaria and Yusoff (2009), wherein they found out that most students have low problem-solving abilities and that more than half of the students could not understand the questions.

Performance in the Different Problems

The students' performance in solving word problems on number, age, coin, work and investment are shown in Table 2. The table reveals that the students had a fair performance in solving number problems as indicated by the percent mean ratings of 46.32 and 46.95 for problems 1 and 2, respectively. Moreover, they had low performance in solving age, coin, and work problems as clearly

indicated by the percent mean ratings that fall within the performance interval of 21 – 40 (Low). The students' very low performance in solving word problems lies on investment problems which bear the lowest percent mean of 20.06 and 9.9 for problems 9 and 10, respectively.

Attitude Towards Solving Word Problems in Mathematics

The attitude of the students towards solving word problems in Algebra are presented in Table 9. As shown in the table, only 4 out of 85 respondents or 4.71% have very favorable attitude towards solving word problems in Algebra; 3 out of 85 or 3.53% have unfavorable attitude; and majority of the respondents, that is, 44 out of 85 or 51.76% have fair attitude towards solving word problems in Algebra. On the whole, the students have a fair attitude towards solving word problems in Algebra as implied by the overall mean rating of 3.41. This finding is similar to that of Zacaria and Yusoff (2009) in their study on the "Attitudes and Problem-Solving Skills in Algebra Among Malaysian Matriculation College Students", wherein the matriculation students were found out to have moderately favorable attitudes towards algebra problem solving.

Relationship Between Attitude and Performance

The computed correlation value between the students' attitude and performance in solving word problems in Algebra which is 0.83, as revealed in Table 10, is high and highly significant as indicated by the computed value of the test statistic $t_c = 13.05$. The coefficient of determination means that 67.24% of the variation in the students' performance in solving word problems is explained by the variation in their attitude. The highly significant positive or direct correlation existing between the two variables implies that students who have favorable attitude towards word problems in mathematics tend to have better performance than those who have less favorable attitude towards the same. This finding

supports the findings of Alejandro (1988) in her dissertation on the mathematical achievement, attitudes and difficulties of students in the ISU System, who concluded that the more positive the students' reaction or attitude towards Mathematics, the higher would be his achievement in the subject. Similarly, Beltran (1990). Delos Santos (1990) and Edchamag (1996) disclosed the desirable impact of positive attitude towards Mathematics as they concluded in their respective studies that students with favorable attitude towards Mathematics tend to have better performance in Mathematics than students who have unfavorable attitude towards Mathematics.

CONCLUSION

Findings of the study are summarized in the following conclusions:

1. The students are weak in solving word problems in algebra. There is a great room for improvement especially on the translation of mathematical statements into algebraic symbols, formulation and analysis of equations.
2. Analysis of error patterns led to the conclusion that the students find great difficulty on algebraic symbolism and analysis; Their inability to deduce correct meaning of mathematical statements further create a chain of errors on succeeding steps required of an algebraic word problem;
3. The students have a fair attitude towards solving word problems in algebra. This level of attitude could possibly explain the level of performance which the students had exhibited in the problem-solving test.
4. Students who have favorable attitude towards solving word problems have the tendency to perform better in solving word problems than students who have less favorable attitude.

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