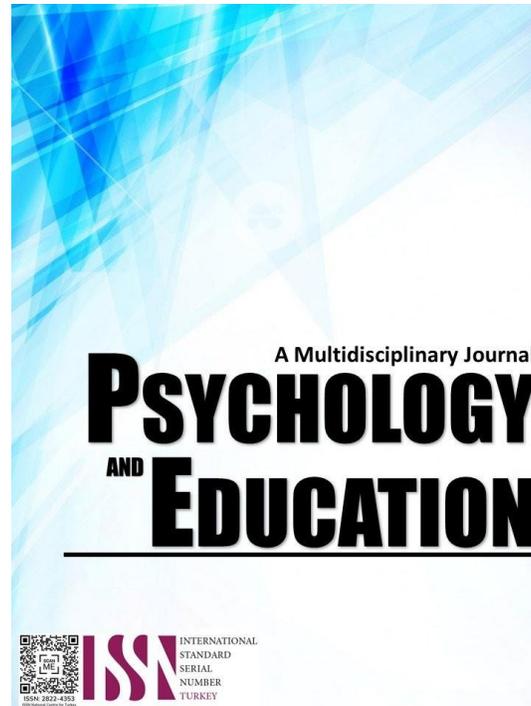


DIFFICULTIES AND COPING STRATEGIES OF BSED MATHEMATICS COLLEGE STUDENTS IN DEALING WITH WORDED PROBLEMS



PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

Volume: 16

Issue 7

Pages: 771-778

Document ID: 2024PEMJ1498

DOI: 10.5281/zenodo.10547522

Manuscript Accepted: 12-27-2023

Difficulties and Coping Strategies of BSED Mathematics College Students in Dealing with Worded Problems

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Abstract

Central to this research is the difficulties in dealing with worded problems and coping strategies. This study employed the descriptive-correlational research design to determine the nature and magnitude by which these variables are related to each other. It included fifty college students as the respondents of this study from the Bachelor of Secondary Education major in Mathematics who were enrolled during the second semester of Academic Year 2022-2023. The findings of the study revealed that the respondents were having much difficulty in dealing with worded problems in terms of translating to Mathematical equations, comprehension, and Mathematical terminologies. Meanwhile, the respondents often utilized coping strategies. It is also shown that one of the best strategies they utilized to cope with the difficulties they encountered was to ask their classmates about the strategies/processes used in getting the right answer. Results bared that there is no significant difference in the difficulties encountered by the respondents in dealing with worded-problems when grouped according to sex and year level.

Keywords: *mathematical equations, worded problems, and mathematical terminologies*

Introduction

"Indi ako kamaan i-solve ang mga word problem kay indi ako ka intindi" Cabalanan et. al, (2020). The most common issue in Mathematics is the inability of the students to complete tasks and their unfavorable views on this subject. Thus, if these issues will not be given attention, it would generate stress and worry in the classroom and eventually cause students to develop a phobia of Mathematics, specifically in dealing with worded problems (Khoshaim, 2020).

Juri (2016) found that students in Indonesia had trouble solving word problems in The Trends in International Mathematics and Science Study (TIMSS) in 2007. For instance, just 8% of Indonesian participants were able to solve the word. The outcome was much less than the 18% average for countries around the world. Mullis et al. (2008) had a similar outcome produced by other word puzzles.

Additionally, Yusuf et al. (2021) assert that the act of problem-solving is a crucial part of the Mathematics Curriculum. According to the Malaysian Education Development Plan (2013), one of the priorities of Mathematics education is developing students' ability to solve. Since word problems and problem-solving are closely intertwined, kids need to learn problem-solving abilities from an early age.

Salameh and Etchells (2016) investigated the causes of the challenges that students have when solving word problems and the role that teachers play in assisting their students. Three teachers from a private school in Dubai, United Arab Emirates, were specifically chosen. Via observations and interviews, data were gathered. Results showed that word problems allow students to cooperate while activating their fundamental and critical thinking skills. Also, teachers lack a guidebook to refer to when assigning word problems in class. Instructors must encourage students to read critically and effectively approach challenges by giving them praise.

Talican (2020) revealed in his study that mathematical word problems as complex and challenging, and this problem-solving requires a wide range of knowledge and comprehension from the students as well as some varied strategies from the teachers.

Numerous pupils at Notre Dame of Midsayap College struggle to solve written problems. According to the majority of Math teachers, this is a result of students' inadequate problem-solving abilities and computational skills. When it comes to problem-solving, it is one of the difficulties that most pupils face.

In this study, the researchers aim to contribute to Psychology and Education by finding the difficulties and coping strategies in dealing with worded problems.

Research Questions

This study aims to identify the difficulties and coping strategies of Mathematics students in dealing with worded problems. Specifically, the study seeks to answer the following questions:

1. What is the demographic profile of the respondents in terms of sex and year level?
2. What are the difficulties of the college students in dealing with worded problems in terms of translating to mathematical equations, comprehension, and mathematical terminologies?
3. What are the coping strategies of college students in dealing with worded problems in Mathematics?

4. Is there a significant difference in dealing with word problems in Mathematics when the respondents are grouped according to sex and year level?

Literature Review

In this part the researchers cited the related literature from books, articles, journals, and similar studies published on the internet. It includes the related literature and studies about worded problems, problem-solving, difficulties in dealing with worded problems (mainly translating worded problems to mathematical equations, mathematical terminologies, and comprehension), coping strategies in dealing with worded problems, and relationship of sex and year-level in dealing worded problems.

Problem Solving

The ability to solve problems is widely seen as a developed thinking capacity. Different thought processes are involved in problem-solving (Codina, Canadas & Castro, 2015). It is a technique that needs conceptual knowledge (Van Merriënboer, 2013). Finding a solution or making a choice for someone using past knowledge is problem-solving (Coban, 2014). Understanding the issue, developing a strategy, implementing the plan, and testing and reviewing the plan are the four steps in the problem-solving process (Sukoriyanto et al., 2016).

Worded-Problem

Powell et al. (2019) state that word problems demand students to understand a language-based problem, recognize relevant details to respond to a prompt and carry out a calculation(s) to generate a problem solution. Because solving word problems requires expertise in reading, linguistic interpretation, and arithmetic, it can be particularly tough for kids who struggle with math.

Difficulties in Dealing with Worded Problems

The goal of Martin et al.'s research (2019) was to understand how students struggled to solve word problems in mathematics within the framework of education for sustainable development (ESD). The UNESCO-promoted ESD educational concept aims to meet the demands of the current generation without jeopardizing the needs of the following generation. ESD could be considered an effort to achieve sustainable development, in other words. The three ESD settings are the economy, the environment, and culture. It is envisaged that all subjects, including mathematics, will incorporate ESD concepts. As a result, the ESD implementation should be supported by the learning approach, instructional materials, learning medium, and evaluation used. In this qualitative study, 30 SMP grade VII students from one Bandung school participated. Data were gathered through testing, observation, and interviews. The number and comparison material were the test's main components. According to the study's findings, children had trouble answering word puzzles. The problem was initially misunderstood by the students. The student's lack of understanding of the problem was the second issue. Finally, pupils made a mistake by exchanging values without being careful.

Translation of worded problem to a Mathematical Equation

Lapinid (2014) found that translating stated challenges is one of the most difficult tasks for a learner today, especially at the primary level. It is thought to be a sizable obstacle to learning mathematics. The conversion of words into symbols is unquestionably one of the steps that can be regarded as crucial in solving word problems (Bardillion, Jr., 2004.). The study, which concentrated on the students' symbolic translation after being exposed to Filipino verbal translation, discovered a connection between the students' attitude and ability for problem-solving.

Aniano (2010) used the degree of difficulty in converting sentences to symbols as one of the variables to assess students' problem-solving abilities. Vista (2010) agreed that students' ability to translate words into symbols influences how well they solve problems. Students' ability to perform the necessary mathematical operations, as well as their understanding of the word problem's content, are expected to be important factors in effectively answering a mathematical word problem (Jitendra and Star, 2012).

Comprehension in Mathematical Worded Problems

Basaran (2013) defined comprehension as accurate reading of a text and proper speech when speaking. Fluent reading ability is defined as word recognition (accuracy), reading rate, and prosody. It also states that it was determined when comprehension skills units aren't formed, it will be difficult to form a relation both between the sentences.

Mathematical Terminologies

Given that most domains of knowledge have their own peculiar vocabulary, comprehending terminology is the fundamental building

block required to construct mathematical knowledge and procedure. The fundamental tool for harnessing the power of mathematics is mathematical language. It plays a crucial part in both the learning and teaching of mathematics, as well as in the overall educational process (Lin et al., 2018).

Coping Strategies in Dealing with Worded Problems

Engin and Emine (2012) defined coping as a process that follows a situational appraisal and is context-dependent rather than a trait. Contextual coping, on the other hand, is determined by how well a person understands the actual pressures they are facing and how to deal with them (Lazarus et al., 1986). One could argue that students only consider context-based coping methods when they encounter and solve math problems.

In contrast, Glennie (2010) saw coping strategies as purposeful responses to stressors, with the primary goal of altering one's circumstances and the secondary goal of accepting one's circumstances.

Student Coping strategies, when one is dealing with a difficult situation, resort to certain ideas and behaviors, which are referred to as "coping". However, some coping mechanisms are less effective than others. Negative coping tactics wear everyone out over time, and they frequently make the situation worse. In contrast, positive coping strategies offer the opportunity to actively work toward eliminating the difficulties (Cliche, 2017).

Relationship of Sex in Dealing with Worded Problems

Hidayati et al. (2019) found gender differences in students' problem-solving abilities in junior high schools in the Bangkalan district. It was concluded that female students have superior problem-solving abilities than male students. Furthermore, teaching science with a problem-solving approach will provide learning experiences that will help students improve their abilities. The study of Sebastian (2017) shows that both sexes, whether male or female students have no discernable distinction in conceptual difficulties in problem-solving, but male students have a higher computational understanding than female students in problem-solving.

Relationship of Year level in dealing with Worded Problems

The mathematical vocabulary utilized in word problems, according to Smartick (2018), causes anxiety for most schoolchildren. It is anticipated that as they mature, their semantic level will rise, and they will be better equipped to acquire lexical competence and problem-solving skills. Regarding linguistic and semantic categories, word issues come in a variety of levels of difficulty. In general, a number of variables, including the child's experiences, past knowledge, and practice, affect their understanding.

Research Methodology

Research Design and Sampling Technique

This research utilized descriptive-correlational design to determine the difficulties and coping strategies of college students in dealing with worded-problems. Meanwhile, complete enumeration sampling was being utilized in the study.

Respondents

The respondents of this study were the BSED Mathematics students enrolled in the Second Semester of A.Y 2022-2023.

Instruments of the Study

This study used a researcher-made questionnaire. The questionnaire was composed of three parts. The first part of the questionnaire contains the demographic profile of the respondents. The respondents checked the applicable information.

Validity and Reliability

The content and face validity were checked and guided by the adviser. The researcher conducted a pilot test to 15 respondents. The data gathered in the pilot test was analyzed with the help of the statistician. Cronbach's Alpha was used in testing the reliability of the instrument. The test resulted in 0.8210 with 30 items which indicated that the instrument is good and reliable.

Procedure

The researchers wrote a letter to the Dean of the College of Education asking permission to allow the researchers to conduct the study on Difficulties and Coping strategies of Mathematics College students in dealing with the worded problem of the BSED-Mathematics

students. Upon having the approval, the researchers also presented the informed consent to the respondents. After securing approval, the researchers distributed the survey questionnaire to the respondents. The researchers also made sure that all the data gathered were kept confidential.

Statistical Tools and Treatment Data

For the interpretation and analysis of the data gathered, frequency counts and percentage distribution, weighted mean and standard deviation, and One-Way ANOVA or variance analysis were used.

Results

This section presents and discusses the results of the statistical treatment of the data gathered.

Respondents' profile in terms of Sex and Year level

This part presents the profile of the BSED-Mathematics students in terms of sex and year level. Pertinent data are presented below.

Table 1. *Profile of the Respondents*

<i>Profile of the Respondents</i>	<i>f</i>	<i>%</i>
<i>Sex</i>		
Male	26	52
Female	24	48
Total	50	100
<i>Year Level</i>		
1 st year	10	20
2 nd year	12	24
3 rd year	12	24
4 th year	16	32
Total	50	100

Difficulties of the College Students in Dealing with Worded Problems

The data pertains to the difficulties of college students in dealing with worded problems in terms of translating to Mathematical equations, comprehensions, and mathematical terminologies are presented in Table 2.

Table 2. *Difficulties of The College Students in Dealing with Worded Problems in Terms of (a) Translating to Mathematical Equations, (b) Comprehension, And (c) Mathematical Terminologies*

<i>Statements</i>	<i>Mean</i>	<i>Sd</i>	<i>Description</i>	<i>Interpretation</i>
A. Translating To Mathematical Equations				
1. I find it difficult to identify keywords or phrases that indicate a Mathematical operation.	3.26	0.94	Moderately Agree	Much Difficult
2. I have poor strategies that make me difficult to combine individual operations into equations.	3.06	0.96	Moderately Agree	Much Difficult
3. I find it difficult to maintain the order of operations to be used.	2.66	0.96	Moderately Agree	Much Difficult
4. I find it difficult to identify the relevant data to solve a worded problem.	3.04	0.92	Moderately Agree	Much Difficult



5. I find it difficult to translate worded problems into mathematical equations.	3.12	1.04	Moderately Agree	Much Difficult
Overall	3.03	0.98	Moderately Agree	Much Difficult
B. Comprehension				
1. I find it difficult to comprehend worded problems.	3.08	0.94	Moderately Agree	Much Difficult
2. I find it difficult to comprehend more complex worded problems.	3.36	0.92	Moderately Agree	Much Difficult
3. I find it difficult to find the given in a worded problem.	2.80	0.99	Moderately Agree	Much Difficult
4. I find it difficult to visualize worded problems.	3.04	0.95	Moderately Agree	Much Difficult
5. I find it difficult to analyze mathematical worded problems.	2.96	0.99	Moderately Agree	Much Difficult
Overall	3.05	0.97	Moderately Agree	Much Difficult
C. Mathematical Terminologies				
1. I find it difficult to identify key terms of operations to be used.	2.70	0.76	Moderately Agree	Much Difficult
2. I find it hard to define terminologies in mathematical statements.	2.80	0.93	Moderately Agree	Much Difficult
3. I find it difficult to familiarize mathematical symbols and their corresponding terminologies.	2.74	0.94	Moderately Agree	Much Difficult
4. I have limited knowledge of difficult mathematical terminologies.	2.86	0.90	Moderately Agree	Much Difficult
5. I have limited vocabulary related to mathematical worded problems.	2.82	0.92	Moderately Agree	Much Difficult
Overall	2.78	0.89	Moderately Agree	Much Difficult
Grand SD and Mean	2.95	0.95	Moderately Agree	Much Difficult

Scale	Range	Description	Interpretation
5	4.20-5.00	Strongly Agree (SA)	---- Very Much Difficult
4	4.21-3.40	Moderately Agree (MA)	---- Much Difficult
3	3.41-2.60	Agree (A)	--- Difficult
2	1.81-3.40	Disagree (D)	---- Less Difficult
1	1.00-1.80	Strongly Disagree (SD)	---- Not Difficult at All

Coping Strategies of College Students in Dealing with Worded Problems in Mathematics

The data pertaining to the coping strategies to overcome the difficulties encountered by the respondents in dealing with worded problems are presented in Table 3.

Table 3. *The Coping Strategies of College Students in Dealing with Worded Problems in Mathematics*

Statements	Mean	Sd	Description
Coping Strategies			
In order to deal with difficulties, I...			
1. practice problem-solving at home.	3.44	0.86	Often
2. rewrite the problem to identify clues.	3.62	0.88	Often
3. review old notes on lectures taught by my previous Mathematics teachers.	3.72	1.09	Often



4.	recall my prior knowledge to solve problems from my previous year level.	3.78	0.91	Often
5.	look for more exercises related to worded problems online.	3.76	1.02	Often
6.	listen attentively to the discussion/ derivation of my teacher.	4.10	0.68	Often
7.	ask for further clarification/s from my teachers if I am confused with the Lesson.	3.68	0.91	Often
8.	ask my teacher explanation about which part of my answer is wrong.	3.74	0.75	Often
9.	ask my teacher to check my answer whether there are seatwork/assignments	3.36	1.01	Sometimes
10.	ask my teacher if there is any other way to solve the problem.	3.70	0.95	Often
11.	ask my classmates for further explanation on the problem I failed to understand.	4.00	0.86	Often
12.	ask my classmates about the meaning of terminologies used in the worded problem.	3.72	0.83	Often
13.	use to discuss my answer with my classmates.	3.96	0.83	Often
14.	ask my classmates about the strategies used to come up with the correct answer.	4.24	0.74	Always
15.	ask my classmates to study a given assignment on worded problems.	3.90	0.86	Often
Overall		3.78	0.91	Often

Scale	Range	Description
5	5.00 – 4.21	Always
4	4.20 – 3.41	Often
3	3.40 – 2.61	Sometimes
2	2.60 – 1.81	Rarely
1	1.80 – 1.00	Never

The difference in Dealing with Worded Problems in Mathematics when Grouped According to Sex and Year Level

Tables 4 and 5 present the data pertaining to the difference between sex and year level in dealing with the worded problem.

Table 4. *The difference in dealing with the worded problems in Mathematics when grouped according to Sex*

Variables	N	Df	p-value	Indication	Decision
Male	26	48	0.13	Not Significant	Do not reject the Null Hypothesis
Female	24				

NS – Not Significant at 0.05 level of significance (2-tailed)

Table 5. *Difference in dealing with worded problems in Mathematics when grouped according to Year level*

Variables	N	Df	p-value	Indication	Decision
1 st year	10	49	0.37	Not Significant	Do not reject the Null Hypothesis
2 nd year	12				
3 rd year	12				
4 th year	16				

NS – Not Significant at 0.05 level (2-level)

Discussion

Profile of the Respondents

The majority of the respondents are female. In terms of year level of the respondents, most of them are fourth year. The result indicates that the students are Moderately Agree with the difficulties in dealing with worded problems as well as the coping strategies used.

Difficulties in Dealing with Worded Problems

Translating Worded problems to Mathematical Equations

The respondents moderately agreed that they have difficulties in identifying the keywords/phrases that indicate a Mathematical operation. This means that they have a hard time determining Mathematical words/phrases or operations to be used. In addition, the respondents also moderately agreed that they had difficulties in translating worded problems into Mathematical equations. These results imply that college students were not so good at dealing with worded problems. Evidently, it supports the study of Dela Cruz and Lapinid (2014) stated that students' greatest challenge was converting verbal difficulties into mathematical symbols. This is due to carelessness, lack of comprehension, interchanging values, and the unfamiliar terms employed in the problem.

Comprehension

When it comes to comprehending Mathematical worded problems, the respondents moderately agreed that they find it difficult to comprehend more complex worded problems. Also, the respondents were having much difficulty comprehending worded problems. This means that students felt difficult to conceptualize a mathematical text, which could lead a poor performance of the students in Mathematics. These results agree with the study of Wijaya (2014) that good problem solvers create operational webs in their minds while forming meaning and thus relating the events in the problem text and following the flow of it. Furthermore, students with higher problem-solving success have higher comprehension levels, but there is no difference in basic skills in Mathematics between students with high and low problem-solving success.

Mathematical Terminologies

The respondents moderately agreed that they have limited knowledge of difficult Mathematical terminologies. At the same time, the respondents agreed that they also have limited vocabulary related to mathematical worded problems. Both of these results imply that the main reason for the students' difficulties in dealing with worded problems was insufficient knowledge and skills in familiarizing different mathematical terminologies, which is crucial to students in learning Mathematics. The results support the study of Lin et. Al (2018) states that most domains of knowledge have their own peculiar vocabulary; comprehending terminology is the building block that requires for constructing mathematical knowledge and procedure. In addition, respondents also have limited vocabulary related to Mathematical worded problems. This is in line with the study of Mbugua (2012), which stated that students encountered numerous challenges when learning the language of Mathematics because Mathematical terminology has its own terms, symbols, and/or structures. Furthermore, students find it much more difficult to identify key terms of the operations to be used in dealing with Mathematical worded problems.

Coping Strategies of College Students in Dealing with Worded Problems

The respondents always asked their classmates about the strategies used to come up with their correct answers and listened attentively to the discussion or derivation of the teacher. This means that the students had the initiative to cope with their difficulties in dealing with Mathematical words. Their strategies, such as consulting their classmates' procedures in answering and listening to their teachers' discussion, emphasize their willingness to be proficient in problem-solving. This result supports the study of Glennie (2010) states that seeking help and learning more, which are metaphorically equal to seeking counsel from a friend and increasing one's knowledge, and some students stay after class to get their questions answered while others raise questions during class to gain the teacher's clarification on specific concepts.

Difference in Dealing with Worded Problems in Mathematics when Grouped according to Sex and Year level

Sex

The sex of the respondents shows no significant difference as they deal with worded problems. It means that regardless of male or female, students experience the same level of difficulties and coping strategies in dealing with worded problems. It implies that sex didn't affect the difficulties encountered by the students. This result supports the study of Sebastian (2017), which stated that both sexes, whether male or female students have no discernable distinction in conceptual difficulties in problem-solving, but male students have a higher computational understanding than female students in problem-solving.

Year Level

The year level of the respondents shows no significant difference as they deal with worded problems. It means that all the students, whether first, second, third, and fourth-year college students, have experienced the same level of difficulties and coping strategies in

dealing with worded problems. Thus, it implies that the year level of the students didn't affect the level of difficulties in dealing with worded problems. This result contradicts the study of Smartick (2018) that students anticipated that as they mature, their semantic level will rise, and they would be better equipped to acquire lexical competence and problem-solving skills.

Conclusion

Based on the findings, it can be concluded that students were lack of skills in dealing with worded problems in terms of translating to a mathematical equation, comprehension, and mathematical terminologies. Students attentively listen to their teachers' discussion and seek help to their classmates on the techniques to derive with the correct answer.

Moreover, both male and female students and regardless of what level they are in college, they experienced the same level of difficulty in dealing with worded problem.

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