

Difficulty in Solving Mathematical Problems by Students

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Received: 02 September 2021

Accepted: 12 November 2021

Keywords:

refrigerant, cop, gwp, vapor
compression, refrigeration

ABSTRACT

The study analyzed the various difficulties faced by the third year students when solving a math problem. The study also revealed that the students' inability to mentally translate the problem into a proper form and use correct math made it harder for them to complete their math problems. The study revealed that students tend to underestimate the complexity of problems they face as problem solvers. This impairs their ability to solve them efficiently.

1. INTRODUCTION

Due to its importance, mathematics is often studied and used in our daily lives. It has been regarded as a subject that helps individuals develop their reasoning and problem-solving skills. Aside from being able to solve problems, mathematics also develops the mind's ability to think critically. Its importance is also evidenced by the number of students who are involved in the process of formulating ideas. One of the most challenging parts of learning mathematics is developing the mind to solve problems that require higher-order thinking skills. Doing so helps develop students' creativity and logical thinking.

In 2011, Hugar explained that in order to learn math, students need to master the skills of problem-solving. This is a process that has been prevalent in the last couple of decades. According to the dictionary, problem-solving is the process of thinking about a problem and coming up with a solution.

According to a study conducted by the University of New York, problem solving is a process that helps students develop their cognitive abilities. After carefully analyzing the problem, students then formulate a strategy to come up with a solution. This process helps them develop new ideas and formulate a strategy that will help them solve the problem. The process helps the students develop their understanding of the concepts introduced in their study. It also serves as an integral part of their math lessons.

In 2004, Michael Yeo stated that problem solving in mathematics can be described as working mathematically. However, this is not the case since the process involves the organization and dealing with the various pieces of knowledge.

Bandong (2000) said that if a student sets his mind to learning, he can learn everything that math has to offer. He noted that the patience needed to learn arithmetic is the key to success.

Despite the importance of mathematics, many students are not able to identify and interpret the basic concepts of the subject. Also, they make errors when they use and interpret numbers. These students often struggle with basic math concepts and are prone to getting into remedial classes.

According to Polya, doing non-routine problems can help students develop higher-order thinking. He argued that these types of problems can also help students improve their analytical skills.

Although it's beneficial for students to solve non-routine problems, they tend to be nervous and uncomfortable doing it. Also, they are not able to apply learned procedures in a simple way.

The study, which was carried out by professor Yeo, showed that students in the city-state performed poorly when it came to solving word problems.

The difficulty in solving math problems is evident in the classrooms. Some students were not able to solve the problems even after trying.

Other students also committed erroneous math operations due to careless math calculations.

These students also have difficulty understanding verbal or written directions or explanations. They also tend to commit math errors due to their improper calculations.

2. RESEARCH SIGNIFICANCE

The ability to solve math problems through written solutions provides students with a valuable insight into the difficulties they might face while working on them. The four-step process used by Polya helped them identify the problems they might have encountered.

The findings of this study reveal how students approach problem solving and provide insight into their thinking.

Although difficulties are not the sole reason why students can't solve math problems, they play a crucial role in the learning process.

3. LITERATURE REVIEW

Krulik (1987) states that a problem is a situation where an individual or group of individuals confronts a problem, and that the individual does not see a path to resolution.

Different experts have provided their own definition of problem solving. The difference between these two is that they only discuss the ways in which the concepts are formulated.

In 1994, Schoenfeld explained that problem solving is a process that students go through when they encounter a non-specific math problem.

They must first read the problem thoroughly, analyze it for any information it has, and come up with a strategy to solve it.

Through the process, students can develop new ideas and improve their existing ones. It also helps them develop new connections.

In 2005, Cai wrote that problem solving can be explained as a cognitive process and that it can be done with the help of certain skills. This paper explores the effects of problem solving on creativity and learning.

According to Hugar (2011), problem solving is the backbone of math instruction. This concept emerged due to the increasing number of students who are able to mentally solve complex problems.

The various aspects of the curriculum related to problem solving are presented in the following three themes. 1) The idea that solving problems is a requirement for academic success, 2) It's art, and 3) It's a learning process.

Referencing the concept of problem solving, Lester (1994) stated that it involves the coordination of various patterns of inference, knowledge, and previous experiences in order to generate new representations of complex problems.

In his book, Yeo (2004) also explained the various forms of knowledge that can be used to solve a problem. The types of knowledge that were presented in the book include algorithmic knowledge, factual knowledge, and strategic knowledge.

According to Newman (1983), the difficulty in solving a problem can be traced back to the various phases of learning, which are known as the seven steps.

The study mentioned that four factors contribute to a person's ability to solve a problem. These include having a good knowledge of math, having an affective approach to problem solving, having managerial skills, and selecting and implementing appropriate strategies.

In 1993, Miller and Kroll identified three major factors that contribute to students' difficulties in problem solving and knowledge, control, and beliefs affect a person's ability to solve problems.

Aside from having the ability to solve problems, Lester also noted that other characteristics such as having a good disposition and being able to attend to the various structural features of a problem can also help a good problem solver.

According to the study of Cai (2005), three goals for problem solving are: first, to examine the complexity of the cognitive processes involved in solving problems; second, to explore the ways in which students can make sense of mathematics; and third, to identify future directions for problem-solving research.

If problem solving is taught in the classroom, students will be able to apply the theories they learned in school to real life situations.

4. METHODS

Twenty-four third year students of the SV University's Biology of Education major participated in the study.

The objective of the test was to determine the difficulty of students in solving problems related to math. The allotted time for the test was 40 minutes.

The test was conducted using the frequency of occurrence of errors as a factor to evaluate the difficulty of the students in solving math problems.

5. RESULTS AND DISCUSSION

The answers to the five-item test revealed that the third year college students had various difficulties in solving the problems. The table below shows the stages where the students failed to complete the task.

The study also showed that the main difficulties students face in solving math problems are their inability to mentally translate the problem into math and their inability to use correct math.

Table 1. Difficulties in solving mathematical problems

	Incorrect			
	Understanding the plan (Lack of comprehension)	Devising a plan (Lack of strategy knowledge)	Carry-out the plan (Inability to translate the problem to mathematical form)	Looking back or answering the problem (Inability to use correct mathematics)
Problems	Frequency (F)	Frequency (F)	Frequency (F)	Frequency (F)
Age	0	7	12	13
Time	6	17	17	18
Motion	0	7	20	21
Number	5	19	20	20
Geometry	11	17	17	17
Total	20	63	82	85

In a study conducted by the SV University, over eighty four percent of the students committed to looking back and getting the wrong answer in order to solve the math problems.

On the other hand, output difficulty refers to the difficulty of working with math procedures and concepts. This stage of math problem solving can be challenging for students due to various factors such as: Not being able to remember certain math facts and procedures, slow down writing, and memory loss.

Most of the time, students make multiple errors during the assessment stage of math. The most common ones were those that affected the Plan Skills.

It has been revealed that students tend to look back and get the wrong answer when they attempt to solve math problems. This indicates that they are not able to use the correct math skills.

The inability to mentally translate a problem into logical forms is the most common reason why students fail to solve math problems. This is also the reason why many teachers deal with incorrect math strategies.

Some students have a hard time merging and/or managing multiple tasks in a complex math problem. They may also not know the components of a complex problem and cannot mentally interpret its logical forms.

In 1993, the authors of Kroll & Miller stated that students must have the right knowledge to solve problems. These factors include conceptual knowledge, algorithmic knowledge, and linguistic knowledge.

It is also important that teachers identify the areas of their students' weaknesses before they can help them develop their problem-solving skills.

Most people who are into math problems find it hard to master the basic rules of problem solving. Although there are various resources available to them, students tend to make errors and mistakes.

6. CONCLUSION

The main difficulties that the participants of this study had were in translating their problems into math equations and in constructing correct math equations. These issues need to be corrected in order to improve their skills in solving math problems.

The study revealed that students should develop an analytical mind when it comes to math problems. They should also expose them to various math strategies that will help them solve them.

The study's findings will also be used to improve the course syllabus in mathematics. It will also be used to develop strategies that will help students solve problems successfully.

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