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A study on problem solving ability in mathematics of IX standard students in Dindigul district

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Abstract

“If I had 60 minutes to solve a problem, I’d spend 55 minutes defining it, and 5 minutes solving it”

- Albert Einstein

In the present study the investigator attempts to study on problem solving ability in mathematics of IX standard students in Dindigul district, Tamil Nadu. The study was conducted on a sample 80 ninth standard students. The sample divided into two types of institute which are Government and private secondary schools. Problem solving ability test in mathematics was used to collect data. The investigator had adopted the survey method and random sampling technique was used. The results showed that the level of problem solving ability in mathematics of IX standard students is average.

Keywords: Problem solving, Mathematics, Survey method, Random sampling technique

Introduction

“If I had 60 minutes to solve a problem, I’d spend 55 minutes defining it, and 5 minutes solving it”

- Albert Einstein

Problem solving is a heart in the study of mathematics. The importance of teaching mathematics and learning mathematics to develop the abilities of solving problem in mathematics and to find the solution of problems in daily life. To many mathematically literate people, mathematics is synonymous with solving problems, doing word problems, creating patterns, interpreting figures, developing geometric construction, proving theorems, etc. The goal of teaching mathematic to be effective was that the students were able to solve its problems. That goal shows that learning mathematics not only aims to develop students in cognitive domains, but also aims to improve the affective domain that can support problem-solving abilities. The results of the study Joseph (2011) [10] concluded that in future mathematics assessment should not on the written test analysis, but analysis of increasing affective students also needs to be done. NCTM (1989) stated that the attitude of the students in facing of mathematics and beliefs can affect their achievement in mathematics. As a matter of fact, the experience in solving the problems of the subject is very important to develop students’ thinking skills and help them gain more skills in solving the problem in daily life.

Need for the study

Problem-solving is considered as the heart of mathematics learning because the skill is not only for learning the subject, but it emphasizes on developing thinking skill method as well. Students can apply their knowledge and problem solving skills to be useful in daily life since the processes of solving the mathematical problem are similar to the general problem solving. Basic education curriculum, Buddhist era 2544 has specified how mathematic learning and students’ quality are important; however, the students do not achieve in learning the subject. Most of the students’ problem was the mathematical problem solving, the most important skill for the students’ further learning. Therefore, the development of problem solving ability in mathematics is an important mission that teachers are about to concern with in order to develop such the necessary skill for their students.

Statement of the problem

According to the problem of mathematics teaching and learning and due to the theory studies, we have found out that the study of factors affecting the students’ problem solving is interesting and necessary because if teachers know about the factors that encourage or obstruct students’ problem solving skill development, they can then manage effective learning activities for the students in order to help them solve mathematic problems effectively. Therefore, the investigator is interested in *a study on problem solving ability in mathematics of IX standard students in Dindigul district.*

Definitions of the term used

• **Problem solving ability**

The ability to understand what the goal of the problem is and what rules could be applied to represent the key to solving the problem. Sometimes the problem requires some abstract thinking and coming up with a creative solution.

• **Mathematics**

Mathematics is a part of science. It has the four fundamental operations of addition, subtraction, multiplication and division. In secondary school level, mathematics education is very useful to develop the creative thinking and self-confident habit of students and it also helps to develop the problem solving habits.

Objectives

- ❖ To identify the level of problem solving ability in mathematics of IX standard students.
- ❖ To find out the significant difference between the IX standard students in their problem solving ability regarding the background variables gender, type of school, locality of the student, extra coaching, community, parental educational qualification and parental occupation.

Hypothesis

- ❖ There is no significant difference in problem solving ability of IX standard students with respect to
 - i. Gender
 - ii. Type of school
 - iii. Locality of the student
 - iv. Extra coaching
- ❖ There is no significant difference in problem solving ability of IX standard students with respect to
 - i. Parental educational qualification
 - ii. Parental occupation
 - iii. Community

Variables of the study

- **Dependent variable**
 - Problem solving ability score
- **Independent variables**
 - Gender
 - Type of school
 - Locality of the student
 - Extra coaching
 - Parental educational qualification
 - Parental occupation
 - Community

Methodology

a. Methodology in brief

The investigator has chosen the survey method for studying the problems of this study. In Dindigul district two secondary schools were selected randomly.

b. Sample

The secondary school students in the population for this study. From among them 80 students studying IX standard were taken as the sample.

c. Tools used

The data were collected by using the problem solving ability test developed and standardized by the investigator and Dr. C. Sivapragasam. There are 20 problems in the test. Each problem has four alternative options. Out of these four options, only one is correct answer. If the student selected the correct answer, the investigator should be given one mark, and if the students selected wrong answer, the investigator should be given a zero mark. In the end all the marks should be added.

d. Statistical techniques used

The study adopted the statistical techniques like mean, median, mode, standard deviation, t-test and F test.

Data Analysis

Table 1: Mean, Median, Mode and Standard Deviation of whole sample with respect to problem solving ability score

Variables	N	Mean	Median	Mode	Standard Deviation
Problem solving ability score	80	10.31	10	9	2.060

From table 1, it is observed that the probability solving ability mean score is 10.31 of IX standard students. Hence, the level of problem solving ability in mathematics of IX standard students is average.

Table 2: Significant differences in the problem solving ability of IX standard students with respect to background variables

Background variable	Subgroup	N	Mean	S.D	t- value	Significant level
Gender	Boys	43	10.88	2.152	2.6816	Significant
	Girls	37	9.68	1.796		
Type of school	Government	40	10.10	2.098	0.9703	Not Significant
	Private	40	10.55	2.050		
Locality of the student	Urban	25	11.12	2.186	2.3868	Significant
	Rural	55	9.96	1.934		
Extra coaching	Tuition	40	11.45	1.880	5.7583	Significant
	No tuition	40	9.20	1.604		

(At 5% level of significance the table value of t is 1.96)

From the table 2, it is observed that background variables are gender, locality and extra coaching have the significant level. There is no significant difference between in problem solving ability of IX standard students with respect of type of

school. The students who go for tuition and do not go for tuition have the significant difference in their problem solving ability in mathematics.

Table 3: Significant differences in the problem solving ability of IX standard students with respect to background variables

Variable	Sources of variation	Sum of squares	df	Mean squares	F Value	Table Value	Remark
Parental Educational Qualification	Between groups	9.516	9	1.057	3.029	2.02	Significant at 5% level
	Within groups	24.434	70	0.349			
	Total	33.950	79				
Parental Occupation	Between groups	27.080	9	3.009	2.929	2.02	Significant at 5% level
	Within groups	71.920	70	1.027			
	Total	99.000	79				
Community	Between groups	12.494	9	1.388	2.472	2.02	Significant at 5% level
	Within groups	39.306	70	0.562			
	Total	51.800	79				

From table 3, it is inferred that the students of different community, students whose parents have different educational qualifications and different occupations have significant differences in their problem solving ability in mathematics.

Findings

- The level of problem solving ability in mathematics of IX standard students is average.
- There is a significant difference in problem solving ability of IX standard students with respect to gender.
- There is a significant difference in problem solving ability of IX standard students with respect to locality of students.
- There is a significant difference in problem solving ability of IX standard students with respect to Extra coaching.
- There is no significant difference in problem solving ability of IX standard students with respect to types of school.
- There is a significant difference in problem solving ability of IX standard students with respect to
 - i. Parental educational qualification
 - ii. Parental Occupation
 - iii. Community

Recommendations

- ◆ Mathematics club should be organized by a mathematics teacher in the school. It provides to students to learn mathematics with interest and involvement. It also helps to improve their problem solving abilities.
- ◆ Extra coaching may be given to the students whose parents are economically and educationally low level and that students are residing in rural areas.
- ◆ Educational institutes should be providing mathematics library facilities in school.
- ◆ Mathematics teacher should be organized the mathematics recreational activities like as number games, Sudoku and puzzles in school for students. This activity helps to improve their problem solving abilities.
- ◆ Mathematics teacher should be providing mathematics concepts for students with life oriented examples.

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