



ORIGINAL RESEARCH PAPER

Education

PROBLEM SOLVING ABILITY AMONG 9TH STANDARD STUDENTS IN RELATION TO THEIR ACHIEVEMENT IN MATHEMATICS AND MANAGEMENT

KEY WORDS: Problem Solving Ability, Achievement in Mathematics, Management and 9th Standard students.

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ABSTRACT

Problem solving ability is a mental process and is a part of the larger problem process that includes problem finding, and problem shaping. Considered the most complex of all intellectual functions, problem solving has been defined as “higher order cognitive process that requires the modulation and control of more routine or fundamental skills”. The main objective of the present study is influence of problem solving ability among 9th standard students in relation to their achievement in mathematics and management. Problem solving ability test is developed and standardized by the investigator. A sample of 600 9th standard students in Y.S.R. Kadapa District of Andhra Pradesh state is collected by following the standardized procedures. 'F' (ANOVA) test and 't' - test were employed for analysis of the data. There is significant influence of achievement in mathematics at 0.05 level of significance and management at 0.01 level of significance on the problem solving ability of 9th standard students.

INTRODUCTION

Life in general and for students in particular has become highly competitive. Secondary level has become very crucial as this higher secondary level shapes the entire future of students. Mathematics is a challenging subject, and performance in Mathematics depends students' clarity in learning basic ideas.

The steps in problem solving are as follows:

Recognize that there is a problem: Not being able to understand that there is a problem should organize by such a manner that it should arouse students' interest to study and solve it.

Define the problem accurately: This seems to involve representing the problem correctly and recognizing concepts that are pertinent to the problem. If the key concepts are not available, the problem may not be solved.

Produce hypotheses about the problem's solution: Based on the concepts selected in the previous step, guesses about how to resolve the problem.

Test the hypotheses: Each hypothesis should be confirmed or disconfirmed. While several hypotheses may solve the problem, it is often possible to select a single best solution. If all are disconfirmed, checking and repeating the previous steps to create different hypotheses is necessary to attain the goal. Mathematics education starts from the day a child is admitted in school and it continues till the child completes studies at the college level. Quantification is the main theme of Mathematics and one cannot remain isolated from the influence of mathematical thought. Ordinary skills like numerical operations, counting and other computations form the very basis of our day-to-day life. There is a growing demand for more scientists, technologists, doctors and many other professionals in every walk of life. Progress in any sense depends upon the growth of Mathematics. Thus, every country in the world has to pay considerable attention to Mathematics education.

Problem solving occurs when an organism or an artificial intelligence system need to move from, a given state, to desired goal state. The productive work involved in the evaluation of the situation and the strategy worked out to

reach one's goals, is collectively termed as problem solving. Problem solving is a deliberate act, involving the use of higher thinking, and systematic planned steps for achieving the set goal. Problem solving ability is the framework, or pattern, within which creative thinking and reasoning ability take place. It is the ability to think, and reason on given levels of complexity. People, who have learned effective problem solving techniques, are able to solve problems at higher level of complexity, than more intelligent people who have no such training. Since frustration is an inevitable commitment of living, a large part of an individual's behavior necessarily involves problem solving activity.

REVIEW OF LITERATURE

Praveen, K (2010) examined the effect of problem solving ability on the achievement in mathematics of high school students. Total 598 students of 10th grade were selected randomly from the different institutions. The findings of the study revealed that 79% variance was contributed by the problem solving ability to achievement in mathematics. The study also revealed that 78.3% boys' and 78.2% girls' problem solving ability contributed to achievement in mathematics.

Mohd. and Tengku (2011) studied the effect of attitude towards problem solving in mathematical achievements. The results showed that level of patience, confidence and willingness had impact on problem solving ability in mathematics. Also, there was significant contribution of overall attitude in problem solving to mathematical achievement. On the other hand, the finding showed that there was no significant relationship between gender & problem solving and mathematical achievement.

Stanly (2014) examined “Problem solving ability of Secondary School Students in Pondicherry region” by considering the data collected from IX- class students. This study revealed that no significant difference was found between the mean scores of problem solving ability of boys and girls students of IX- standards. Mean scores of problem solving ability of government school students significantly different from private school students of IX- class. The means for problem solving ability of urban school students significantly differed from rural school students of IX- standard also the mean scores of problem solving ability of school students of IX- standard differed significantly between high achievers and low achievers.

Mohan Kumar, A and Sekhar, P (2019) "Problem solving ability in mathematics and academic achievement among secondary school students. The present study is designed to make out the status of problem solving ability of 9th standard students sample consists of 432 9th standard students from Chennai and Thiruvallur districts of Tamil Nadu. The study revealed that secondary school students are moderate in problem solving ability and average in academic achievement in mathematics and positive correlation between problem solving ability and academic achievement in mathematics.

Scope of the Study: The main intention of the present study is to find the relation of problem solving ability of 9th standard students with achievement in mathematics and management.

Objective of the Study: To study the influence of problem solving ability of 9th standard students with their achievement in mathematics and management.

Hypotheses of the study

1. Achievement in mathematics would not have significant influence on the problem solving ability of 9th standard students.
2. Management would not have significant influence on the problem solving ability of 9th standard students.

Tools for the Study

1. Problem solving ability test was developed and standardized by the investigator. The total items are 100. All the answer scripts were valued on the basis of the scoring key prepared for the test. **One mark** is awarded for every correct answer and the total marks of the each student were indicated on the top of the answer sheet.
2. The terminal examinations marks were taken as the indices of the level of achievement in mathematics of the 9th standard students.
3. Personal data regarding the student - 1. Name and 2. Management of the school.

Data Collection

The sample for the investigation consisted of 600 9th standard students in Y.S.R. Kadapa District of the state of Andhra Pradesh. The stratified random sampling was applied. In the first stage is management of the school i.e. government and private school, in the second stage is locality of the school i.e. rural and urban school and third stage is gender of the students i.e. boys and girls. In total **300 boys** and **300 girls** are included in this study. It is a **2X2X2 factorial design** with **600** sample subjects. The investigator was visited secondary schools with the permission of the head masters of the secondary schools. The 9th standard students who attended to the school on the day of collection of data are considered for the purpose of the investigation. It was provide to the concerned 9th standard students. 9th standard students were given necessary instructions about the problem solving ability test and motivated to respond genuinely to all the items. The data on each variable in the investigation is properly coded to suit for computer analysis. The analysis was carried out on the basis of objectives of the investigation and hypotheses formulated by employing appropriate statistical techniques. The inferential statistical techniques 't' and 'F'-tests were employed to test hypotheses.

RESULTS AND DISCUSSION

1. Achievement in mathematics

In the present investigation, On the basis of problem solving ability, the 9th standard students are divided into three groups using quartile values. The students whose problem solving ability is up to Q₁ value form as Group - I, Group - II form as above Q₁ and up to Q₃ value and Group - III form as above Q₃ value. The influence of 'achievement in mathematics' on the results of 9th standard students is investigated. The corresponding problem solving ability score of three groups

are analyzed accordingly. The influence of 'achievement in mathematics' on results is investigated through one - way ANOVA technique. The following hypothesis is framed.

Hypothesis - 1

Achievement in mathematics would not have significant influence on the problem solving ability of 9th standard students.

The above hypothesis is tested by employing one - way ANOVA technique.

The results are presented in **Table - 1**.

Table - 1: Influence of achievement in mathematics on the problem solving ability of 9th standard students

S. No.	Achievement in mathematics	N	Mean	SD	'F' - Ratio
1.	Group - I	208	68.44	15.96	3.500*
2.	Group - II	194	68.51	15.69	
3.	Group - III	198	72.06	15.19	

* Indicates significant at 0.05 level

The table value of 'F' for 2 and 597 df at 0.01 level is 4.65 and at 0.05 level is 3.01.

It is clear from the **Table - 1** that the computed value of 'F' (3.500) is greater than the critical value of 'F' (3.01) for 2 and 597 df at 0.05 level. Hence the **Hypothesis - 1 is rejected** for the variable 'achievement in mathematics' at 0.05 level of significance. It is concluded that '**achievement in mathematics**' has significant influence on the problem solving ability of 9th standard students.

2. Management

In the present investigation, the 9th standard students are divided into two groups; on the basis of management 300 government school 9th standard students form as Group - I and 300 private school 9th standard students form as Group - II. The influence of 'Management' on the problem solving ability of 9th standard students is investigated. The corresponding problem solving ability score of two groups are analyzed accordingly. The influence of locality on the problem solving ability is investigated through 't' - technique. The following hypothesis is framed.

Hypothesis - 2

Management would not have significant influence on problem solving ability of 9th standard students.

The above hypothesis is tested by employing 't' - technique. The results are presented in **Table - 2**.

Table - 2: Influence of management on the problem solving ability of 9th standard students

S. No.	Management	N	M	SD	't' - Value
1.	Government	Group - I	300	71.35	2.652**
2.	Private	Group - II	300	67.97	

** Indicates significant at 0.01 level

The table value of 't' for 1 and 598 df at 0.01 level is 2.59 and at 0.05 level is 1.96

It is clear from the **Table - 2** that the computed value of 't' (2.652) is greater than the critical value of 't' (2.59) for 1 and 598 df at 0.01 level. Hence the **Hypothesis - 2 is rejected** for the variable '**management**' at 0.01 level of significance. It is concluded that 'management' has significant influence on the problem solving ability of 9th standard students.

EDUCATIONAL IMPLICATIONS

The findings of the present research have raised some important questions related to the educational needs of the students with special reference to their problem solving ability.

1. Achievement in mathematics is the highly influenced variable on the problem solving ability of 9TH standard students. High achievement students have better problem solving ability than the low achievement students. The administrators have to provide extra coaching facilities for the low achievement students.

2. Management is the highly influenced variable on the problem solving ability of 9TH standard students. Government students have better problem solving ability than the private students. The administrators have to provide good facilities for the private students.

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