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Correlation of problem solving ability and academic achievement in mathematics among school students of secondary level

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Abstract

Mathematics is one of the most important subjects in school. Mathematic presents and develops the "problem-solving" notion, a core component of classroom learning with a strong formative effect on children. Problem solving is the most successful notion in mathematics for conceptualization and re-conceptualization of concepts, operational and basic mathematical information transfer, and ensuring long-term and meaningful learning. The present experimental research intended to find correlation of problem solving ability and academic achievement in mathematics among students at secondary level. The finding of study revealed that there is found strong positive correlation of problem solving ability and academic achievement in mathematics among students at secondary level.

Keywords: *Problem Solving Ability, Academic Achievement, Mathematics.*

INTRODUCTION

Problem solving occurs when an organism or an artificial intelligence system has to go from a given condition to a desired target state, which is the framework or pattern within which creative thinking and reasoning occurs. It is the secret to success and has long been considered the most important part of human behaviour. Knowledge and comprehension are essential for studying mathematics because they provide a foundation for exploring concepts and developing mathematical reasoning to make deductions and solve problems.

Using an appropriate mathematical concepts and problem solving ability in both familiar and unfamiliar situations including those in real - life situations (Ois, 2011).

It is important in the initial learning of mathematical concepts and skills, and not merely as an environment for practicing concepts and skills, as previously noted. According to research, knowledge develops during the problem-solving process, in which important arithmetic concepts and skills are incorporated (Schoen & Charles, 2003). It is extremely important in pupils' academic progress. Academic achievement on the part of pupils is the core goal of all formal educational initiatives. Furthermore, in some circumstances, adolescents are compelled to pursue academic education due to their parents' excessive zeal and drive. Such pupils do not pursue school with a single focus and year, which leads to a negative attitude towards achievement in school. Lack of proper guidance at the right moment hinders the interest, aptitudes, abilities and capacities of an individual. All these problems have contributed to develop negative attitude towards education and effects on academic performance.

Need for the Study

Mathematics is synonymous with problem solving, word problems, pattern creation, figure interpretation, geometric construction, theorem proof, and so on. The goal of teaching mathematics to be effective were students able to solve their problem which shows that learning mathematics aimed to develop their cognitive and affective domain that can support problem solving abilities. Problem resolution is a procedure that allows for a constructive action. It enables students to address problems through creative and critical thinking. Problem-solving aptitude, when combined with a positive mental attitude and a desire to learn, is a powerful force. Problems are the genuine evidences of life that everyone in the world has tactfully, and they are not always sheltered. They have the appearance of an onion, with challenges appearing one after the other. In short, they are always confronted with challenges, and complexities pursue individuals at all hours of the day and night; even children have troubles in the classroom and at home. Children can deal with any problem in their own unique way. Some of the procedures they employ are highly systematic, while others are far more ad hoc. In many circumstances, the methods used by children to address their problems are, at best, simple for youngsters; this might indicate a variety of things. Children may feel disappointed and frustrated if they do not address their difficulties. Children who solve issues, on the other hand, may feel quite protected and courageous. Problem solving assists kids in developing a stronger and more unified sense of self. In this way the current research mainly focus on problem solving abilities of secondary students. Hence the present problem is need of the hour.

Therefore, the investigator was used to find out the ground realities entitled as " ***correlation of problem solving ability and academic achievement in mathematics among school students of secondary level*** **".**

Review of Related of Literature

- Venkatarathanam (2021) - a study on problem solving ability of higher secondary school students in relation to their academic achievement**.** The purpose of the study is to analyse the problem solving ability of higher secondary school students in relation to their Academic Achievement. The students of class XI and XII standard studying in higher secondary schools of Thiruvallur District constitute the population of the study. The sample consists of 300 students of Class XI and XIIth standard from 6 different higher secondary schools of Thiruvallur District. The Problem Solving Ability Test (PSAT) developed by L.N.Dubey was used for the study. The marks obtained in the half yearly examination were considered as academic achievement of higher secondary students. The finding of the study reveals that the moderate level of problem solving ability among higher secondary students and It was found that the moderate level of academic achievement among higher secondary students. The study reveals that there is no significant difference between the Male and Female Higher Secondary School Students on their Problem solving ability and Academic Achievement. It was found that there is a significant difference between the rural and urban higher secondary school students on their Problem Solving Ability and Academic Achievement. The study also reveals that there is a positive relationship between problem solving ability and Academic Achievement of higher secondary Students.
- Hooda, Madhuri (2018) - Effect of Problem Solving Ability on Mathematics Achievement among Secondary School Students: An Empirical Study. The purpose of the present study is to investigate the mathematics achievement of secondary school students in relation to problem solving ability and gender. Descriptive survey method was used. Problem Solving Ability and Gender were treated as independent variables whereas Mathematics Achievement was treated as dependent variable. A sample of 400 secondary school students was selected through multi-stage random sampling technique. The findings of the study revealed that problem solving ability and gender has significant main effect on the mathematics achievement of the secondary school students. However, no significant double interaction effect of problem solving ability and gender on mathematics achievement of the secondary school students was found. Thus, efforts should be made to help the students to improve their problem solving ability which will help them in improving their mathematics achievement. Workshops and seminars should also be organized in all educational institution to guide the students about the various techniques to enhance the mathematics achievement. The findings of the present study has an implication for teachers that they should use the appropriate classroom techniques, methods and tools so that better problem solving ability can be accomplished.
- Vani (2015) - Problem Solving Ability and Academic Achievement in Mathematics of VII Standard Students in Madurai District. A survey was conducted to find out the relationship between problem solving ability and academic achievement in

Mathematics of VII Standard Students in Madurai District. For the present study Problem Solving Scale was used which consists of 25 items under 6 dimensions. The sample consists of 300 Stratified randomly sampled for VII Standard students (includes both gender) procured from 6 different Secondary and Hr. Sec. Schools in Madurai Region. The data collected from the sample was statistically analyzed using SPSS package. The result revealed that the sample at the problem solving ability and academic achievement for vii standard students. Relationship between problem solving and academic achievement is high positive.

Objective of the Study

- To study the correlation of problem solving ability with academic achievement in mathematics among students at secondary level.

Hypothesis of the study

1 There is no significant correlation of problem solving ability with academic achievement in mathematics among students at secondary level.
2 There is no significant correlation of problem solving ability with academic achievement in mathematics among boys at secondary level.
3 There is no significant correlation of problem solving ability with academic achievement in mathematics among girls at secondary level.

Research Method

In the present study quasi-experimental method has been used. In this method two groups were selected as- experimental group and control group. In this method Total 15 Lesson plan on problem solving skills among mathematics subject has been prepared by the Researcher.

Sample of the Study

The present study was conducted on adolescent boys and girls of 8 and 9th class. For this the sample consists of 100 students.

Tools used for the Study

In the present study self-developed achievement test has been used to find academic achievement of students in mathematics subject.

Statistical techniques:

In the present study Correlation of coefficient has been used for data analysis.

Data Analysis and Interpretation

$H_0$1 - There is no significant correlation of problem solving ability with academic achievement in mathematics among students at secondary level.

Table 1

Correlation of problem solving ability with academic achievement in mathematics among students at secondary level

Variable	N	'r' value	Result
Problem Solving Ability	100	0.76*	Strong positive

Academic Achievement			correlation

*Significant at 0.01 level

Table 2 indicates the correlation between problem solving ability and academic achievement. From the observation of table it is clear that the 'r' value is 0.76, which is quite strong positive correlation between problem solving ability and academic achievement on mathematics among secondary level students. As a result, formulated null hypothesis H03 "There is no significant correlation of problem solving ability with academic achievement in mathematics among students at secondary level" is rejected.

$H_0$2 - There is no significant correlation of problem solving ability with academic achievement in mathematics among boys at secondary level.

Table 2

Correlation of problem solving ability with academic achievement in mathematics among boys at secondary level

Variable	N	'r' value	Result
Problem Solving Ability	50	0.72*	Strong positive correlation
Academic Achievement			

*Significant at 0.01 level

Table 2 indicates the correlation between problem solving ability and academic achievement. From the observation of table it is clear that the 'r' value is 0.72, which is quite strong positive correlation between problem solving ability and academic achievement on mathematics among secondary level boys. As a result, formulated null hypothesis H03 "There is no significant correlation of problem solving ability with academic achievement in mathematics among boys at secondary level" is rejected.

$H_0$3 - There is no significant correlation of problem solving ability with academic achievement in mathematics among girls at secondary level.

Table 3

Correlation of problem solving ability with academic achievement in mathematics among girls at secondary level

Variable	N	'r' value	Result
Problem Solving Ability	50	0.73*	Strong positive correlation
Academic Achievement			

*Significant at 0.01 level

Table 3 indicates the correlation between problem solving ability and academic achievement. From the observation of table it is clear that the 'r' value is 0.73, which is quite strong positive correlation between problem solving ability and academic achievement on mathematics among secondary level girls. As a result, formulated null hypothesis H03 "There is no significant correlation of problem solving ability with academic achievement of mathematics among secondary level" is rejected.

Conclusion and Implication

The finding of study revealed that there is found strong positive correlation of problem solving ability and academic achievement on mathematics among secondary level students. The reason behind is that the parents of secondary students provide more facilities and opportunities to their children in developing their problem solving ability through seminars, discussions and other play-way techniques. They motivate and help their children to excel in various fields and this develops high problem solving ability among them. Problem solving is essential for success and is recognized as the most important part of human behaviour. One of the primary goals of education is to improve the ability to achieve higher levels of performance. No two people are alike. Individual variances exist in problem-solving skill. Some people can manage a situation, while others cannot. A considerable portion of a person's life is devoted struggling to discover effective solutions to his difficulties. A student who is adept at problem solving will be well adjusted both in class and at home. Educators can play an important role in building a teaching and learning environment by presenting concepts in an activity-oriented manner to alleviate or minimize mathematics fear. Various types of co-curricular activities can be organized frequently to promote qualities such as cooperation, tolerance, open-mindedness and sharing of responsibilities to enhance their Problem Solving Ability.

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