A Correlational Study of Mathematical Interest and Problem-Solving Ability of Male and Female Students of Secondary Level

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ABSTRACT

The present study aimed to examine whether students with stronger problem-solving abilities also show a higher interest in mathematics. Mathematics, as a foundational subject in school education, contributes significantly to the development of logical reasoning and critical thinking. Problem-solving ability, a crucial cognitive skill, enables students to approach mathematical situations effectively. The study adopted a correlational research design and included a sample of 160 secondary level students (80 boys and 80 girls) selected through random sampling from CBSE-affiliated schools in Ghaziabad district. Standardized tools were used to assess both mathematical interest and problem-solving ability. Data analysis was carried out using Karl Pearson's correlation coefficient. The results indicated that there was no statistically significant correlation between problem-solving ability and mathematical interest for both boys (r=0.185) and girls (r=0.167). This suggests that, in the selected sample, students with higher problem-solving ability do not necessarily exhibit greater interest in mathematics. Although the hypothesis that mathematical interest depends on problem-solving ability was not supported by the findings, the study highlights the importance of exploring other factors such as teaching methods, learning environment, and personal motivation, which may influence students' interest in mathematics.

Keywords; Correlational study, Mathematical Interest, Problem-Solving Ability, and Secondary level

INTRODUCTION

Education is not confined to the walls of a classroom or the pages of a book; it is a dynamic and lifelong process that shapes our perspectives, values, and actions (Erdoğan Coşkun, A., 2022). At its essence, education goes beyond the acquisition of facts and figures. It is about fostering curiosity, critical thinking, and problem-solving skills that empower individuals to explore and understand the world around them. Education also acts as a powerful agent of change, driving innovation, economic development, and social transformation.

During schooling, the learners are exposed to different branches of knowledge like language, mathematics, social science, arts, physical and health education, etc. by exposing learners to these areas will enable them to acquire the subject specific competencies. Mathematics is one of the core and compulsory subject at school level.

Mathematics is a collection of ideas organized through logical reasoning. Mathematics is most likely the ancient organized discipline of human knowledge, developed continuously in the major culture. The theory, principles, axioms and methods played an important role in the evolution of the subject as it is learned and used today. Mathematics have a central place in educational research. Mathematics has a unique place in the school curriculum, desire to improve its effectiveness has sparked wide range of research aimed at understanding the nature and conceptual development of mathematics in order to produce optimal learning. Mathematics is highly structured subject and attracted by the Psychologists, Educationists. They use mathematics for the development of human learning, understanding and ability.

Ability of Problem solving is a cognitive process that comprises of discovering, analysing solving problems (Wu, H., & Molnár, G., 2022). Problem solving helps in overcoming obstacles and resolves the issue. It is the process of working through details of a problem to reach a solution.

Kumar, A. (2021) pointed out that problem solving includes systematic operations and can be used to assess on individual's critical thinking abilities. Problem solving is the higher level of cognitive process that necessitates

the modulation and control of fundamental skills. Mathematical problems may be solved through formula, symbols, and equation directly. Mathematics is not limited to only concrete problems but it includes abstract problems. Learners of mathematics face real-life problems which are solved through the conversion of real-life situation into mathematics by using some suitable conditions.

Mathematical problem-solving ability enhances the higher order thinking and logical reasoning of the learner. The nature of mathematics is objective and it requires the conceptual understanding so that it can be applied to solve the real-life problems. Student's willingness is to solve the mathematical problems and other activity of the real-life. Student must be ready to learn mathematics and develop their cognitive ability to understand and solve problems of mathematics as well as real world problem. Dhyani, Vidhi (2014) conducted a study on "A study of mathematical aptitude in relation to intellectual and problem-solving abilities of secondary level students." Seemaichamy, A. (2017) studied "Performance in mathematics in relation to emotional intelligence and problem-solving ability of secondary school students." V. Jyothi (2019) investigated "A Study on Secondary School Students Attitude towards Mathematics and Their Problem-Solving Ability." Milan, L. A (2021) examined study of "Problem-solving ability aptitude and interest in the achievement of mathematics among secondary school students." Sarkar, Satyajit (2022) investigated "relationship of reasoning ability, problem solving skill and achievement in mathematics among secondary school students." Singh, Dilip (2023) investigated "Mathematical Problem-solving Ability among Secondary School Students in relation to Mathematical Aptitude and Mathematics Self-concept." Babu Ganesh, A (2023) examined "Effect of Neurocognitive Modeling in Enhancing Problem-Solving Ability of Mathematics among Secondary Level Students."

Objectives Of the Study

1. To study the relationship between Mathematical Interest and Problem-Solving Ability of secondary level students among boys.
2. To study the relationship between Mathematical Interest and Problem-Solving Ability of secondary level students among girls.

Hypotheses Of the Study

1. There is a significance correlation between the Mathematical Interest and Problem-Solving Ability of secondary level students among boys.
2. There is a significance correlation between the Mathematical Interest and Problem-Solving Ability of secondary level students among girls.

Delimitations Of the Study

1. The data were collected from the students studying at secondary level (9^{th} class).
2. The study was confined to the school of Ghaziabad district affiliated to CBSE board.

Population And Sample for The Study

All the students of secondary level (9^{th} class) under the CBSE schools of Ghaziabad district were the population of this study. Total 10 CBSE schools were selected by Random sampling method. 8 boys and 8 girls students were selected from each school by random sampling method. Hence total 160 students were sample size for the study. The sample table is given in the table-1.

Table-1: Sample Table

Gender	Sample from each school	Number of total schools selected randomly	Total sample
Boys	8	10	80
Girls	8		80
Total	8		160

RESEARCH TOOLS

Following standardized tools were used for data collection:

(I). Mathematical Interest Scale:

Data for Mathematical Interest was collected by the 'Mathematical Interest Scale' which is Dr. Uma Tandan and Ashok Pal. The scale consists of both positive and negative statements. Positive statements are to be scored on the basis of weightage of 5,4,3,2,1 and negative statements are to be scored as 1,2,3,4,5 for Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree responses (table-03). After scoring each item the scores are added and thus total score of an individual is computed.

Table-02: Scoring Weightage

Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

(II). Problem-Solving Ability Test:

Data for Problem-Solving Ability was collected by the 'Problem-Solving Ability Test' which is prepared and standardized by Roop Rekha Garg. The present test consists total 22 problems along with alternative answers, (except items No. 2 and 20) in which only one answer is correct. If the teste writes the correct answer he should be awarded one marks and for the wrong answers zero should be given. The maximum marks will be 22.

ANALYSIS AND INTERPRETATION OF DATA

Hypothesis 1:

There is significance correlation between Mathematical Interest and Problem-Solving Ability of secondary level students among boys.

The first objective of the present study is to study the relationship between Mathematical Interest and Problem-Solving Ability of secondary level students among boys. To fulfil this objective, correlation coefficient was calculated through Karl Pearson correlation method, which has been presented in Table 3.

Table 3: Correlation between Mathematical Interest and Problem-Solving Ability of Secondary Level Students among Boys

Variable	Correlation coefficient (r)	df	Value of significance level	Result
Mathematical Interest	0.185	78	0.217	Not Significant
Problem-Solving Ability				

Significance level-0.5

In the above table 3, to examine the correlation between mathematical interest and problem-solving ability of secondary level students among boys, the Pearson correlation coefficient technique was used. The obtained correlation value is 0.185 which is less than the critical value 0.217 at the 0.05 level of significance.

Hence, hypothesis -there is significance correlation between Mathematical Interest and Problem-Solving Ability of secondary level students among boys is rejected. Thus, it is clear that there is no significant correlation

between mathematical interest and problem-solving ability of secondary level students among boys.

Hypothesis 2:

There is significance correlation between Mathematical Interest and Problem-Solving Ability of secondary level students among girls. For testing of this hypothesis, the related data is presented in Table 4..

Table 4: Correlation between Mathematical Interest and Problem-Solving Ability of Secondary Level Students among Girls

Variable	Correlation coefficient (r)	df	Value of significance level	Result
Mathematical Interest Problem-Solving Ability	0.167	78	0.217	Not Significant

Significance level-0.5

To examine the correlation between mathematical interest and problem-solving ability of secondary level students among girls, the Pearson correlation coefficient technique was used. The obtained correlation value is 0.167 which is less than the critical value 0.217 at the 0.05 significance level. Hence, hypothesis-there is significance correlation between Mathematical Interest and Problem-Solving Ability of secondary level students among girls is rejected. Thus, it is clear that there is no significant correlation between mathematical interest and problem-solving ability of secondary level students among girls.

CONCLUSION

The study found no statistically significant correlation between mathematical interest and problem-solving ability among both boys and girls. This indicates that the relationship between mathematical interest and problem-solving ability is very low and statistically not significant. Therefore, it can be concluded that among the selected sample, problem-solving ability does not have meaningful impact on the mathematical interest of secondary level students. This may be due to the fact that students may have mathematical interest due to external factors (e.g., teacher influence, enjoyment of subject, parental motivation), not necessarily because they are good problem solvers. and Problem-solving ability and interest might develop separately, meaning a student can be good at solving problems but still not be interested in mathematics, or vice versa.

Understanding the correlation between interest and problem-solving abilities can lead to tailored educational approaches that better engage students and enhance learning outcomes in mathematics. Insights gained from the study can inform curriculum development to make mathematics education more relevant and engaging, potentially leading to increased student interest and better problem- solving skills.

Identifying factors that influence students' interest and problem-solving abilities can help educators provide targeted support and interventions to students who may be struggling in these areas.

Despite the importance of mathematics education, there may be gaps in the literature regarding the relationship between interest and problem-solving abilities specifically at the secondary level. This study can help fill that gap and contribute to the existing body of research.

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