

MATHEMATICAL PROBLEM SOLVING ABILITY AND ACADEMIC ACHIEVEMENT AMONG HIGHER SECONDARY STUDENTS

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Abstract

Mathematics is one of the important subjects in school education. Mathematic introduces and develops the "problem - solving" concept, fundamental component of school learning with a strong formative effect on students. In mathematics problem solving represents the most effective concept to conceptualization and re-conceptualization of concepts, to operational and basic mathematical knowledge transfer to ensure a sustainable and meaningful learning. The present survey research intended to find the levels of mathematical problem solving ability and achievement in mathematics of higher secondary first year students for that the required data were collected from 360 sample using random sampling technique along the Mathematical Problem Solving Ability Test (MPSAT) and achievement test in mathematics. The finding reveals that mathematical problem solving ability and achievement in mathematic of higher secondary first year students are found to be average. There is a significant difference among students on their mathematical problem solving ability in terms of their residential background and medium of instruction. Considering achievement in mathematics there is also significant in terms of their gender.

Keywords: Problem Solving Ability, Mathematics, Academic Achievement.

Introduction

Right from the elementary level, children learn mathematical problems from school experiences. Solving mathematical problems is a kind of experience which comprise of cognitive, creative and evaluative process of mind. The cognitive process like thinking, logical reasoning and evaluation are required to solve any kind of problems in day to

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 mathematics problem are similar to the general problem solving.

Mathematical Problem Solving

Mathematical Problem Solving is a process that involves a set of factors and tasks to achieve a defined goal. "Helping students construct a deep understanding of mathematical ideas and processes by engaging them in doing mathematics: creating, conjecturing, exploring, testing and verifying".

Academic Achievement

Academic achievement or academic performance is the extent to which a student, teacher or institution has achieved their short or long term educational goals. Academic achievement may refer to a pupil's performance in a given academic arena where pupil earns good grades or awards in mathematics.

Review of Related Study

Umadevi M.R. (2009) conducted a study on 'A study on the relationship between Problem Solving Ability and Academic Achievement of Secondary School Students'. The objectives of the study were to investigate the problem solving ability of IX standard students based on sex and type of school, to investigate the mean difference if any between the level of problem solving ability of IX standard students with their academic achievement and to investigate the relationship between problem solving ability and academic achievement of IX standard students. The findings indicated that there was no significant difference in problem solving ability of boys and girls. There was significant difference in problem solving ability of students studying in government and private schools and there was a significant relationship between academic achievement of students with high, moderate and low problem solving ability.

Need for the Study

The school education of higher secondary level is one of the most important one in every student's life because it is the professionally turning point. There are different groups are available pursuing higher secondary level like maths, biology, commerce and accountancy, history and economics and vocational etc., The students are studying at higher secondary with mathematical in somehow they differ firm other groups in terms paper studying and practical experience. The critical and logical thinking are required to the solving mathematical problems that is assumed that will help to acquire better performance in other subjects in terms of achievement. Observation of researchers especially previous results of the term end examination

something different in relation to their academic achievement. Hence, researchers take out study to find what is.

Objectives

- Levels Mathematical Problem Solving Ability and Academic Achievement of higher secondary first year students are high.
- To find out whether there is significance difference on Mathematical Problem Solving Ability and Academic Achievement higher secondary first year students in terms of their Gender, locality, Medium of Instruction, Subject Group and Family Type.

Hypotheses

- There is no significant difference in Mathematical Problem Solving Ability and Academic Achievement of higher secondary first year students in terms of their Gender, locality, Medium of Instruction, Subject Group and Family Type.
- There is no significant relationship between Mathematical Problem Solving Ability and Academic Achievement among higher secondary first year students.

Methodology

Descriptive Survey method was adopted and 360 students of eleventh class represented the sample of this study by random sampling technique. Standardised tools were used Problem Solving Ability Test (PSAT) designed and validated by L.N.Dubey (2006). In Statistical Analysis Mean, Standard Deviation, t-Test were used.

Tools Description and Administration

Problem Solving Ability Tool

This problem solving ability tool was developed by L.N. Dubey. It has 20 problems in the test. Each problem has four alternative answers. Only one among the four is correct answer, respondent secure one mark for right answer and zero for wrong answer.

Achievement Test

Third mid-term examination marks have been accounted for achievement test scores which had been conducted by district examination board.

Administering the Test Tool

Careful attention was taken while administering the problem solving test in terms of seating arrangements, instruction about tool and test duration.

Statistical Techniques

To analyse the collected data percentage analysis, Mean, SD, t and carl-pearson product movement coefficient of correlation (r) were used as statistical techniques.

Hypotheses Testing

Table No 1. Number, Percentage of Mathematical Problem Solving Ability and Academic Achievement of Students in Three Different Levels

Variable	Low		Average		High	
	N	%	N	%	N	%
Mathematical Problem Solving Ability	96	26.6	176	48.8	88	24.4
Academic Achievement	113	31.3	150	41.6	97	26.9

Considering the Table no. 1, it is evident that along the percentage analysis the level of mathematical problem solving ability and academic achievement of higher secondary first year students in Tiruchirappalli district are found to be Average.

Table No 2. Number (N), Mean (M), Standard Deviation (S.D) and't' Value of Mathematical Problem Solving Ability and Academic Achievement of Higher Secondary First Year Students with Respect to their Background variables

Main Variable	Background Variable	Category	N	Mean	S.D	't' Value	Remarks
Mathematical Problem Solving Ability	Gender	Boys	172	116.61	13.66	0.87	NS
		Girls	188	117.06	13.39		
	locality	Urban	213	118.36	13.06	2.31	S
		Rural	147	115.45	13.69		
	Medium of Instruction	English	226	118.54	14.82	2.30	S
		Tamil	134	111.12	11.96		
	Subject Group	Biology	156	104.34	9.30	1.62	NS
		Computer science	204	112.32	11.92		
Family Type	Joint family	96	102.71	9.93	0.51	NS	
	Nuclear family	264	101.39	12.33			
Academic Achievement	Gender	Boys	172	320.42	85.76	1.32	S
		Girls	188	385.54	78.63		
	locality	Urban	213	342.60	69.51	1.86	S
		Rural	147	356.71	89.86		
	Medium of Instruction	English	226	354.50	70.51	1.33	S
		Tamil	134	324.31	67.73		
	Subject Group	Biology	156	345.81	77.62	1.53	S
		Computer Science	204	381.70	72.58		
Family Type	Joint	96	396.50	73.50			

		family				0.51	NS
		Nuclear family	264	401.21	63.00		

Table No 3. Correlation between Mathematical Problem Solving Ability and Academic Achievement of Higher Secondary First Year Students

Variables	N	Calculated 'r' Value	Table Value	Remark
Mathematical Problem Solving Ability Vs Academic Achievement	360	0.06	0.108	NS

Findings

- The level of mathematical problem solving ability and academic achievement among higher secondary first year students is found to be average.
- There is no significant difference between boys and girls students on their mathematical problem solving ability.
- There is significant difference between boys and girls students on their academic achievement. Girls are found greater than on their academic achievement.
- There is significant difference between urban and rural students on their mathematical problem solving ability and academic achievement. Urban students are found greater than rural students.
- There is significant difference between Tamil and English medium students on their mathematical problem solving ability and academic achievement. English medium students are found greater than Tamil medium students.
- There is no significant difference between biology group and computer science group students on their mathematical problem solving ability, but significantly differ on their academic achievement especially computer science group students are better performer.
- Considering the family status of the students no significant appear both in mathematical problem solving and academic achievement.
- Finally there is no significant while find the correlation of these two variables such as mathematical problem solving ability and academic achievement.

Conclusion

According to the analysis of data, mathematical problem solving ability may not be associated to the academic achievement the findings of sub variables attract the researchers to carry out the similar kind of research in future. And he findings shows that steps to be taken for improve the problem solving ability of higher secondary students.

This study will help the teachers and head masters consider the findings for the future academia of higher secondary students.

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