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Problem Solving Ability And Achievement in Mathematics of XI Standard Students

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Absract

The present study helps to provide some information about Mathematics teaching and learning focuses to develop the ability to solve a wide variety of complex mathematical problems. To many mathematically literate people Mathematics is synonymous with solving problems, doing word problems, creating patterns. The sample consists of 100 students in Tirunelveli district. The study reveals that there is no significant difference between male and female, rural and urban XI std. Students. Mathematics is an essential discipline because of its practical role to the individual and society. Presenting a problem and developing the skills needed to solve that problem is more motivational than teaching the skills without a context.

Reference to this paper should be made as follows:

A. Kiruba*,
Dr. M. Antony Raj**

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Introduction:

Problem solving Ability is the highest form of learning in Gagne's theory of learning. Asubel (1998) views, "The ability to solve a problem is the primary goal of education". Mathematics teaching and learning focuses to develop the ability to solve a wide variety of complex mathematical problems. To many mathematically literate people Mathematics is synonymous with solving problems, doing word problems, creating patterns, interpreting figures, developing geometric constructions, proving theorems etc.

The National Council of Teachers of Mathematics (NCTM 2000) recommended that problem solving be the central focus of Mathematics teaching because it encompasses skills and functions, which are important parts of one's everyday life .Problem solving involves taking series of actions in the process of an investigation that seeks to bridge the gap between a problem state and the anticipated goal. A problem solving strategy, therefore, comprises action and steps taken by the learner to reach anticipated goal when faced with the problem situation. Problem solving behaviour occurs in novel or difficult situations in which a solution is not obtainable by the habitual methods of applying concepts and principles derived from past experience in very familiar situations. Achievement may be defined as a change in the behavior in a desired direction. It is an important and essential constituent in the process of evaluation

Significance of the study:

The problem solving is an activity that involves the students engagement in a variety of cognitive actions including accessing and using previous knowledge and experience successful problem solving involves coordinating previous experience, knowledge familiar representations patterns is inference intuition in an effort to generate new representations and related patterns of inference that resolve the tension or ambiguity that promote the original problem solving activity.

The present study helps the teacher to get an idea of problem solving ability of their students and how the students can perform in their life. So, this plays a significant role in deciding their problem solving ability and achievement in mathematics. If problem solving ability of XI Std. students is improved, it will be more effective in their achievement in mathematics. This will help them in their higher studies.

Objectives of the Study:

1. To find out the level of problem solving ability of XI std. students and its dimensions.
2. To find out the level of achievement of XI std. students.
3. There is no significant difference in the problem solving ability and its

dimensions of XI standard students in terms of gender and locality of the school.

4. There is no significant difference in the problem solving ability and its dimensions of XI standard students in terms of locality of school.

5. To find out whether there is any significant relationship between the problem solving ability and achievement in mathematics of XI standard students.

Hypothesis:

1. There is no significant difference in problem solving ability and its dimensions of XI std. students with respect to its gender.

2. There is no significant difference in problem solving ability of XI std. students with respect to its locality of school

3. There is no significant relationship between problem solving ability and achievement in mathematics of XI std. students.

Method:

The survey method is used in the present study

Sample:

The investigator used the random sampling technique for selecting the sample. The population of the study covers the students of Tirunelveli Educational district. The sample consists of 100 XI std. students.

Tools used for the Present study:

Problem solving ability inventory prepared by the investigator and her guide.
Achievement questionnaire prepared by the investigator and her guide.

Statistical Techniques Used:

Mean, t-test, were used for analyzing the data.

Data Analysis:

Table 1

Level of problem solving ability of XI std. students and its dimensions

Variables	Low		Moderate		High	
	N	%	N	%	N	%
Numerical ability	8	8.0%	92	92.0%	4	4.0%
Figural ability	6	6.0%	90	90.0%	0	0.0%
Logical ability	0	0.0%	89	89.0%	11	11.0%
Analytical ability	22	22.0%	67	67.0%	11	11.0%
Problem solving ability	23	23.0%	61	61.0%	16	16.0%

It is inferred from the above table that the level of numerical ability, figural ability, logical ability, analytical ability and problem solving ability are moderate.

Table. 2

Level of achievement of mathematics of XI std. students

Variables	Low N %	Moderate N %	High N %
Achievement in mathematics	11 11.0%	84 84.0%	5 5.0%

Its inferred from the above table that achievement in mathematics is moderate.

Table. 3

Difference in problem solving ability and its dimensions of XI std. students with respect to its gender.

Dimensions	Male (N=50)		Female (N=50)		Calculated 't' value	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Numerical ability	4.64	0.485	2.860	0.385	0.99	NS
Figural ability	3.04	0.198	2.38	0.753	1.13	NS
Logical ability	1.94	0.867	1.74	0.671	1.57	NS
Analytical ability	1.76	0.765	2.88	0.800	1.41	NS
Problem solving ability	1.58	0.642	2.26	0.679	1.19	NS

(At 5% level of significance, the table value of 't' is 1.96)

It is inferred from table that there is no significant difference between male and female XI std. students in their problem solving ability and its dimensions.

From the mean value it is inferred that numerical ability, figural ability, logical ability and problem solving ability male are better than female. But in analytical ability female are better than male.

Table. 4

Difference in problem solving ability and its dimensions of XI std. students with respect to its locality of school.

Dimensions	Rural (N=41)		Urban (N=59)		Calculated 't' value	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Numerical ability	2.176	0.017	1.671	0.286	1.82	NS
Figural ability	1.17	0.408	2.68	0.643	1.36	NS
Logical ability	2.00	0.632	1.82	2.789	0.54	NS
Analytical ability	1.20	0.623	1.54	1.001	1.59	NS
Problem solving ability	0.59	0.753	1.51	1.191	1.25	NS

(At 5% level of significance, the table value of 't' is 1.96)

It is inferred from table that there is no significant difference between rural and urban XI std. students in their problem solving ability and its dimensions.

From the mean value it is inferred that urban XI std. students are better than rural students in figural ability, logical ability, analytical ability and problem solving ability. In numerical ability rural XI std. students are better than urban students

Table 5

Relationship between problem solving ability and achievement in mathematics of XI std. students

Dimensions	Calculated 'g' Value	Table Value	Remarks at 5% level
Numerical ability	0.157	0.197	NS
Figural ability	0.136		NS
Logical ability	0.219		S
Analytical ability	0.257		S
Problem solving ability	0.165		NS

It is inferred from the above table that there is no significant relationship between numerical ability and figural ability and problem solving ability. There is significant relationship between logical ability, analytical ability

Interpretations:

1. Its inferred that logical ability uses the straight facts in order to solve problems, It is the process of using a rational, systematic series of steps based on sound mathematical procedures and given statements to arrive at a conclusion. So it is significant with achievement
2. It is inferred that analytical ability to visualize, articulate, conceptualize or solve both complex and uncomplicated problems by making decisions that are sensible given the available information and ability to visualize, gather information, articulate, analyze, solve complex problems, and make decisions. Analytical skills are essential in the workplace to ensure necessary problem solving occurs to keep productivity and other areas of the workforce functioning smoothly. So its significant with achievement

Conclusion:

Problem solving is an important component of Mathematics because students would be able to achieve all the three values namely functional, logical and aesthetic. The main objective of teaching Mathematics is to train up the students in the art of problem solving. Problem solving in Mathematics is helpful in the proper development of one's mental powers. Every problem in Mathematics trains an individual in scientific method of reasoning and thinking.

The habit of thinking and problem solving developed by the study of Mathematics helps in establishing an intelligent and good understanding of our surroundings and in the development of some common abilities like arithmetic reasoning, numerical ability and logical reasoning which are very much essential for the day to day life situations. Mathematics is an essential discipline because of its practical role to the individual and society. Presenting a problem and developing the skills needed to solve that problem is more motivational than teaching the skills without a context.

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