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ACHIEVEMENT IN MATHEMATICS OF HIGHER SECONDARY STUDENTS IN RELATION TO THEIR PROBLEM-SOLVING ABILITY, SELF-CONCEPT AND ATTITUDE TOWARDS MATHEMATICS

***Nancy A**
****Dr. S. K. Sivasubramanian**

*Research scholar, Department of Education, Annamalai University

**Associate Professor (Retd.,), Department of Education, Annamalai University

Abstract

The present study is an attempt to study the relationship in Achievement in Mathematics of higher secondary students in relation to their problem-solving ability, self-concept and attitude towards Mathematics. Problem Solving Ability Test scale (Dr.
Roop Rekha Garg,1986), Self -concept scale, (Ms.Manju Agarwal (1995))and Mathematics attitude scale (Dr. C. Dandapani,2015) were used to collect the data required for the study.

The main objectives of the study were to find out if there is any significant relationship between variables taken for the study viz., Problem solving ability, self-concept, attitude towards Mathematics and achievement in Mathematics of higher secondary students,

Random sampling technique was applied in the present study. Data for the study was collected from 1000 higher secondary students from the schools in Thanjavur town.

The findings revealed that there exists no significant relationship between

Problem solving ability and attitude towards Mathematics, self-concept and Achievement in Mathematics of higher secondary students. There is significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students.

Keywords: Problem solving ability, self-concept, attitude towards Mathematics, Achievement in Mathematics and higher secondary students.

1.1.0 INTRODUCTION

The role of education is the important factor for the development of a nation. It is only education through which the change on a grand scale in the society can be achieved. While food, clothing and shelter are the basic needs, education is also the basic need of human life.

The progress of society and the development of an individual go hand in hand. It is universally accepted that any country needs a higher priority towards its educational development, so that it ensures its quality to produce the right kind of persons to the country. Science and technology improves the effective utilization of the natural resources while education is concerned with the development of human resources. In this context, in the modern society, the process of education is not merely to impart knowledge but to develop desirable habits, interests, attitudes and skills which help the individual to lead a full and worthwhile life.

1.2.0 REVIEW OF RELATED LITERTURE

Madhvi Agrawa (2015) made an attempt to find out the relationship between Academic Achievement and Self-Concept of Secondary Level Students. The purpose of this research was to investigate the relations of Academic achievement and Self-Concept in relation to gender, area of school and type of the school of secondary level Students. The sample for the investigation comprised 400 secondary class students, where 200 boys and 200 girls of class IX from various government or sarvodaya vidhalayas and public schools in East Delhi and North-East Delhi within the age range of 15-16 years, from urban and rural areas were taken as a sample in the academic year of 2011-2012 who participated in the research. Problem Solving Ability Test scale (Dr. Roop Rekha Gorg), Self -concept scale,(Ms.Manju Agarwal (1995))and Mathematics attitude scale (Dr. C. Dandapani) were used to collect the data required for the study

The descriptive statistics, pearson's coefficient of correlation and t-test were used in the analysis of data. One of the findings of the study was that no significant difference was observed in the self-concept of the secondary level student in gender, and management variation, but urban students have better self-concept than rural students. Results further revealed non-significant difference in achievement motivation with regard to locale and management variation of secondary level students, but boys showed better academic achievement than girls. Another finding of the study revealed that socio-economic selfconcept of the girls was better than their counterpart, results of the study also revealed that temperamental qualities, emotional tendencies and mental health of urban students were better as compared to rural students. The study also revealed significant relationship between the two variables of self-concept and academic achievement.

Mzohwe Yahya Mazanz (2019) conducted a study on “Investigating Students’ Attitude towards Learning Mathematics.” Students’ learning of and performance in mathematics is affected by a number of factors, including students’ attitude towards the subject, teachers instructional practices, and school environment. This study was conducted to investigate students’ attitudes towards learning mathematics in Tanzania. It also sought to ascertain reasons for the liking or disliking mathematics and the relationship between attitude and performance.The ABC Model was employed and the Walberg’s Theory of Productivity to investigate students’ attitudes towards mathematics and associated factors. The quantitative and qualitative data were collected from 419 primary school students, 318 secondary school students, and 132 College students from 17 schools and 6 colleges in mainland Tanzania using a survey. The collected data were analysed using percentages, means, standard deviations, ANOVA, correlation, regression and thematic analysis. The results show that initially students exhibit a positive attitude towards mathematics, but their attitude becomes less positive as the students move forward to higher levels of education. A significant positive weak correlation between students’ attitude and performance was established. Mathematics’ enjoyment and

attitude significantly predicted students' performance in our data. The factors influencing the students' liking or disliking of mathematics constituted student's aptitude attribute, instructional and social psychological environmental factors. Furthermore, the results show that failure in examinations is attributed to teacher didactic strategies, institutional resources, poor learning and examination strategies, and failure to understand instructions. The results provide insights for future research and inciting changes in teaching- learning practices that would promote mathematics enjoyment and subsequent better performance in the subject.

Shraddha Sharma and Deepti Sharma (2023) conducted a Study of Effect of Self-

Concept and Problem Solving Ability on Academic Achievement of Higher Secondary School Students of Indore. Education is one of the important transformation and effective input for nation building. One of the main purposes of the Education is to develop the students through providing proper conditions for them so to reach the highest levels of Academic Achievement .The purpose of the study is to investigate the effect of Self-concept and Problem Solving Ability on Academic Achievement of Higher Secondary School Students. The objective of the study was to study the effect of Self- Concept, Problem Solving Ability and their interaction on Academic Achievement of students. Hypothesis was "There is no significant effect of Self-Concept, Problem Solving Ability and their interaction on Academic Achievement of students". The students of class XI and XII standard studying in higher secondary schools of Indore District constitute the population of the study. The sample consists of 104 students of Class XI and standard from 2 different C.B.S.E. higher secondary schools of Indore District. The Self-Concept Rating Scale developed by R. Saraswat and The Problem Solving Ability Test (PSAT) developed by L. N. Dubey were used as a tool for data collection for the study. The marks obtained in the previous examination were considered as academic achievement of the selected students. Data was analyzed with the help of TWO WAY ANOVA. The finding of the study reveals that the Academic Achievement of Higher Secondary School Students was not affected with the interaction of Self-Concept and Problem Solving Ability of male and female students. The researcher found that students with high Problem Solving Ability were found to be superior to students with low Problem Solving Ability. The Academic Achievement of students with high and low Self-Concept to be on the same extent. The Academic Achievement of Higher Secondary School Students was not affected with the interaction of Self-Concept.

1.3.0 SIGNIFICANCE OF THE STUDY

Life is full of problems and challenges. Problems are inevitable in life. Handling a problem successfully is a skill. It is a life skill since it is a part and parcel of life. Every step in our lives, every moment in our lives, we have to face many problems. The problems may be small or big. Different problems are faced at different stages of life. An understanding of the relationship between self-concept and achievement will be of great importance in determining whether there exists any inter-relationship between the variables under study, which will pave for better motivation for achievement. The result of the present study will be useful to arrive at those pertinent causes, which facilitate or affect achievement. Those finding can be utilized by the teachers in the field of education to develop proper achievement in their subject of study in the school.

It is thus noted that attitude and achievement motivation and intelligence are three of the dominant feature of attitude.

Hence the present study is undertaken to find out the Achievement in Mathematics of higher secondary students in relation to their problem solving ability, self-concept and attitude towards Mathematics. In this study, Problem Solving Ability, self-concept and attitude towards Mathematics is considered as independent variable and Achievement in Mathematics is taken as dependent variable and the impact of certain demographic variables such as gender, birth order, area of living, nature of school, medium of instruction, type of school, type of family, father's educational status, mother's educational status and family annual income on Problem Solving Ability, self-concept and attitude towards Mathematics and Achievement in Mathematics of higher secondary students will be found out.

1.4.0 STATEMENT OF THE PROBLEM

The present study is entitled as "Achievement in Mathematics of higher secondary students in relation to their problem solving ability, self-concept and attitude towards Mathematics."

1.5.0 OBJECTIVES OF THE STUDY

The following objectives are stated for present study:

1. To find out if there is any significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students.
2. To find out if there is any significant relationship between Problem solving ability and attitude towards Mathematics of higher secondary students.
3. To find out if there is any significant relationship between self-concept and Achievement in Mathematics of higher secondary students.

1.6.0 HYPOTHESES OF THE STUDY

The following Hypotheses are stated for present study:

1. There is no significant relationship between Problem solving ability and Achievement in Mathematics attitude towards Mathematics of higher secondary students.
2. There is no significant relationship between Problem solving ability and attitude towards Mathematics of higher secondary students.
3. There is no significant relationship between self-concept and Achievement in Mathematics of higher secondary students.

1.7.0 METHODOLOGY

- Survey method was followed to carry out this study.

- Population: All the students studying in XI standard for higher secondary schools from Thanjavur town..
- Sample: 1000 samples were collected from three schools and in

Thanjavur town for the present study.

- Sampling Technique: Simple random sampling technique will be

used in the study.

1.8.0 TOOL USED FOR THE STUDY

- Problem Solving Ability Test constructed and standardized by Dr. Roop

Rekha Gorg. Agra.(1986)

- Self -concept scale standardized by Ms.Manju Agarwal (1995).
- Mathematics attitude scale developed and standardized by Dr. C.

Dandapani(2015)

1.9.0 TESTING OF HYPOTHESES

Hypothesis- 1

There is no significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students

Table – 1

Significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students

VARIABLES	NUMBER OF SAMPLES	CORRELATION (γ)	L.S
Problem Solving Ability	1000	0.319	S
Achievement in Mathematics			

The above table clearly shows that there is significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students. Hence the stated hypothesis that there is no significant relationship between Problem solving ability and

Achievement in Mathematics of higher secondary students is **rejected**.

Hypothesis – 2

There is no significant relationship between Problem Solving Ability and attitude towards Mathematics of higher secondary students.

Table – 2

Significant relationship between Problem Solving Ability and attitude towards Mathematics of higher secondary students

VARIABLES	NUMBER OF SAMPLES	CORRELATION (γ)	L.S
Problem Solving Ability	1000	0.119	NS
Attitude towards Mathematics			

The above table clearly shows that there is no significant relationship between Problem Solving Ability and attitude towards Mathematics of higher secondary students. Hence the hypotheses state that there is no significant relationship between Problem Solving Ability and attitude towards Mathematics of higher secondary students of higher secondary students is **accepted**.

Hypothesis -3

There is no significant relationship between Self-concept and Achievement in Mathematics of higher secondary students.

Table – 3

Significant relationship between Self-concept and Achievement in Mathematics of higher secondary students

VARIABLES	NUMBER OF SAMPLES	CORRELATION (γ)	L.S
Self-concept		0.055	NS
Achievement in Mathematics			

The above table clearly shows that there is no significant relationship between Selfconcept and Achievement in Mathematics of higher secondary students. Hence the hypotheses state that there is no significant relationship between Self-concept and Achievement in Mathematics of higher secondary students is **accepted**.

1.10.0 FINDINGS OF THE PRESENT STUDY

1. There is significant relationship between Problem solving ability and Achievement in Mathematics of higher secondary students.

2. There is no significant relationship between Problem solving ability and attitude towards Mathematics of higher secondary students.

3. There is no significant relationship between self-concept and Achievement in Mathematics of higher secondary students.

1.11.0 SUGGESTION FOR FURTHER STUDY

A number of problems were raised in the course of discussion of the finding in the present research. The following are some specific areas to which attention of further research may be undertaken.

1. A study could be conducted to know the relationship between mathematics attitude, mathematics aptitude and self-concept among higher secondary and college students.
2. The present study could be done attempted on a large sample and in different states.
3. The present study was done only in some schools of particular district. This study can be extended by comparing different districts.
4. A comparative study on Intellectual Commitment of higher secondary school students in their Academic Achievement in mathematics.
5. A comparative study on Intellectual Commitment of secondary and higher secondary students in terms of their gender and birth order.
6. A comparative study on Intellectual Commitment of secondary and higher secondary students in terms of their Self-esteem.

1.12.0 CONCLUSION

Problem solving in mathematics is a fruitful exercise for the development of one's mental faculties as the process of problem solving involves the scientific method of thinking and reasoning. A thorough understanding of mathematical concepts is essential for solving problems in mathematics. A student having good problem solving ability, will be able to properly adjust in the class as well as at home. Higher secondary school stage is the most appropriate stage to develop their problem solving ability about mathematics problems. At Higher secondary school stage, students integrate many concepts and skills that they have learnt into a problem-solving ability. Mathematical modeling, data analysis and interpretation taught at this stage can consolidate a very high level of mathematical knowledge. The result of the present study reveals that there was a significant relationship between problem solving ability and Achievement in mathematics of higher secondary students.

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