RELATIONSHIP BETWEEN MATHEMATICAL REASONING ABILITY AND MATHEMATICAL ANXIETY OF HIGHER SECONDARY STUDENTS

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Abstract

The aim of the study is to find out the relationship between mathematical reasoning ability and mathematical anxiety of higher secondary students. For this purpose, a sample of 600 higher secondary students was selected through simple random sampling technique and normative survey method. For the present study Mathematical Reasoning Ability Test (MRAT) and Mathematical Anxiety Scale (MAS) constructed and validated by the investigator. Results found that the higher secondary students level of mathematical reasoning ability and mathematical anxiety are average. It is concluded that the gender and type of school management of higher secondary students is differ significantly in their mathematical reasoning ability and mathematical anxiety. Finding also indicated that there is significant and negative relationship between mathematical reasoning ability and mathematical anxiety of higher secondary students.

Key Words: Mathematical Reasoning Ability, Mathematical Anxiety, Gender, Type of School Management and Higher secondary students.

1. Introduction

India has always taken pride in producing a galaxy of renowned mathematicians like Aryabhatta, Mahaviracharya, Brahmagupta, Bhaskaracharya and others. In fact till the 12th century A.D. India was the leading nation in the world in many branches of mathematics. There had been revival of research in mathematics at the beginning of the century. Great geniuses like S.Ramanujam is a significant contributor to mathematics in the beginning of 20th century. The education commission report(1964) observes, "the advent of automation and cybernetics in the country marks the beginning of new scientific to the study of mathematics". Perhaps the area in which least research carried out in India is mathematics education at school level. In general, there is a lack of pedagogical analysis in the field of mathematics education. The reasons for such a state of affairs may be the general apprehension in the minds of pupils that mathematics can be mastered by only a selected few and not by all.

Mathematics, by its very nature is highly logical and sequential. It is a highly systematically organized and exact branch of science. A neglect of the study of mathematics makes one to be highly disorganized and chaotic. In fact it is the numerical part of man's life and knowledge. Quantification is the main theme of mathematics and one cannot remain isolated from the influence of mathematical thought. Ordinary skills like numerical operations counting and other computations from the very basis of our day-to-day life. An ignorance of mathematics in the masses is a formidable obstacle in the individual's personal growth. It is unaware that most of mathematics as it is in existence to-day is of India origin and a lot of work is now being done in the past two to three decades. There is a growing demand for more scientists, technologists, doctors and many other

professionals in every walk of life. Progress in any sense depends upon the growth of mathematics. Thus every country in the world has to pay considerable attention to mathematics education.

2. Need for the Study

Mathematics is a science that is important for all students to learn, from elementary school to high school even in college. Many reasons for the need for students to learn mathematics, among others, because mathematics is a means of logical and mathematical thinking, a means of developing creativity, a means of recognizing patterns of relationships and generalization of experience and a means of solving problems in everyday life. Among the district of Tamilnadu, achievement in mathematics of the higher secondary students lags behind than the other districts. Hence, it was felt by the investigators to study the mathematical reasoning ability and mathematical anxiety of higher secondary students in Cuddalore district of Tamilnadu, India.

3. Objectives of the Study

1. To find out the level of the Mathematical Reasoning Ability of higher secondary students.
2. To find out the level of the Mathematical Anxiety of higher secondary students.
3. To find out whether there is any significant difference in the Mathematical Reasoning Ability of higher secondary students with regard to a) Gender and b) Type of school management.
4. To find out whether there is any significant difference in the Mathematical Anxiety of higher secondary students with regard to a) Gender and b) Type of school management.
5. To find out whether there is any significant relationship between Mathematical Reasoning Ability and Mathematical Anxiety of higher secondary students.

4. Hypotheses of the Study

1. The level of the Mathematical Reasoning Ability of higher secondary students is average.
2. The level of the Mathematical Anxiety of higher secondary students is average.
3. There is no significant difference in the Mathematical Reasoning Ability of higher secondary students with regard to a) Gender and b) Type of school management.
4. There is no significant difference in the Mathematical Anxiety of higher secondary students with regard to a) Gender and b) Type of school management.
5. There is no significant relationship between Mathematical Reasoning Ability and Mathematical Anxiety of higher secondary students.

5. Method and Sample of the Study

In the present study the investigator followed normative survey method. The present study consists of 600 higher secondary students studying in Cuddalore District, Tamilnadu State, India. The samples were selected by using simple random sampling technique.

6. Statistical Techniques Used

The data collected were descriptively analyzed by employing the following statistical techniques:

1. Descriptive Analyses (Mean and Standard Deviation)
2. Differential Analyses ('t' test and 'F' test)

3. Correlation Analyses (Karl Pearson Product Moment Correlation)

7. Tools Used for the Study

The present study Mathematical Reasoning Ability Test (MRAT) and Mathematical Anxiety Scale (MAS) constructed and validated by the investigator.

8. Analysis and Interpretation of Data

Hypothesis 1

The level of the Mathematical Reasoning Ability of higher secondary students is average.

Table-1
Showing the Mean and Standard Deviation Scores of Mathematical Reasoning Ability of Higher Secondary Students

Variable	N	M	SD
Mathematical Reasoning Ability	600	26.32	5.47

It is evident from the Table 1, that the calculated mean score is found to be 26.32 and the standard deviation value is 5.47 respectively, which indicates that the mean score lies between than the average value (21-30). Therefore hypothesis 1 is accepted and it is concluded that the mathematical reasoning ability of higher secondary students is average.

Hypothesis 2

The level of the Mathematical Anxiety of higher secondary students is average.

Table-2
Showing the Mean and Standard Deviation Scores of Mathematical Anxiety of Higher Secondary Students

Variable	N	M	SD
Mathematical Anxiety	600	28.15	5.74

It is evident from the Table 2, that the calculated mean score is found to be 28.15 and the standard deviation value is 5.74 respectively, which indicates that the mean score lies between than the average value (23-32). Therefore hypothesis 2 is accepted and it is concluded that the mathematical anxiety of higher secondary students is average.

Hypothesis 3

There is no significant difference in the Mathematical Reasoning Ability of higher secondary students with regard to a) Gender and b) Type of school management.

Table-3
't' value of Mathematical Reasoning Ability Scores of Higher Secondary Students with regard to Sub-Samples

Variable	Sub-Samples	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Mathematical Reasoning Ability	Male	308	29.03	7.27	2.47	Significant
	Female	292	25.10	5.29		
	Government	300	28.86	6.23	2.10	Significant
	Private	300	24.49	5.40		

It is evident from the table 3, the calculated 't' value is found to be 2.47 and it is higher than the table value of 1.96. It reveals that there is significance difference between the male and female students with respect to their mathematical reasoning ability. Hence the stated hypothesis is rejected.

It is evident from the table 3, the calculated 't' value is found to be 2.10 and it is higher than the table value of 1.96. It reveals that there is significance difference between the government and private school higher secondary students with respect to their mathematical reasoning ability. Hence the stated hypothesis is rejected.

Hypothesis 4

There is no significant difference in the Mathematical Anxiety of higher secondary students with regard to a) Gender and b) Type of school management.

Table-4
't' value of Mathematical Anxiety Scores of Higher Secondary Students with regard to Sub-Samples

Variable	Sub-Samples	N	Mean	SD	't' Value	Level of Significance at 0.05 Level
Mathematical Anxiety	Male	308	27.66	5.95	3.38	Significant
	Female	292	31.26	7.65		
	Government	300	26.02	4.62	2.52	Significant
	Private	300	30.77	6.94		

It is evident from the table 4, the calculated 't' value is found to be 3.38 and it is higher than the table value of 1.96. It reveals that there is significance difference between the male and female students with respect to their mathematical anxiety. Hence the stated hypothesis is rejected.

It is evident from the table 3, the calculated 't' value is found to be 2.52 and it is higher than the table value of 1.96. It reveals that there is significance difference between the government and private school higher secondary students with respect to their mathematical anxiety. Hence the stated hypothesis is rejected.

Hypothesis 5

There is no significant relationship between Mathematical Reasoning Ability and Mathematical Anxiety of higher secondary students.

Table-5
Showing the Correlation Values between Mathematical Reasoning Ability and Mathematical Anxiety of Higher Secondary Students

Variable	N	'r' Value	Level of Significance at 0.01 level
Mathematical Reasoning Ability and Mathematical Anxiety	600	-0.210	Significant

From the above table the 'r' value found to be -0.210. From this there is significant relationship between mathematical reasoning ability and mathematical anxiety. Hence it is concluded that there is significant and negative relationship between the mathematical reasoning ability and mathematical anxiety of higher secondary students.

9. Findings of the Study

➢ The level of mathematical reasoning ability of higher secondary students is average.

➢ The level of mathematical anxiety of higher secondary students is average.

➢ There is significance difference between the male and female higher secondary students with respect to their mathematical reasoning ability.

- ➢ There is significance difference between the government and private school higher secondary students with respect to their mathematical reasoning ability.
- ➢ There is significance difference between the male and female higher secondary students with respect to their mathematical anxiety.
- ➢ There is significance difference between the government and private school higher secondary students with respect to their mathematical anxiety.
- ➢ There is significant and negative relationship between the mathematical reasoning ability and mathematical anxiety of higher secondary students.

10. Conclusion

In the present study relationship between mathematical reasoning ability and mathematical anxiety of higher secondary students. Results found that the higher secondary students' level of mathematical reasoning ability and mathematical anxiety are average and it is inferred that there is significant and negative relationship between mathematical reasoning ability and mathematical anxiety of higher secondary students.

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