RELATIONSHIP BETWEEN MENTAL ABILITY AND ACADEMIC ACHIEVEMENT IN MATHEMATICS OF SECONDARY SCHOOL STUDENTS

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ABSTRACT

This research article is based on study conducted among secondary school students Kottarakara, Kollam district, Kerala. The Normative Survey method was adopted in this study to collect the data. The sample consisted of 365 1X standard students. 't' test and 'r' were used to analyse the data. The findings revealed that there is significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables: locality in urban, type of management in unaided and type of family in nuclear of secondary school students. And also there is no significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables, namely gender, locality in rural, Type of management in government and aided and Type of family in joint of secondary school students.

INTRODUCTION

Learning is the process by which an individual acquires various habits, knowledge, attitude and experiences. Education is the instrument which serves as the tool for any kind of learning. Learning science needs a deeper creative and critical thinking skill. Learning is acquiring new, existing knowledge, behaviours, skills, values or preference and may involve synthesizing different types of information. Mental ability represents a person's brain power in different areas of competency. Psychologists agree that the term mental ability describes a person's ability to learn and remember information, to recognise concepts and their reaction and to apply information to their own behaviour in an adaptive way. Tests of general mental ability include scales that measure specific constructs such as verbal, mechanical, numerical, social, and special ability. Mental ability has a great role to play in academic achievement.

Academic achievement is the accomplishment or acquired proficiency in the performance of an individual in a given skill or body of knowledge. Academic achievement is considered as a key criterion to judge one's total potentiality and

capabilities. The term achievement refers to the degree or level of success attained in some specific school tasks, especially scholastic performance. Thus, achievement in Mathematics and general mental ability can be defined as the product resulting from knowledge, comprehension, application, analysis, synthesis and evaluation of all information.

NEED AND SIGNIFICANCE OF THE STUDY

Mental Ability Test included questions that required reasoning and problem solving of varying level of difficulty, graded by age. It refers to knowledge and understanding of oneself and of one's relations to others. In an academic situation, especially with younger learner, some subjects fail to impart information to students simply because the students are not interested and do not pay attention. By Mental Ability Tests, the interests and attention of students in academic subjects can be improved.

The effectiveness of any educational system is gauged to the extent the students involved in the system achieve, whether it is cognitive or psychomotor domain. In general terms, achievement refers to the scholastic or academic achievement of the student at the end of an educational programme.

STATEMENT OF THE PROBLEM

"The problem selected for the study is entitled **"**Relationship between Mental Ability and Academic Achievement in Mathematics of Secondary School Students**".**

DEFINITION OF KEY TERMS

Mental Ability

The capacity to perform the higher mental processes of reasoning, remembering, understanding and problem solving.

Academic Achievement

Academic Achievement is knowledge, attitude or skill developed in the school subject usually designated by test scores or by tasks assigned by the teacher or by both.

OBJECTIVES

1. To find out the significant difference in Mental Ability of Secondary School Students with respect to gender, locality and type of family.
2. To find out the significant difference in Academic Achievement in Mathematics of Secondary School Students with respect to gender, locality and type of family.

3. To find out the significant relationship between Mental Ability and Academic Achievement in Mathematics of Secondary School Students with respect to gender, locality, type of management and type of family.

HYPOTHESES

1. There is no significant difference in Mental Ability of Secondary School Students with respect to gender, locality and type of family.
2. There is no significant difference in Academic Achievement in Mathematics of Secondary School Students with respect to gender, locality and type of family.
3. There is significant relationship between Mental Ability and Academic Achievement in Mathematics of Secondary School Students with respect to gender, locality, type of management and type of family.

SAMPLE

A sample of 365 1X standard students of different schools in Kollam district was selected for the study. Stratified random sampling method was adopted for selecting the sample.

TOOLS USED FOR THE PRESENT STUDY

1. General Mental Ability Test was prepared and validated by the investigator with the help of guide Amalraj.
2. Achievement scores in Mathematics of IX standard students selected from schools.

Hypothesis 1

There is no significant difference in the mean scores of Mental Ability of secondary school students with respect to gender.

Table 1

COMPARISON OF MENTAL ABILITY BASED ON GENDER

Sl. No.	Dimensions	Gender	Mean	Standard Deviation	Number	t-value	Result
1	Numerical Ability Factor	Male	50.20	10.01	239	0.52	NS
		Female	49.63	10.02	126		
2	Serial Learning	Male	49.04	9.47	239	2.33	S
		Female	51.59	10.21	126		
3	Problem Solving Ability Factor	Male	49.04	9.77	239	2.44	S
		Female	51.67	9.82	126		
4	Spatial Factor	Male	49.57	9.28	239	0.9	NS
		Female	5.58	10.81	126		
5	Reasoning	Male	49.85	10.52	239	0.41	NS

		Female	50.28	8.95	126		
6	Word Fluency Factor	Male	49.06	9.08	239	2.41	S
		Female	51.63	9.97	126		

*NS denotes Not Significant and * S denotes Significant.

The above table shows that the calculated t-values are less than the table value (1.96) at 5% level of significance for 363 degrees of freedom. Hence, the hypothesis is accepted with respect to gender for the dimensions Numerical Ability Factor, Spatial Factor and Reasoning. Therefore there is no significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Spatial Factor and Reasoning of secondary school students with respect to gender.

Since the calculated t-values are greater than the table value (1.96) at 5% level of significance for 363 degrees of freedom, the hypothesis is rejected with respect to gender for the dimensions Serial Learning, Problem Solving ability Factor and Word Fluency Factor. Therefore there is significant difference in Mental Ability and its dimensions such as Serial Learning, Problem Solving Ability Factor, Word Fluency Factor with respect to gender.

Hypothesis 2

There is no significant difference in the mean scores of Mental Ability of secondary school students with respect to locality.

Table 2

COMPARISON OF MENTAL ABILITY BASED ON LOCALITY

Sl. No.	Dimensions	Locality	Mean	Standard Deviation	Number	t-value	Result
1	Numerical Ability Factor	Rural	48.93	10.36	196	2.23	S
		Urban	51.24	9.45	169		
2	Serial Learning	Rural	50.05	10.71	196	0.29	NS
		Urban	49.76	8.64	169		
3	Problem Solving Ability Factor	Rural	49.27	10.17	196	1.42	NS
		Urban	50.73	9.44	169		
4	Spatial Factor	Rural	49.17	10.24	196	1.57	NS
		Urban	50.78	9.28	169		
5	Reasoning	Rural	47.66	9.73	196	4.97	S
		Urban	52.72	9.65	169		
6	Word Fluency Factor	Rural	49.05	10.48	196	1.99	S
		Urban	50.98	8.04	169		

*NS denotes Not Significant and * S denotes Significant.

The above table shows that the calculated t-values are less than the table value (1.96) at 5% level of significance for 363 degrees of freedom. Hence, the hypothesis is accepted with respect to Locality for dimensions such as Serial Learning, Problem Solving Ability Factor and Spatial Factor. Therefore there is no significant difference in Mental Ability and its dimensions such as Serial Learning, Problem Solving Ability Factor and Spatial Factor with respect to locality.

Since the calculated t-values are greater than the table value (1.96) at 5% level of significance for 363 degrees of freedom, the hypothesis is rejected with respect to locality for dimensions such as Numerical Ability Factor, Reasoning and Word Fluency Factor. Therefore there is significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Reasoning and Word Fluency Factor with respect to locality.

Hypothesis 3

There is no significant difference in the mean scores of Mental Ability of secondary school students with respect to type of family.

Table 3

COMPARISON OF MENTAL ABILITY BASED ON TYPE OF FAMILY

Sl. No.	Dimensions	Type of Family	Mean	Standard Deviation	Number	t-value	Result
1	Numerical Ability Factor	Joint	53.86	9.43	13	1.50	NS
		Nuclear	49.86	10.00	352		
2	Serial Learning	Joint	53.17	12.11	13	0.99	NS
		Nuclear	49.80	9.69	352		
3	Problem Solving Ability Factor	Joint	53.21	9.43	13	1.27	NS
		Nuclear	49.82	9.86	352		
4	Spatial Factor	Joint	55.10	8.13	13	2.32	S
		Nuclear	49.73	9.84	352		
5	Reasoning	Joint	50.76	9.81	13	0.09	NS
		Nuclear	49.92	10.02	352		
6	Word Fluency Factor	Joint	53.17	7.38	13	0.40	NS
		Nuclear	49.88	9.54	352		

*NS denotes Not Significant and * S denotes Significant.

The above table shows that the calculated t-values are less than the table value (1.96) at 5% level of significance for 363 degrees of freedom. Hence, the hypothesis is accepted with respect to Type of family for the dimensions such as Numerical Ability Factor, Serial Learning, and Problem Solving Ability Factor, Reasoning and Word

Fluency Factor. Therefore, there is no significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Serial Learning, and Problem Solving Ability Factor, Reasoning and Word Fluency Factor with respect to type of family of secondary school students with respect to type of family.

Since the calculated t-value is greater than the table value (1.96) at 5% level of significance for 363 degrees of freedom, the hypothesis is rejected with respect to Type of Family for the dimension Spatial Factor. Therefore there is significant difference in Mental Ability in the dimension Spatial Factor with respect to Type of family.

Hypothesis 4

There is no significant difference in the mean scores of academic achievement in mathematics of secondary school students with respect to background variables.

Table 4

COMPARISON OF ACADEMIC ACHIEVEMENT IN MATHEMATICS WITH RESPECT TO BACKGROUND VARIABLES

Sl. No.	Variables	Category	Mean	Standard Deviation	Number	t-value	Result
1	Gender	Male	48.88	9.54	239	2.88	S
		Female	52.12	10.53	126		
2	Locality	Rural	50.13	10.07	196	0.27	NS
		Urban	49.85	9.95	169		
3	Type of Family	Joint	54.82	7.55	13	2.31	S
		Nuclear	49.82	10.04	352		

*NS denotes Not Significant and *S denotes Significant.

The above table shows that the calculated t-values are less than the table value (1.96) at 5% level of significance for 363 degrees of freedom. Hence, the hypothesis is accepted with respect to locality. Therefore, there is no significant difference in the mean scores of academic achievement in mathematics of secondary school students with respect to locality.

Since the calculated t-value is greater than the table value (1.96) at 5% level of significance for 363 degrees of freedom, the hypothesis is rejected with respect to background variables such as gender and type of family. Therefore, there is significant difference in the mean scores of academic achievement in mathematics of secondary school students with respect to Gender and Type of Family.

Hypothesis 5

There is significant correlation between Mental Ability and Academic Achievement in Mathematics of Secondary School students.

Table 5

RELATIONSHIP BETWEEN MENTAL ABILITY AND ACADEMIC ACHIEVEMENT IN MATHEMATICS

Sl No.	Variables	Category	Number	Calculated 'r' value	Table value	Result
1	Gender	Male	239	0.044	0.139	NS
		Female	126	0.176	0.196	NS
2	Locality	Rural	196	0.012	0.139	NS
		Urban	169	0.158	0.139	S
3	Type of management	Govt.	106	0.079	0.196	N S
		Aided	154	0.011	0.139	N S
		Unaided	105	0.205	0.196	S
4	Type of family	Joint	13	0.062	0.553	NS
		Nuclear	352	0.104	0.088	S

*NS denotes Not Significant and * S denotes Significant

The above table shows that the calculated 'r' values are greater than the table value at 5% level of significance. Hence, the hypothesis is accepted with respect to background variables such as Locality - urban, Type of management - unaided and Type of family - nuclear. Therefore there is significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables such as locality - urban, Type of management - unaided and Type of family - nuclear of secondary school students.

Since the calculated 'r' values are less than the table value at 5% level of significance, the hypothesis is rejected with respect to background variables such as gender, locality - rural, Type of management - government and aided and Type of family - joint. Therefore there is no significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables such as gender, locality - rural, Type of management – government and aided and Type of family - joint of secondary school students.

MAJOR FINDINGS OF THE STUDY

1. It is found that there is no significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Spatial Factor, Reasoning and toto of secondary school students with respect to gender. And there is significant difference in Mental Ability and its dimensions such as Serial Learning, Problem Solving Ability Factor, Word Fluency Factor with respect to gender.
2. It is found that there is no significant difference in Mental Ability and its dimensions such as Serial Learning, Problem Solving Ability Factor, Spatial Factor and in toto with respect to locality. And there is significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Reasoning and Word Fluency Factor with respect to Locality.
3. It is found that there is no significant difference in Mental Ability and its dimensions such as Numerical Ability Factor, Serial Learning, and Problem Solving Ability Factor, Reasoning, Word Fluency Factor and in toto with respect to type of family of secondary school students with respect to Type of Family. There is significant difference in Mental Ability in the dimension Spatial Factor with respect to Type of Family.
4. It is found that there is no significant difference in the mean scores of Academic Achievement in Mathematics of secondary school students with respect to Locality. And there is significant difference in the mean scores of academic achievement in mathematics of secondary school student with respect to Gender, and Type of Family.
5. It is found that there is significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables such as locality - urban, Type of Management - unaided and Type of Family - nuclear of secondary school students. And there is no significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables such as gender, locality in rural, type of management – government and aided and Type of Family - joint of secondary school students

CONCLUSION

The present study was intended to find out the relationship between Mental Ability and Academic Achievement in Mathematics of secondary school students. From this study the investigator found that there is significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to the background variables locality - urban, Type of Management - unaided and Type of Family - nuclear of secondary school students. And also there is no significant correlation between Mental Ability and Academic Achievement in Mathematics with respect to background variables namely Gender, Locality - rural, Type of management - government and aided and Type of Family - joint of secondary school students.

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