International Journal of Advanced Educational Research
ISSN: 2455-6157
Impact Factor: RJIF 5.12
www.educationjournal.org
Volume 3; Issue 5; September 2018; Page No. 39-43

Relationship between achievement in mathematics and mental alertness of higher secondary students

R Noyel Jayarani[1*], Dr. T Thilagavathy[2]
[1] Research Scholar, Department of Education, Annamalai University, Chidambaram, Tamil Nadu, India
[2] Associate Professor, Department of Education, Annamalai University, Chidambaram, Tamil Nadu, India

Abstract
Mathematics expresses itself everywhere, in almost every facet of life in nature all around us and in the technologies in our hands. Mathematics is the language of science and engineering describing our understanding of all that we observe. It is an attempt to find out the sources that are in the students which keep them with interest in learning Mathematics with love and circumstances which helps them to learn Mathematics in order to achieve high marks. Language and mathematical skills are very much essential for the students in all walks of life. The present study examined the achievement in mathematics and mental alertness of higher secondary second year students. It was administered to 800 Higher Secondary students from 12 schools around Nagapattinam Educational District. In the findings, the researcher arrived at the result that Achievement in Mathematics and Mental Alertness of higher secondary students is average. There is significant positive relationship between Achievement in Mathematics and Mental Alertness of higher secondary students. Further Mental Alertness has a very strong association with Achievement in Mathematics of higher secondary students.

Keywords: mathematics, higher secondary students, mental alertness and achievement

Introduction
The students' character and qualities are formed and moulded by education. It directs them to analyses, reason out and then decide to do right things in all circumstances. Thus there is difference in character formation between literate and illiterate people. It also promotes dignified behavior in the students. Still more the study of Mathematics is one of the means to develop in the students good potentials that are necessary for social living as well as for maintaining one's economic status. Mathematics has been interpreted and explained in various ways. It is the part of man's life and knowledge. It helps the man to give exact interpretation to his ideas and conclusions. It deals with quantitative facts and relationships as well as with problems involving space and forms. Engineering, Banking and other business are directly linked with mathematics. The reasoning in Mathematics is of peculiar kind and possesses a number of characteristics such as simplicity, accuracy, certainty of results, originality, similarity to the reasoning of life and verification. Mathematics is used in all areas of life.

Significance of the Study
Achievement also depends upon one's intelligence. Mental alertness promotes highest degree of contribution for achievement in mathematics. In order to achieve more in mathematics, the efforts are to be made to alert the mental ability of the higher secondary students. In the present study, the results reveal that contribution of Mental Alertness is higher than Attitude towards Mathematics and Parental Encouragement. Challenging the mind to take in new information not only means that one will learn new things, but as an added benefit, one will also acquire a higher level of mental alertness. From time to time, everyone experiences problems with attention and focus. Stress, fatigue, and general health can all lead to reduce mental abilities. This study attempts to provide with ways and means to increase mental alertness in the students which paves way for scoring high in Mathematics.

Objectives of the Study
1. To find out the level of Achievement in Mathematics and Mental Alertness among Higher secondary students.
2. To find out the relationship between Achievement in Mathematics and Mental Alertness of Higher secondary students.
3. To find out the significant difference between Achievement in Mathematics with respect to the gender towards Higher secondary students.
4. To find out the significant difference between Achievement in Mathematics with respect to Boys' and Girls' Higher secondary students.
5. To find out the significant difference between Achievement in Mathematics with respect to Boys' and Co-education Higher secondary students.
6. To find out the significant difference between Achievement in Mathematics with respect to Girls' and Co-education Higher secondary students.
7. To find out the significant difference between Mental Alertness with respect to the gender towards Higher secondary students.
8. To find out the significant difference between Mental Alertness with respect to Boys' and Girls' Higher secondary students.
9. To find out the significant difference between Mental

Alertness with respect to Boys' and Co-education Higher secondary students.
10. To find out the significant difference between Mental Alertness with respect to Girls' and Co-education Higher secondary students.

Hypotheses of the Study
1. The level of Achievement in Mathematics and Mental Alertness among Higher secondary students is low.
2. The relationship between Achievement in Mathematics and Mental Alertness do not differ significantly among higher secondary students.
3. There is no significant difference between Achievement in Mathematics with respect to the gender towards higher secondary students.
4. There is no significant difference between Achievement in Mathematics with respect to Boys' and Girls' Higher secondary students.
5. There is no significant difference between Achievement in Mathematics with respect to Boys' and Co-education Higher secondary students.
6. There is no significant difference between Achievement in Mathematics with respect to Girls' and Co-education Higher secondary students.
7. There is no significant difference between Mental Alertness with respect to the gender towards Higher secondary students.
8. There is no significant difference between Mental Alertness with respect to Boys' and Girls' Higher secondary students.
9. There is no significant difference between Mental Alertness with respect to Boys' and Co-education Higher secondary students.
10. There is no significant difference between Mental Alertness with respect to Girls' and Co-education Higher secondary students.

Operational definitions of the terms used in the present study
- Achievement in Mathematics refers to the scores obtained in Mathematics achievement test constructed and validated by the researcher specially for the present study.
- The mental alertness is the function pertaining to the mind, such as awareness, perception, imagination, reasoning and keen watchfulness.
- Higher Secondary Students refers the second year students of Higher Secondary program.

Demographic Variables
- Gender (Male / Female)
- Type of School (Boys'/Girls'/Co-education)

Tools used in the study
- The tool to measure 'Achievement in Mathematics' is constructed and validated by the investigator for second year higher secondary students.
- 'General Mental Alertness Test' is constructed and validated by the investigator.

Sample of the study
Random sampling technique is used in the selection of the samples of 800 Higher Secondary second year students from 12 schools around Nagapattinam Educational District, Tamil Nadu, India.

Statistical Techniques
Mean and standard deviation for the entire sample and demographic variables were calculated for Achievement in Mathematics and Mental alertness. The test of significance 't' test was used to find out the significance difference between the means. The correlation coefficient has been found out to determine the relationship between the Achievement in Mathematics and Mental alertness. Regression Analysis is used to define the contribution of Mental Alertness for Achievement in Mathematics of higher secondary students.

Scoring Procedure of the tools
Maximum score of Achievement in Mathematics =50
Maximum score of Mental alertness = 48

Analysis of Data
Null Hypothesis 1: The level of Achievement in Mathematics and Mental Alertness among Higher secondary students is low.

Table 1: Mean and Standard deviation of the scores of Achievement and Mental Alertness

VARIABLES	N	Mean	S.D
Achievement in Mathematics	800	36.77	6.52
Mental Alertness	800	35.52	4.22

From the Table 1, it is concluded that the level of Achievement in Mathematics and Mental Alertness of higher secondary second year students is average. The framed null hypothesis is rejected and alternate hypothesis is accepted. Hence it is found that both Achievement in Mathematics and Mental Alertness of higher secondary second year students shows average level.

Null Hypothesis 2: The relationship between Achievement in Mathematics and Mental Alertness do not differ significantly among higher secondary second year students.

Table 2: Relationship between Achievement in Mathematics and Mental Alertness

VARIABLES	N	Correlation	Significant level
Achievement in Mathematics	800	0.814	Significant Positive relationship
Mental Alertness	800		

From the table 2, the calculated 'r' value is 0.814, which is significant at 0.05 level. The framed null hypothesis is rejected and alternate hypothesis is accepted. Hence it is concluded that there is significant positive relationship between Achievement in Mathematics and Mental Alertness of higher secondary students.

Null Hypothesis 3

There is no significant difference between Achievements in Mathematics with respect to the gender towards higher secondary students.

Table 3: Mean and SD scores of Achievement in Mathematics towards gender

Variable	Gender	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Achievement in Mathematics	Male	350	35.42	7.10	5.27	Significant
	Female	450	37.82	5.94		

From the table 3, the obtained 't' value 5.27 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected. Hence it is found that there is significant difference in the mean score between male and female higher secondary students in respect of their Achievement in Mathematics.

Null Hypothesis 4: There is no significant difference between Achievement in Mathematics with respect to Government and Government Aided Higher secondary students.

Table 4: Mean and SD scores of Achievement in Mathematics towards Boys' and Girls' Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Achievement in Mathematics	Boys'	104	35.81	6.76	3.64	Significant
	Girls'	216	38.31	5.19		

From the table 4, the obtained 't' value 3.64 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected and it is concluded that there is significant difference between the mean scores of the students of Boys' and Girls' higher secondary schools in respect of their Achievement in Mathematics.

Null Hypothesis 5: There is no significant difference between Achievement in Mathematics with respect to Boys' and Co-education Higher secondary students.

Table 5: Mean and SD scores of Achievement in Mathematics towards Boys' and Co-education Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Achievement in Mathematics	Boys'	104	35.81	6.76	0.649	Not Significant
	Co-education	480	36.29	6.89		

From the Table 5, the obtained 't' value 0.649 is less than the table value at 0.05 level of significance. Hence the null hypothesis is accepted and it is concluded that there is no significant difference between the mean scores of the students of Boys' and Co-education higher secondary schools in respect of their Achievement in Mathematics.

Null Hypothesis 6: There is no significant difference between Achievement in Mathematics with respect to Girls' and Co-education Higher secondary students.

Table 6: Mean and SD scores of Achievement in Mathematics towards Girls' and Co-education Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Achievement in Mathematics	Girls	216	38.31	5.19	3.84	Significant
	Co-education	480	36.29	6.89		

From the Table 6, the obtained 't' value 3.84 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected and it is concluded that there is significant difference between the mean scores of the students of Girls and Co-education higher secondary schools in respect of their Achievement in Mathematics.

Null Hypothesis 7: There is no significant difference between Mental Alertness with respect to the gender towards Higher secondary students.

Table 7: Mean and SD scores of Achievement in Mathematics towards gender

Variable	Gender	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Mental Alertness	Male	350	34.42	4.67	6.69	Significant
	Female	450	36.38	3.61		

From the table 7, the obtained 't' value 6.69 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected. Hence it is concluded that there is significant difference in the mean score between male and female higher secondary students in respect of their Mental Alertness.

Null Hypothesis 8: There is no significant difference between Mental Alertness with respect to Boys' and Girls' Higher secondary students.

Table 8: Mean and SD scores of Mental Alertness towards Boys' and Girls' Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Mental Alertness	Boys'	104	34.08	4.48	6.79	Significant
	Girls'	216	36.95	3.00		

From the table 8, the obtained 't' value 6.79 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected and it is concluded that there is significant difference between the mean scores of the students of Boys and Girls higher secondary schools in respect of their Mental Alertness.

Null Hypothesis 9: There is no significant difference between Mental Alertness with respect to Boys' and Co-education Higher secondary students.

Table 9: Mean and SD scores of Mental Alertness towards Boys' and Co-education Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Mental Alertness	Boys'	104	34.08	4.48	2.30	Significant
	Co-education	480	35.19	4.46		

From the table 9, the obtained 't' value 2.30 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected and it is concluded that there is significant difference between the mean scores of the students of Boys and Co-education higher secondary schools in respect of their Mental Alertness.

Null Hypothesis 10: There is no significant difference between Mental Alertness with respect to Girls' and Co-education Higher secondary students.

Table 10: Mean and SD scores of Mental Alertness towards Girls' and Co-education Higher secondary students

Variable	Types of School	N	Mean	S.D	t-Value	Level of significance at 0.05 level
Mental Alertness	Girls	216	36.95	3.00	5.29	Significant
	Co-education	480	35.19	4.46		

From the table 10, the obtained 't' value 5.29 is greater than the table value at 0.05 level of significance. Hence the null hypothesis is rejected and it is concluded that there is significant difference between the mean scores of the students of Girls and Co-education higher secondary schools in respect of their Mental Alertness.

Major Findings of the study

1. It is found that both Achievement in Mathematics and Mental Alertness of higher secondary second year students shows average level.
2. It is found that there is significant positive relationship between Achievement in Mathematics and Mental Alertness of higher secondary second year students.
3. It is found that there is significant difference in the Achievement in Mathematics of higher secondary second year students towards gender.
4. It is found that there is significant difference in the Achievement in Mathematics between the students of Boys' and Girls' higher secondary second year schools.
5. It is found that there is no significant difference in the Achievement in Mathematics between the students of Boys' and Co-education higher secondary second year schools.
6. It is found that there is significant difference in the Achievement in Mathematics between the students of Girls' and Co-education higher secondary second year schools.
7. It is found that there is significant difference in the Mental Alertness of higher secondary second year students towards gender.
8. It is found that there is significant difference in the Mental Alertness between the students of Boys' and Girls' higher secondary second year schools.
9. It is found that there is significant difference in the Mental Alertness between the students of Boys' and Co-education higher secondary second year schools.
10. It is found that there is significant difference in the Mental Alertness between the students of Girls' and Co-education higher secondary second year schools.

Conclusion

The present research is an eye opener for the investigator to arrive at the result that Mental Alertness contributes more for the Achievement in Mathematics. In this competitive world the students have to equip themselves with all sorts of knowledge and keep in touch with all advancement of science and technology, which would assist them to sharpen their mind. Alertness and keen observation about all progress and development would lead the students to grow in mental alertness which in turn would help to achieve high in mathematics. For mathematics is used in all advancement and development of Science and technology. Lot of readings on current issues also promote mental alertness and for high achievement in Mathematics. The sharp mental alertness would induce interest in Mathematics and create in them strong personality, mental strength and confidence to solve any sort of problem that they may face in the world.

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