

# Influence of Arithmetical Ability, Attitude Towards Mathematics and Study Habit on the Achievement in Mathematics at the secondary stage

First Author\*, Second Author\*\*

**Abstract**— The present investigation aims at studying the validity of students' arithmetic ability, attitude towards mathematics and study habit for measuring their achievement in mathematics at secondary stage. A sample of 500 secondary school students was taken from twenty secondary schools of kamrup district, Assam. Participated in the present study, in which the relationship among the achievement in mathematics was most closely related with arithmetical ability, attitude towards mathematics and study habit.

Result of the study shows that:-

- The Relative contribution of Arithmetic ability, Attitude towards Mathematics and Study Habit is given by the equation  $AIM = -27.689 + 1.038 \cdot ARA + 0.038 \cdot ATM + 0.455 \cdot SH$ , Where AIM=Achievement in Mathematics, ARA = Arithmetic Ability, ATM=Attitude towards Mathematics, SH=Study habit.
- Arithmetic ability, attitude towards mathematics and study habit contributes 36.6%, 25.95% and 38.1% respectively to the variance in mathematics achievement of the subject having a statistically significant contribution.
- The three independent variables jointly contribute .638 (63.8%) to the variance of the achievement in mathematics

**Key Words**- Arithmetic ability, Attitude, Study habit, Achievement and mathematics.



## 1 INTRODUCTION

The mathematics is a backbone of students to achieve and developed the skill in reasoning and thinking level. In elementary stage the base on mathematics should be imposed to develop for mental observation and creativity or innovativeness. Due to the lack of proper knowledge on mathematics the student suffer in all spheres of life. So from the grass root level the teaching of mathematics should be effective and scientific. In there stepping stone and process of learning the students should involved in the respective area with more interestingly. The new generation must be trained as lover of mathematics and science from the very beginning of the stage when they come in contact in the number world- the very root of the world of mathematical science.

In the last two decades the dependent of modern society on mathematics has grown enormously. It is a major cultural force in human civilization. History of mankind reminds us that from very beginning of human civilization from the time Thales- Plato- Aristotles- Arya Bhatta - Bhaskara etc. mathematics has determined the direction and content of much philosophical thought giving light in various directions. It

is at the entire root of all scientific reasoning and at the major theory of physical science. History of mathematics reminds us that mathematical idea has helped to mould twentieth century of life thought. It penetrates into every corner not only of science and technology but also in the world of art, humanity of medicine- industry etc.

For overall uplift men of human society - mathematically skilled persons- a generation of lover of mathematics is essential. The new generation must be trained of lover of mathematics from very beginning of the stage when they come into contact with the number of world - the very root of the world of mathematics. Famous mathematician E.T.Bell says - High school course is sufficient to gather basic concept of mathematics to acquire amount of knowledge necessary to understand "every thing" about the nature of mathematics and after understanding in the positive way the nature of mathematics, one surly be attracted to the mathematics world and we should also try to attract them to the mathematics world by motivation or otherwise.

Unfortunately, whatever may be the reason behind majority of the pupils of new generation developed dislike of mathemat-

ics – not only in India throughout the world – for considerable part of the student community; is it the most dreaded subject in the curriculums. But mathematics is a compulsory subject in the secondary stage, therefore to pass secondary school final examination “High School Leaving Certificate Examination” each and every people must secure the ‘pass’ marks in mathematics. Moreover education system is highly exam-oriented in our country.

It is observed that the number of achievers is increasing day by day. But there are very few number of pupils is found to achieve the subject mathematics properly. But the number achievement in the subject mathematics is found to be very poor. At present there is generally a widespread public concern about the result being achieved in mathematics

Moreover, from the theoretical considerations we may assume that some of the variables play important role in the academic in mathematics. Three variables of effective dimensions have been identified for this study: Arithmetic ability, attitude towards mathematics and study habit. The Arithmetical ability is the fundamental approach of mathematics and the way how to proceed in the problem solving techniques.

Habit is defined as a conformed way of doing things. Study habits are a well planned and way of studying and preparing lessons to achieve and to attained a form of consistency in the academic improvements and passing

Attitude is a general tendency of an individual to act in a certain way under certain conditions .Attitude towards mathematics is the feeling and emotions of mathematics. N.K.Dutt (1978)[1]says “Attitude underlie many of the significant dramatic instances of man’s behavior”

The studies carried out in the area of effect on achievement in mathematics to the individual influence of Arithmetical ability and study habits. The investigator went

through the literature and found that little work was done relating mathematics achievement with the independent variables like arithmetical ability, attitude towards mathematics and study habit areconsidered individually. But no work was undertaken combining all the above factors and percentage of contribution of each variable in achievement in mathematics.

## 2.1 Significance of the study

There are many factors, which influence the Achievement in mathematics. It is need of the hour to identify factors related to mathematics learning & teaching which results in “Pupils Achievement in Mathematics”. There should be scientific research in this respect.

In India and abroad numbers of studies are done in this respect but in our North East number of studies in this area are very few. Some of these studies already done are mentioned below:

Jain S.L. and Burad G.L 1988[2]: Studied “Low results in mathematics at secondary examination in Rajasthan” He found that there are some administrative and academic causes for low results in mathematics. In the academic side he found that non availability of mathematics teacher due to late appointment and frequent transfers, lack of infrastructure, teacher’s habit of leaving of classroom etc. are some factors for under achievement in subject mathematics. A low standard in the lower class, non availability of the book, lack of timely correction of home work, overcrowded classrooms, lack of sufficient periods for the subjects were some of the academic causes.

Rosaly.A.1992.[3] Studied “the relationship between attitude of students towards mathematics and achievement.” He found that –urban boys and girls had a more positive attitude towards mathematics than rural boys and girls. He also found that girls were higher than boys in their achievement in mathematics. The attitude of high school

students towards learning mathematics and their achievement mathematics were related.

Subudhi. B. 1990[4]: studied "study habit of high school students in relation to intelligence, anxiety, sex, residence and grade". In this study he found that high intelligent students and low intelligent students do not differ significantly in their study habit.

Female students have better study habit than the male students. He also found that hosteller have better study habit and more favorable attitude towards study than non hostellers. This finding is supported by a research study done by Comoetra (1970) that resident student are less in the habit of reading guides and help books. Secondly hostellers are not generally local students; they come from distance places for study. This makes them achievement oriented. Students of grade IX and X do not significantly in the study habits and attitude towards study.

Patel. Chatur.P.1997 [5]: Studied "attitude of secondary school students towards study of mathematics" In this study he found that sex is a significant factor in developing the attitude towards the study of mathematics. The boys have more +ve attitude than girls. To develop a more +ve attitude towards mathematics, girls must be given various educational programmed and practice in mathematics.

He also found that attitude of urban area students are more positive than that of rural one, towards mathematics. Area and sex have no significant difference in the attitude towards mathematics.

Oyedeji.O.A[6]: Studied about perseverance, study habits and self- concept as predictors of student's performance in secondary school mathematics in Nigeria" He found that the three variables self concept , perseverance and study habit have contributed significantly to the variance of mathematics performance.

## 2.2 Objective of the study

(I). To find out the significant relationship between the student's achievement in mathematics and arithmetic ability, attitude towards mathematics and the study habit separately and jointly.

(II). To study the significant difference of achievement in mathematics, arithmetic ability, attitude towards mathematics and study habit to the variance of achievement in mathematics of IX standard students.

(III). To determine the relative contribution of the arithmetic ability, attitude towards mathematics and study habit to the prediction of achievement in mathematics.

## 2.3 Sample

The Normative survey method was used for the present study. For this purpose a sample of 500 secondary school students from secondary schools of South Kamrup district were selected at random from the population of standard IX, selecting 25 students from each school.

## 2.4 Collection of Data

The data was collected from 20 schools after taking permission from the school authority. The investigator analyzed 500 data with the help of SPSS Software.

## 2.5 Tools

Four main instruments were used to collect data for the study. They are:-

- (a) *Mathematics achievement test*: This has its content based on senior secondary mathematics syllabus and contains multiple choice items and validated with the assistance some senior secondary school teachers
- (b) *Arithmetical ability inventory*: This was constructed and validated with the assistance some senior secondary school teachers.
- (c) *Attitude towards mathematics inventory*: To enquire the attitude of the pupils a standardized inventory was used to measure attitude towards mathematics of the pupil.
- (d) *The study habit inventory*: To enquire the nature of the pupils' study a study habit inventory was used.

## 2.6 Data collection

The investigator collected the data by visiting the schools. Four tools were used for analysis of data.

## 2.7. Data analysis

Correlation and multiple regressions were used for analysis of data.

**2.8. Hypotheses Testing**

H1) There is no significant relationship between arithmetical ability, attitude towards mathematics and study habit and academic achievement of mathematics of IX standard

students.

H2) There is no significant difference to the variance of arithmetic ability, attitude towards mathematic and study habit and achievement in mathematics of IX standard students.

**Table-I**  
**r-value for Achievement in Mathematics and Arithmetic ability, attitude towards mathematics and study habit**

Sl. No.	Independent Variables	Dependent Variables	r-value	Relation
1	ARA	AM	.605	Significant
4	ATM	AM	.618	Significant
5	SH	AM	.509	Significant

NOTE: AIM= Achievement in mathematics, ARA= Arithmetic ability, ATM= Attitude towards mathematics, SH= Study habit.

**Table -II**  
**Mean achievement and S.D of the subjects on ARA, ATM and SH of mathematics.**

Variables	N	Mean	S.D
AIM	500	38.03	22.37
ARA	500	15.28	8.05
ATM	500	20.94	6.10
SH	500	62.00	21.48

**Table-III**  
**ANOVA of regression of achievement in mathematics on ARA, ATM, and SH.**

	df	S.S	MS	F-Value	p-Value
Model	3	159715.9	53238.63	293.60	.000
Error	246	89941.60	181.334		
Total	249	249657.5			

**Table- IV**  
**R and R<sup>2</sup> of regression of achievement in mathematics on ARA, ATM and SH**

	ARA	ATM	SH	ARA+ATM	ARA+ATM+SH
<b>R</b>	.605	.509	.618	.686	.800
<b>R<sup>2</sup></b>	.366	.259	.382	.471	.640
<b>Adj. R<sup>2</sup></b>	.365	.258	.381	.469	.638

**Table-V**  
**The relative contribution of ARA, ATM and SH to the prediction of achievement in mathematics.**

	Beta	Sd. Error	T value	p-value
<b>intercept</b>	-27.689	2.520	-10.988	<0.01
<b>ARA</b>	1.038	.082	12.615	<0.01
<b>ATM</b>	1.036	.106	9.767	<0.01
<b>SH</b>	.455	.030	15.236	<0.01

## 2.9. Hypotheses Testing

H1) There is no significant relationship between arithmetical ability, attitude towards mathematics and study habit and academic achievement of mathematics of IX standard students.

H2) There is no significant difference to the variance of arithmetic ability, attitude towards mathematic and study habit and achievement in mathematics of IX standard Students.

- (i) From table-I it may be observed that the r-value of Arithmetical ability, Attitude towards mathematics and study habit on achievement in mathematics are 0.605, 0.618 and 0.509 respectively. All these values are much closed to one. So arithmetical ability, attitude towards mathematics and study habit to the achievement in mathematics are significantly related. So it may be concluded that the student who has the high arithmetical ability, high attitude to the subject mathematics and better study habit imply the high achievement in mathematics.

- (ii) From table-III it may be observed that the regression is statistically significant with  $F = 293.60$  (significant beyond  $< 0.01$ ). This implies that the three variables ARA, ATM and SH have contributed significantly to the variance in achievement in mathematics

- (iii) From table-IV it may be observed that the relative contributions of the independent variable to the variance of achievement in mathematics with the adjusted  $R^2$  value of 0.365 (36.5%), 0.258 (25.8%) and .381 (38.1%) for ARA, ATM and SH respectively. Again the three independent variable ARA, ATM and SH respectively jointly contribute 0.638 (63.8%) to the variance in the dependent variable achievement in mathematics.

- (iv) From table-IV it may be observed that the contribution of variables - Arithmetical ability (36.6%) attitude towards mathematics (25.9%) and Study habit (38.2%) are statistically significant with t-values of 12.615, 9.767 and 15.236 re-

spectively. By using the beta values from table 4, the regression equation for the relationship is given as:

$$\text{AIM} = -27.689 + 1.038 \cdot \text{ARA} + 0.038 \cdot \text{ATM} + 0.455 \cdot \text{SH}$$

### Findings of the study

1. Arithmetical ability and achievement in mathematics are significantly related.
2. Attitude towards mathematics and achievement in mathematics are significantly related
3. Study habit and achievement in mathematics are significantly related
4. Regression is statistically significant and the three variables ARA, ATM and SH has significant contribution to the variance of Achievement in Mathematics.
5. The three independent variables jointly contribute .638 (63.8%) to the variance of the achievement in mathematics.

6. The Regression equation for the relationship is given by-  $\text{AIM} = -27.689 + 1.038 \cdot \text{ARA} + 0.038 \cdot \text{ATM} + 0.455 \cdot \text{SH}$

### Conclusion

Result of the present study has supportive results from the studies. The entire variable has made significant contribution to the variance in achievement in mathematics of the student. Good concept and arithmetic approach in arithmetic measures the excellence in mathematics. From this study we may conclude that favorable attitude towards mathematics has impact in achievement in mathematics. It is also found that the study habit is a factor on the variance in the score of achievement in mathematics of secondary school pupils followed by the attitude.

10. **Noorjehan N. Ganihar, Wajiha A.H. (2009)** "Factors affecting academic achievement of IX standard students in mathematics" Vol. 8 No. 7, Page (25-33). Edutracks.

### REFERENCES

1. **Dutt, N.K. (1978)** Psychological foundations of education .New Delhi : Doaba house
2. **Jain.S.L and Burad. G.L (1988)**: Investigation on causes of high Failure rates in Mathematics of the secondary stage pupils of Rajasthan. Fifth srvey of Research in Education, Vol. 1, Buch
3. **Rosalyn.A. 1992** The relationship between attitude of students towards Mthematics and achievement.M.Phil. Edu. Madurai Kamraj University
4. **Subudhi, B. (1990)** "Study habit of high school students in relation to intelligence, anxiety, sex, resident and grade." Vol. C-VII No-1, Page (5-7). The Educational Review.
5. **Chatur, P. Patel. (1997)**: "Attitude of secondary school students towards study of mathematics." Vol. CIII- No 4, Page (66-70). The Educational Review.
6. **Oyedeji, O.A.:** "Perseverance, Study habit and self concept as predictors of students' performance in secondary school mathematics in Nigeria."
7. **Chatur, P. Patel. (1997)**: "Attitude of secondary school students towards study of mathematics." Vol. CIII- No 4, Page (66-70). The Educational Review.
8. **Kundu, C.L. Tutoo.D.N.:** Education Psychology." Sterling Publishers Pvt. Ltd.
9. **Mishra, B.B.:** (1997): "Correlates of academic achievement of high school student in India." Vol. CIII-No2, Page (21-25). The Educational Review.

---

First Author\*: Dr. Ranjana Chaudhury, Rtd.Head of the department of mathematics, Handique girl's college, Guwahati, Assam, Pin-781001

Second Author\*\*: Dhiraj Kumar Das, Associate Professor & H.O.D, Mathematics, J.N.College, Boko, Kamrup, Assam, Pin: 781123.