

Influence of Arithmetical Ability and Study Habit on the Achievement in Mathematics at Secondary Stage

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Abstract: Arithmetical ability and study habits are some of the factor that influences the student's achievement in mathematics. The present study aims at studying the influence of areas in relation to the arithmetic ability and study habit on the achievement in mathematics to the pupils' at secondary stage. A sample of 500 students of standard IX from secondary school of south kamrup district, Assam, participated in the present study, in which the relationship among the achievement in mathematics was most closely related with arithmetical ability and study habit. Analysis of data indicated that there is a significant difference on achievement in mathematics of the students in case of sex for different sub categories but independent for the sub-categories of medium. The regression equation thus obtained shows that arithmetic ability and study habit contributes 28.44% and 29.66% respectively to the Achievement in mathematics.

Key words: Arithmetic Ability, Study Habit, Achievement in Mathematics, Sex, Medium

1. INTRODUCTION

Mathematics is the oldest of all sciences that have developed through the ages having a direct impact on the quality of human life in our planet. It is known to all of us that arithmetic is the basic branch of mathematics and numerical concept is at the root of each and every mathematical concept. However arithmetical ability and numerical ability may influence pupils' achievement in mathematics. Several studies are done to find out how achievements of the pupils are influenced by their mathematical ability and numerical ability. The national policy of education (1986)[1] has also considered the importance of mathematics in general education and suggests that 'mathematics should be visualized as the vehicle to train a child to think, reason, analyze and to articulate logically. The ability of do something is the quality acquired skill or talent. Study habit always creates talent and skill of problem solving techniques. Study habit is a well planned and deliberate pattern of study which has attained form of consistency on the part of the student towards understanding academic subject and s and passing at examination (Pauk, 1962;Deese, 1959; Akinboye,1974)[2,3,4]Rastogi(1983)[5] investigated the influence of command over basic arithmetical skill on mathematics achievement. He observed that poor command over basic arithmetical skill was to be an important cause of backwardness in mathematics. The investigator observed that the relation between Achievement in mathematics and Achievement in arithmetic is yet to be explored. Kaur(1985) analyzed abstract concepts in mathematics and isolated the figural angular factor and numerical facility factor as dominant factors in learning mathematics and thus achievement in mathematics in case of high school student. Sumangala(1995)[6] has studied 750 students of class IX in Kerala and found that the numerical ability, numerical reasoning , ability to choose symbols, spatial ability and abstract reasoning abilities to be significantly correlated to the achievement in mathematics. According to Olayinka (1996) and Yahaya (2003),[7] passing examination to secure certificates either for admission into higher institution or secure good jobs is the main goal of education to many people and not the acquisition of knowledge and skills through studying. Hence the present study entitled "Influence of arithmetical ability and study habit on the achievement in mathematics at secondary stage

2. Objective of the study:

The present study was taken up with the following objectives:

- [1]. To find out the relationship between achievement in mathematics and Arithmetical ability and study habit of IX standards students
- [2]. To study the significant difference of achievement in mathematics, arithmetic ability and study habit of IX standards students when they are classified according to their sex
- [3]. To study the significant difference of achievement in mathematics, arithmetical ability and study habit of IX standards students when they are classified according to the medium of instruction.

- [4]. To study the significant difference of achievement in mathematics with different arithmetic ability and study habit group of IX standards students when they are classified according to the sex.
- [5]. To study the significant difference of achievement in mathematics with different arithmetic ability and study habit group of IX standards students when they are classified according to the medium of instruction.
- [6]. To determine the relative contribution of the arithmetic ability and study habit to the prediction of achievement in mathematics.

3. Samples

The normative survey method on stratified random technique was used for the present study. For this purpose 250 boys and 250 girls of standard IX from secondary school of south kamrup district were selected at random.

4. Tools Used

Following tools were used to collect the data for the study-

- (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) **Arithmetic ability questionnaire:** This was constructed and validated with the assistance some senior secondary school teachers.
- (c) **Study habit Inventory:** This was constructed and validated by the investigator.

5. Data collection

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

6. Data analysis

Correlation, t-test and multiple regressions were used to study the variables in the present study.

Hypothesis testing

- H1) There is no significant relationship between arithmetic ability and study habit and achievement in mathematics of IX standards students
- H2) There is no significant difference on the mean achievement in mathematics, arithmetic ability and study habit of boys and girls student studying in IX standards.
- H3) There is no significant difference on the mean achievement in mathematics, arithmetic ability and study habit of English and Assamese medium students studying in IX standards .
- H4) There is no significant difference on the mean achievement in mathematics with different arithmetic ability and study habit group of IX standards students when they are classified according to sex.
- H5) There is no significant difference on the mean achievement in mathematics with different arithmetic ability and study habit group of IX standards students when they are classified according to the medium of instruction.

Table-1
r-value for Achievement in mathematics and Arithmetical ability , study habit

| Sl.No. | Variable | N | df | r | p |
|--------|-----------------------------------|-----|-----|------|-------|
| 1. | Achievement in Mathematics | | | | |
| 2. | Arithmetic ability | 500 | 498 | .605 | <0.05 |
| 3. | Achievement in Mathematics | | | | |
| 4. | Study habit | 500 | 498 | .618 | <0.05 |

Table-2
Data and Results of test of significance of Difference between mean scores of Achievement in Mathematics for different Sub Samples

| Sub Samples | | N | Mean | S.D | t value |
|-------------|----------|-----|-------|-------|---------|
| Sex | Boys | 250 | 45.67 | 26.01 | 8.12 |
| | Girls | 250 | 30.39 | 14.45 | |
| Medium | English | 250 | 39.48 | 23.01 | 1.45 |
| | Assamese | 250 | 36.58 | 21.65 | |

Table-3
Data and Results of test of significance of Difference between mean scores of Arithmetical ability for different Sub Samples

| Sub Samples | | N | Mean | S.D | t value |
|-------------|----------|-----|-------|------|---------|
| Sex | Boys | 250 | 16.80 | 8.10 | 5.09 |
| | Girls | 250 | 13.25 | 6.43 | |
| Medium | English | 250 | 16.06 | 8.22 | 2.92 |
| | Assamese | 250 | 13.96 | 7.08 | |

Table-4
Data and Results of test of significance of Difference between mean scores of Study Habit for different Sub Samples

| Sub Samples | | N | Mean | S.D | t value |
|-------------|----------|-----|-------|-------|---------|
| Sex | Boys | 250 | 65.09 | 21.56 | 3.29 |
| | Girls | 250 | 58.82 | 20.97 | |
| Medium | English | 250 | 62.78 | 20.70 | .855 |
| | Assamese | 250 | 61.14 | 22.24 | |

Table-5
Significance Differences between the Means of Achievement in mathematics Scores with different sub categories of Arithmetic ability

| Sl. No. | Sub category | N | Mean | SD | SE(Means) |
|---------|--------------|-----|-------|-------|-----------|
| 1 | High | 145 | 56.35 | 24.17 | 2.01 |
| 2 | Average | 216 | 35.25 | 16.42 | 1.12 |
| 3 | Low | 139 | 23.24 | 13.94 | 1.18 |

| Group | t value | D.F. | Significance |
|----------|---------|------|--------------|
| High/Ave | 9.88 | 359 | .000 |
| Ave/Low | 7.12 | 353 | .000 |
| High/Low | 14.06 | 282 | .000 |

Table-6
Significance Differences between the Means of Achievement in mathematics Scores with different sub categories of Study Habit

| Sl. No. | Sub category | N | Mean | SD | SE(Means) |
|---------|--------------------|-----|-------|-------|-----------|
| 1 | Regular | 142 | 54.08 | 19.61 | 2.52 |
| 2 | Moderately Regular | 120 | 48.04 | 18.62 | 1.15 |
| 3 | Irregular | 328 | 23.41 | 15.18 | 1.79 |

| Group | t value | D.F. | Significance |
|-------------|---------|------|--------------|
| Reg/Modreg | 8.91 | 350 | .000 |
| Modreg/Irrg | 2.74 | 422 | .006 |
| Reg/Irrg | 9.21 | 222 | .000 |

Significance Differences between the Means of Achievement in mathematics Scores with different sub categories of Study Habit

Multiple Regression Analysis

In pursuance of the objective (VI) of the study, i.e. to determine the relative contribution of the arithmetical ability and study habit to the prediction of achievement in mathematics of IX standard students, data were subjected to statistical treatment of multiple regression technique.

Table-7
The relative contribution of Arithmetical ability and study habits in to the prediction of achievement in mathematics.

| Variables | Constant | Regression Coefficient | B-Coefficient | r value | % of contribution |
|--------------------|----------|------------------------|---------------|---------|-----------------------|
| Arithmetic ability | -12.05 | 1.26 | .47 | .605 | 28.44 |
| Study habit | | .49 | .48 | .618 | 29.66 |
| | | | | | R ² =58.10 |

- [1]. From table-I it may be observed that the r-value of algebraic ability and study habit on achievement in mathematics are 0.605, 0.618 respectively. All these values are much closed to one. So algebraic ability 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 and better study habit imply the high achievement in mathematics.
- [2]. From table-2 we observed that with regard to achievement there is significant difference between boys and girls ($t=8.12$, significant at 0.05 level) but not significant between English medium and Assamese medium students ($t=1.45$, not significant at 0.01 level). It is seen that the mean achievement score for boys ($M=43$) is higher than that of girls ($M=33.06$). So it may be concluded that the null hypothesis is rejected for achievement in mathematics for different sub samples of sex and accepted in case of medium. This implies that Boys are high on achievement in mathematics when compared with girl's students. But Achievement in Mathematics is independent for the sub-categories of medium.
- [3]. From table-3 we observed that with regard to arithmetical ability there is significant difference between boys and girls ($t=5.09$, significant at 0.05 level) and between English medium and Assamese medium students ($t=2.92$, significant at 0.05 level). So it may be concluded that the null hypothesis is rejected for arithmetical ability for different sub samples sex and medium. This implies that Boys are high on algebraic ability when compared with girl's students and assamese medium student has high arithmetic ability than English medium students.
- [4]. From table-4 we observed that with regard to study habit there is significant difference between boys and girls ($t=3.29$, significant at 0.05 level) and there is no significant difference between English medium and Assamese medium students ($t=.855$, not significant). So it can be inferred that study habit is independent for sub-categories of sex and medium.
- [5]. From table-5 we observed that with regard to achievement in mathematics, there is significant difference between sub-categories of arithmetical ability between high and Average ($t= 9.88$), average and low ($t=7.12$) and high and low ($t=14.06$).
- [6]. From table-6 we observed that with regard to achievement in mathematics, there is significant difference between sub-categories of study habit between regular and moderately regular ($t= 2.54$), moderately regular and irregular ($t=13.41$) and regular and irregular ($t=17.05$).
- [7]. From table- 7 it is observed that-
 - (a) The achievement in mathematics by the independent variable arithmetic ability of IX standard students to the extent of 28.44%.

- (b) The achievement in mathematics by the independent variable study habit of IX standard students to the extent of 29.66%.
- (c) The regression equation obtained for total sample of 500 to predict achievement in mathematics of IX standard students with the help of the prediction variable algebraic ability and study habit is : $AIM = -12.05 + 1.26 * ALA + .49 * SH$ Where AIM= Achievement in mathematics, ALA= Arithmetic ability, SH= study habit

7. Findings of the study

- [1]. **Findings of coefficient of analysis**
 - . Arithmetical ability and achievement in mathematics are significantly related.
 - . Study habit and achievement in mathematics are significantly related.
- [2]. **Findings of t-test analysis**
 - . Boys have better achievement in mathematics than girls.
 - . English and Assamese medium students are independent for the achievement in mathematics.
 - . Boys are high on arithmetical ability compared with girls.
 - . High arithmetical ability group have the better achievement in mathematics than average and low group of pupils.
 - . Regular study habit group have the better achievement in mathematics than irregular and moderately regular group of pupils
- [3]. **Findings of Multiple Regression analysis**
 - . Arithmetical ability as an independent variable depends on the achievement in mathematics of IX standard students to the extent of 28.44% %.
- [4].
 - . Study habit of mathematics as an independent variable depends on achievement in mathematics of standard students to the extent of 29.66%

Conclusion

From the above study we may conclude that the arithmetical ability and study habit influence the achievement in mathematics. Moreover the achievement in the subject mathematics mostly depends on pupils study habit. The teacher needs to improve their relationship with the students to encourage good study habits through home assignment. A large number of studies have been done on ability of the students from lower grades to secondary grades in grasping concept of different topics of arithmetic. So it is beyond imagination for most of the parents and teacher's that to improve the arithmetical ability to influence pupil's achievement in mathematics the students proper study habit necessary.

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