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Nikhat Zulekha
Asistant professor,
Integral University, Lucknow,
India.

Dr. Zeba Aqil
Associate professor,
Integral University, Lucknow,
India.

Mathematics Achievement of 9th Standard Student In Relation To Their Gender and Attitude towards Mathematics

Nikhat Zulekha, Zeba Aqil

Abstract

Education is universally recognized as the most effective tool of bringing desirable change towards the social and economic betterment and cultural transformation of the society in the status of human being and the country as a whole. In one hand, education develops the total personality of the individual and on the other hand education contributes to the growth and development of society. Humphreys, Traxler and North (1960) have very correctly remarked "Our future material and cultural welfare and progress, even our survival as a nation depends upon the wise use of abilities and energies of our people."

The main objective of this research is to find out the attitude of students towards Mathematics and also to see the influence of gender and medium of instruction on Mathematics achievement.

Keywords: Academic achievement, Achievement in Mathematics, Gender Difference, Attitude.

Introduction

Mathematics is a creative discipline, the language of Mathematics is international. Mathematics become an indispensable factor for the progress of our present day world. It is the pivot of all civilization. Each individual is required to compute his or her income and balance, his family budget irrespective of having any formal education of Mathematics.

There is no Science, no Arts and no profession, where Mathematics does not held a key position. The accuracy and exactness of a science is determined to a major extent by the amount of Mathematics utilised in it. Even Social Science like economics, Psychology, and Geography etc. makes abundant use of Mathematics. This gigantic work of construction of dams, bridges, building of ships, aeroplanes, bombs etc. are possible only because of the quantitative Science. Even in Medical Science Mathematic is used to measure doses, the blood pressure, the rate of the pulse, the body temperature etc. The sun rises and sets at specific moment. The stars appear at fixed time. Mathematics suns in the veins of Natural Science like Physics and Astronomy. Mathematical thinking is important for all members a modern society as a habit of mind for its use in the work place, business and finance and for personal decisions making. Mathematics is fundamental to National prosperity in providing tools for understanding Science, Engineering, Technology and Economics. It is essential in public decision making and for participation in the knowledge economy, Math equips pupils with uniquely powerful way to describe, analyze and change the world. Pupils who are functional in Maths and financially capable are able to think independently and applied and abstract ways and can reasons, solve problem and assess risk.

An ideal system of education should enable individuals to know and develop to the fullest their physical and intellectual potentialities and promote their awareness of societal and human function as responsible members of society. In modern world we have to be more and more exact, we make larger use of quantitative terms we have to accurate to a split of second. Mathematics is vital to the continued growth of the nation, both for expanding internal advancement and maintenance of leading role of the world community. A strong background in Mathematics is crucial for many career and job opportunities in today's increasing technological society. There can be no schooling without Maths.

Mathematics helps in the process of decision making through its application to real life situations. It contributes in the development of precision, rational and analytical thinking,

Correspondence:
Nikhat Zulekha
Asistant professor,
Integral University, Lucknow,
India.

reasoning, positive attitudes and aesthetic sense. NPE(1986) Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and to articulate logically. Apart from being a specific subject, it should be treated as a concomitant to any subject involving analysis and reasoning. Most of the boards of secondary education in India prescribed two types of syllabus.

From ancient times, our society has given a lots of renowned Mathematician who have contributed a lot towards universalization of Mathematics as well accepted discipline in the whole education system. Along with this there is a myth in the society from yester year that a lot of gender bias prevails regarding choice and inclination towards Mathematics by the softer sex (female).Female were considered to be lacking logical and reasoning abilities as a result, they were diverted towards non-scientific discipline. On the contrary human physiology has proved that there is only difference of one pair of gene in the biological make up of male and female.

To sort out this query researcher decided to take up a study to investigate difference of gender and attitude towards selection of Mathematics as a core subject to study. For this purpose the sample under study was adolescent (that is IXth standard students) because in these formative year students have to make choice of subject for their future carrier.

School education has received a global attention in the recent and the past. However, the research in this priority sector of education has mostly remained confined within the developed countries. As regards to developing countries and particularly India, research in school education is not providing a healthy sign. Kumar, (1995) [1] from his similar study concluded that male and female have similar attitude towards mathematics

In another study Melkonian, Michael (1997) [2] found that female students outperformed their male counterparts in mathematics achievement test. Alkhateeb (2001) [3] Nagaraju, Sumalatha, *et.al* (2002) from their research work also highlighted females better achievement in mathematics grade.

Xin Ma and Jianymin (2004) conducted a study to determine the casual ordering between Attitude towards Mathematics and achievement in mathematics of secondary school students. Results showed the achievement demonstrated casual predominance over attitude across the entire secondary school. Gender difference in this casual relationship was not found but elite status in mathematics moderated this casual relationship. Thomas (2006) conducted a study to determine the Attitude towards Mathematics and achievement by combining co-operative learning strategies with instruction delivered using an Integrated Learning System (ILS). Sixty five fifth grade students were randomly divided in two groups, co-operative and individual. Result revealed that students using on ILS for mathematics instruction performed better on standardised tests and were more positive towards math and they worked in co-operative groups than when they worked on the same individually.

Yet in another study Orhun (2007) [5] suggested that there are differences among learning modes preferred by female and male students, their mathematical achievement and attitude towards mathematics, but these differences were not depending upon. Saha (2007) conducted a study Gender, Attitude to Mathematics, cognitive style and Achievement in Mathematics. It was found that all the three contributes to statistically significant difference in achievement in

mathematics.

Many research studies conducted in India and Abroad suggest the boys superiority over girls in educational Achievement in general and numerical ability in particular. Generally, it has been observed that male students have more knowledge and understanding of the Mathematical concepts and thinking in comparison to the females. In the Indian situation, it was found that boys' score in the Mathematics is higher than that of girls. The result of research studies conducted by Sathiyagirirajan (1981) [40], Holland & Sandler (1982) [18], Khatoon (1988) [23], Sucin (1992), Driver (1993) [14], Bassa (1993) [8], Leiker (1993) [26], Chakalisa (1994) [11], Thomous & Wangu (1995) [45], Narayan (1995) [31], Matpass (1999) [28], Patel (1996) [33], Piearey (1996) [35], Arnold & Judith (1996) [7], Paria Debasis (1996) [32], Wells (1996) [48], Pruett (1997) [37], Kaliyan (1997) [22], Jacobi (1997) [20], Marsh (1998) [27], Singh & Singh (2007) [42] and Khatoon & Mahmood (2010) [24] result support the conventional expectation of the boys superiority over the girls in learning Cyrus (1996) [13] (boys have more ability in Mathematics), Narayan (1995) [31] (boys scored higher on Numerical Ability), Becker (1981) [9] also found the same result. On the other hand, some researches reveal that the girls' superiority over boys' in the Mathematics Achievement viz. Endsley (1984) [15], Wohlgehager (1992) [50], Wang (2001) [47].

On the other hand, some researches reveal that the girls' superiority over boys' in the Mathematics Achievement viz. Endsley (1984) [15], Wohlgehager (1992) [50], Wang (2001) [47] found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981) [39], Koehler (1986) [25], Carmichall (1986) [10], Rajyaguru found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981) [39], Koehler (1986) [25], Carmichall (1986) [10], Rajyaguru (1991) [38], Teston (1992) [44], Abdulmajeed (1992) [6], Miller (1993) [30], Harvath (1995) [16], found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981) [39], Koehler (1986) [25], Carmichall (1986) [10], Rajyaguru (1991) [38], Teston (1992) [44], Abdulmajeed (1992) [6], Miller (1993) [30], Harvath (1995) [16], found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981) [39], Koehler (1986) [25], Carmichall (1986) [10], Rajyaguru (1991) [38], Teston (1992) [44], Abdulmajeed (1992) [6], Miller (1993) [30], Harvath (1995) [16], found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981) [39], Koehler (1986) [25], Carmichall (1986) [10], Rajyaguru (1991) [38], Teston (1992) [44], Abdulmajeed (1992) [6], Miller (1993) [30], Harvath (1995) [16], found that girls achieved significantly higher score in the Mathematics than the boys. Segars (1995) [41], Srinivasan (1999) [43], Toole (2001) [46] and Choudhury & Kumar (2009) [12] found in their studies that sex factor did not have an effect on the learning

outcomes in the Mathematics. Besides it, Houston (1980) [19], Jensen (1982) [21], Heimann Vtefreyja (1982) [17], Carmichall (1986) [10], Metcaff (1986) [29] and Prakash & Pandey (1996) [36] found that males and females have significant difference on the Mathematics Achievement. Due to dearth of literature in Indian context, this study was undertaken by the researcher to discover this underlying presumption in Indian settings.

Statement of the problem

“A study of mathematics achievement of 9th standard students in relation to gender and attitude towards Mathematics.”

Objectives of the study

The present study is aimed at achieving the following objectives:

- To study the Mathematics achievement of 9th grade student.
- To study the impact of attitude in Mathematics of 9th grade students.
- To study the Mathematics achievement on gender basis.
- The comparison of 9th grade students on the basis of medium of school i.e. English and Hindi medium.

Hypothesis

The hypotheses have desirably to be stated in the null-form. The follow null-hypothesis have been constructed for testing through the study. The confidence interval set-up for the purpose of accepting or rejecting the hypotheses in the study is 0.05 to 0.01 levels. The following hypotheses were established

- There is no significance difference in the comparison of the mathematics achievement of 9th standard student on gender basis.
- There is no significance difference in the comparison of the mathematics achievement of 9th standard student on the basis of medium of school i.e. English and Hindi medium.
- There is no significance impact on the Attitude of the students towards Mathematics and their Achievement in Mathematics.

Significance of the study

In most of the studies the relationship of just one or two variables with achievement in Mathematics has been worked out. Thus, need to have the Indian data to see how the different factors are at work in various school situations in this country. The present study was, therefore, designed to fulfil these needs and it aimed at identified variables, having relationship with Mathematics achievement. Through appropriate statistical techniques an attempt was made to work out the relative importance of the different variables in determining achievement in Mathematics.

Method of Study

Design: Statistical inference technique has been used as a design for testing framed hypothesis.

Variables: Two sets of variables employed in this study are:
Independent variables: Gender, attitude towards Mathematics
Dependent variables: Mathematics achievement.

Sample: The sample of this study consisted of 200 students of class IX divided equally among both genders and medium of instruction.

Tool used: The tools employed for collection of the data mentioned above included the following.

1. Mathematics Achievement test (MAT).
2. A Mathematics attitude scale.

Data collected for the study

The following base line data were collected for carrying out the present investigation.

1. Scores of the students related to gender,
2. Scores of the students related to attitude in Mathematics.

Statistical techniques employed

Following statistical measure were used for analyzing the data-

1. Mean and standard deviation
2. T-test for measuring the significant of the difference between means.

Results and Interpretation

Table 1.1: Mathematics achievement of 9th standard students on the basis of gender

Gender	N	Mean Score	S.D	SEM	DF	t-value	Significance
Male	100	28	6.10	1.02	198	1.95	Not significant
Female	100	30	8.2				

Table 1.1 presents the results of statistical comparison between all male [N=100] and female [N=100] on achievement in Mathematics. The mean, SD for both groups along with the corresponding t-ratio are given in the relevant column of the table.

On achievement in Mathematics the mean score of male and female students were compared by using t-test which was found to be not significant at 0.05 and 0.01 level.

These results led to the conclusion that there is no significant difference between male and female students of 9th standard on Mathematics achievement. The graphical representation of mean achievement scores of both sexes is given in fig. 1.1

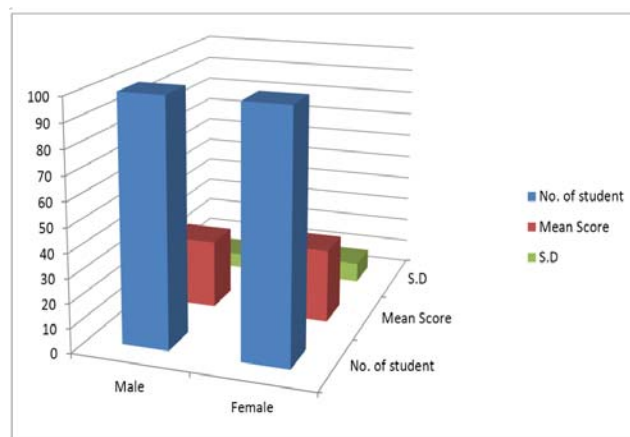


Fig 1.1 Mean achievement scores of Male and Female students

Comparison of Mean Achievement Score in Mathematics of English medium and Hindi medium

Table 1.2: Comparison of Mean Mathematics Achievement Scores of 9th Standard English medium and Hindi medium students

Medium of Instruction	N	Mean Score	S.D	SEM	DF	t-value	Significance
English Medium	95	26	5.72	0.90	198	0	Not significant
Hindi Medium	105	26	7.10				

Table 1.2 presents the results of statistical comparison

between all English medium [N=95] and Hindi medium [N=105] on achievement in Mathematics. The mean, SD for both groups along with the corresponding t-ratio are given in the relevant column of the table.

On achievement in Mathematics the mean score of English medium and Hindi medium students were compared by using t-test which was found to be not significant 0.05 and 0.01 levels.

These results led to the conclusion that there is no significant difference between English medium and Hindi medium students of 9th standard on Mathematics achievement.

The graphical representation is given in fig. 1.2

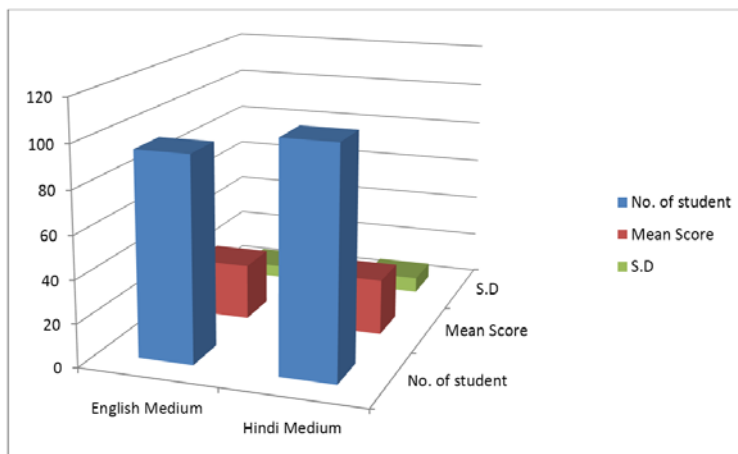


Fig. 1.2: Mathematics achievement scores of 9th Standard English and Hindi medium students.

Comparative study on the attitude of the students of 9th standard in Mathematics achievement

To find out the attitude of the students towards Mathematics it is necessary to know the interest of the student in Mathematics. Attitude of the students is closely related to the interest of the students in Mathematics. Attitudes motivate the students for learning and so play a role in learning outcomes. Attitude towards Mathematics influence student's performance.

Students were categorized into three groups' i.e. positive attitude, neutral attitude and negative attitude.

Table 1.3: Percentage of students' positive attitude, neutral attitude and negative attitude.

No. of students	Positive Attitude	Neutral Attitude	Negative Attitude
200	65%	15%	20%

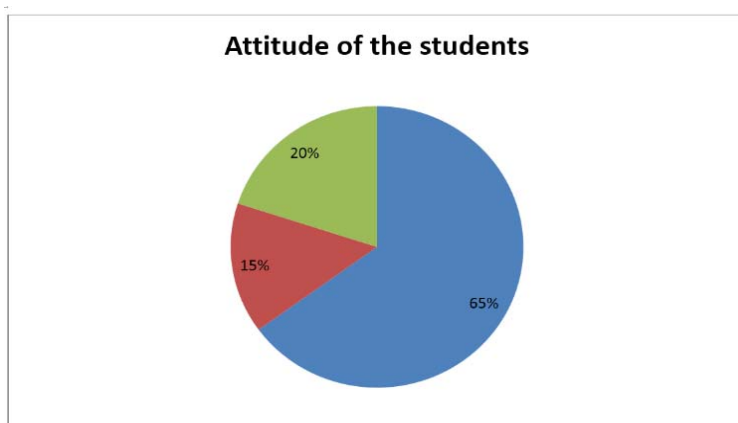


Fig 1.3: Percentage of the number of students in Positive, Neutral and Negative Attitude

It is clear from the table 4.5 that the number of students in positive, neutral and negative attitude are 65%, 15% and 20% respectively.

Comparative study on the attitude of 9th standard students in Mathematics Achievement: For studying relationship of attitude towards Mathematics and their achievement in Mathematics students were categorised into two groups i.e. favourable and unfavourable.

Table 1.4: Comparison of Mean Achievement Score in Mathematics of 9th standard students on the basis of their Attitude towards Mathematics

Attitude in Mathematics	N	Mean Score	S.D	SEM	DF	t-value	Significance
favourable	130	88	10.17	1.22	168	5.73	Not significant
Unfavourable.	20	81	5.34				

Table 1.4. Presents the results of statistical comparison between favourable students [N=130] and unfavourable students [N=20] on achievement in Mathematics. The mean, SD for both groups along with the corresponding t-ratio are given in the relevant column of the table.

On achievement in Mathematics the mean score of favourable and unfavourable students were compared by using t-test which was found to be not significant at 0.05 and 0.01 level.

These results led to the conclusion that there is no significant difference between favourable and unfavourable students of 9th standard on Mathematics achievement.

The graphical representation is given in fig. 1.4

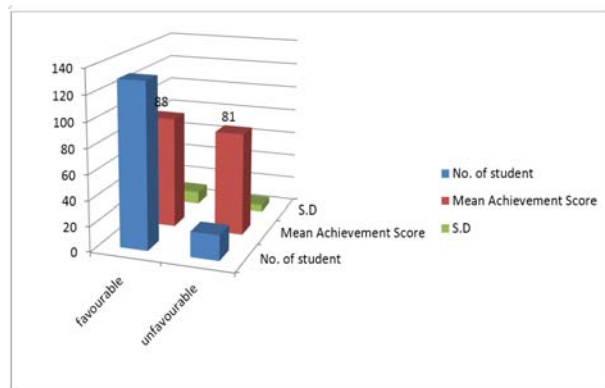


Fig 1.4: Mean Achievement Scores of favourable and unfavourable group.

Findings

The findings have been listed along with significant quantitative information's. The implications of these findings for theory and practices of education and for further researches in this area have also been discussed.

Findings of the study are as follows:

- There is no significant difference between male and female students of 9th standard on Mathematics achievement.
- There is no significant difference between English medium and Hindi medium students of 9th standard on Mathematics achievement.
- There is no significant difference between CBSE Board and UP Board students of 9th standard on Mathematics achievement.
- There is no significant difference between favourable and unfavourable students of 9th standard on Mathematics achievement.

Implications

Research of all kinds are directed towards the goal of discovering new knowledge about nature so that the new knowledge might be utilize for making human living more comfortable. A research study is meaningful if and only if its findings can be put a profitable use to solve a problem of human interest. The findings of this study have some

important implication for educational practices in general and curriculum planning, teaching methods and evaluation techniques in particular. The findings also have some implications for further research in this field. The detailed discussions of these implications are as follows.

Educational Implications

The psychology of individual differences states that even individual is different from every individual in the world in all respect of personality. Therefore, it is obviously highly unreasonable to place every child in the same kind of learning situation. It needs not to be emphasized that all educational efforts are aimed at improving academic performance.

Some of the Educational Implications of the study are as follows:

- There is no difference in the achievement in Mathematics of male and female students of 9th standard.
- There is no difference in the achievement in Mathematics of English medium and Hindi medium students of 9th standard.
- There is no difference in the achievement in Mathematics of CBSE Board and UP Board students of 9th standard.
- There is no difference in the achievement in Mathematics of favourable and unfavourable students of 9th standard.

There is no significant difference between favourable and unfavourable students of 9th standard on Mathematics achievement

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