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Influence And Interaction Effect Of Attitude Towards Mathematics On Achievement In Mathematics Of Secondary School Students With Respect To Gender

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Abstract

Mathematics is an important subject in secondary school but it is very disinteresting to note that performance in mathematics by secondary school students are not up to the mark. This study focuses on the improvement of secondary school students' achievement in mathematics In this light, the researcher tried to investigate the achievement in mathematics in relation to attitude towards mathematics and gender. The sample was selected randomly and consisted of 600 students studying in IX class both boys and girls from rural and urban area of Jalandhar district. The Attitude Towards Mathematics scale by Sharma(2009) and Achievement in Mathematics scale by Singh & Kumar(2009) was used for the collection of data. Descriptive survey method of investigation was used in this study. The findings revealed that significant difference was found in the achievement of students with respect to attitude of students towards mathematics. There was no significant difference in achievement in mathematics of boys and girls. There was no interaction effect of attitude towards mathematics and Gender on achievement in mathematics of students

Keywords – Attitude towards mathematics, Achievement in Mathematics.

Introduction

Education aims at modifying the behavior to suit the social needs and contextual expectations. One of the determinants of behavior is attitude. Family, neighborhood, school peer group develop

attitudes in the growing children develop children in growing children towards people, things, places etc. These acquired tendencies make the child to behave in a certain way towards specific objects or situations. Attitudes reflect a person's tendency to think or behave in a positive or negative manner towards the object or person or situation. The cognitive component of an attitude is reflected in a person's perception of the object or what the person says about his feeling about the object. A student may have favorable attitude towards his school (affective). He at the same time, believes that school has few attractive elements (cognitive).Attitudinal change is the need of the day. Attitudes and their organization are the products of individual's own reactions to their own experiences. Attitude towards mathematics is a mathematical approach in which individual shows his readiness to respond by associating ideas and making decisions and assessments while solving problems. Neale (1969) defines an attitude towards mathematics as 'a liking or disliking about mathematics, a tendency to engage in or avoid mathematical activities, a belief that one is good or bad at mathematics and useful or useless of mathematics'.

Mathematics has utmost importance in school education. Its influence has been so fundamental and widespread that being numerate is becoming more important than being literate. Today, Mathematics is used throughout the world in many fields including natural science, engineering, medicine and the social sciences. From the hurried arithmetic that we prefer in our daily lives to the exacting calculations of science and technology mathematics shapes and influences nearly every object around us. Thus abstract and advanced mathematical methods help in medical diagnosis, undergird security of banking operations and ensure space-flight control. Today human being depends upon mathematics for day to day functioning. Mathematics can be expected to play a much greater and more critical role, directly and indirectly in our daily lives. Mathematical knowledge is indispensable in understanding the forces of nature. Mathematics is the only subject that encourages and develops logical thinking. It enables the student to discriminate between essentials and non- essentials. It helps them to gift facts, to draw conclusions without ambiguity and that is the subject by which they may learn what is meant by rigid reasoning.

The importance of mathematics is stressed in the 2007 revision of the National Curriculum, which refers to the mathematics as useful in the workplace and fundamental to national prosperity (QCA, 2007). Mathematics generates logical attitude. It gives training to different faculties of mind. Mathematics provides definite way of thinking. Through mathematics students learn to work systematically, regularly and properly. The philosophy of teaching mathematics is backed up by painting to the wide range of applications, 'Social sciences, biological and medicine, management, and it seems , every field of human endeavor' where mathematics makes a contribution (Burghes and Wood, 1984). Mathematics is mainly a tool for solving problems; it must be included in the curriculum so that pupils can acquire the skills they need to solve problems. Mathematics is a fascinating body of knowledge or means for appreciating patterns and it forms the part of culture. A study of mathematics contribution to societal values, how people feel about themselves and their environment (Bishop,1991). If our students are to function effectively at this time of rapid technological advancement and globalization, they must be mathematically literate. Those understand and can do mathematics have significantly enhanced opportunities and options that will open doors to productivity. Therefore it is necessary for every person to have a basic knowledge of mathematics to lead his daily life activities properly.

The achievement means all those behavioral changes which take place in the individual as a result of the learning experience of various kinds. For the improvement in achievement in mathematics in India NCERT and INSA (Indian National Science Academy) have been key players. INSA has organized many programs for improving curricular, good textbooks, educational teachers, those responsible for the professional development of teachers and those involved in the assessment of mathematics. Teaching and learning of mathematics is a complex activity and many factors determine the success of this activity. Many factors influence the student's performance in mathematics. Among these factors student's attitudes towards mathematics is the major factor that affects mathematics achievement.

REVIEW OF RELATED LITERATURE

Review of related literature is an important pre-requisite for actual planning and execution of research work. It describes how the

proposed research is related to prior research. The following studies related to attitude towards mathematics are of the considerable relevance to the present problem.

Singh,K., Granville,M.& Dika, S. (2002) conducted a study comparing the effect of attitude, motivation and academic engagement on academic performance among eighth grades in mathematics and science. The study of the total effects revealed the important influences of academic engagement, attitude and motivation on achievement.

X. Ma & J. Xu. (2004) conducted a study on secondary school students to determine the casual ordering between attitude and achievement in mathematics. Results showed the achievement demonstrated casual predominance over attitude across the entire secondary school. Gender difference in this casual relationship was not found.

Juter, K. (2005) conducted a study on two groups, each of about a hundred students to study the attitude to mathematics and to explore possible links between how well such students manage to solve tasks about limits of functions and their attitude. Questionnaire, field notes and interview technique was used. Students with positive attitude perform better in solving limit problems.

Saha,S. (2007) conducted a study on gender, attitude to mathematics, cognitive style and achievement in mathematics. He concluded that all the three contributes to statistically significant difference in achievement in mathematics.

Ganley, C.M., & Vasilyeva, M. (2011) conducted a study on 114 eighth grade students (67 girls and 47 boys). Two of the sub scales of the Fennema Sherman Math Attitude Scales were used in the study. Students' math grades were used to measure their class room performance in mathematics. They examined the role of spatial skills and math attitudes in predicting the math performance of middle school students. The results showed that despite similar levels of math performance for boys and girls, the significance of particular predictors varied as a function of sex. Spatial skills predicted math performance in boys not in girls.

Kumar,L.& Singh, P. (2011) conducted a study on 500 higher secondary school students of Patna district selected

randomly. For the measurement of attitude towards mathematics, the scale was developed and standardized by Lalit Kumar. Achievement of students in Mathematics was taken from their achievement in math scores in their secondary board examination. They concluded that attitude towards mathematics is significantly correlated with achievement in mathematics. More than 50% higher secondary school students possesses favorable attitude towards mathematics.

Mahanta,D. (2012) conducted a study on 500 students of class tenth in secondary schools located in the Nagaon district of Assam in relation to attitude of students, mathematics achievement, gender and medium of instruction. A questionnaire containing 50 questions was prepared with positive and negative implications. She concluded that most of the boys and girls have positive attitude towards mathematics, there exists a slight difference in achievement in mathematics due to gender and there exists no difference in achievement in mathematics due to medium of instruction.

Mahanta, S. & Islam M. (2012) conducted a study on 1057 secondary students of Kamrup district of Assam. Out of which 553 were male and 504 were female students. To obtain data Mathematics attitude scale was developed by the investigator and for achievement, the marks of students in mathematics examination were considered. He concluded that attitude of students towards mathematics and achievement was positively correlated. Boys show more positive attitude towards mathematics than girls.

Michelli, M.P. (2013) conducted a study on fifth grade students to identify the effect of attitude on achievement in mathematics. To gather the data a questionnaire including Likert scale survey and a math test was administered. The results indicated that there is significant relationship between attitude toward and achievement in mathematics. Concerning gender, males had a more positive attitude towards math as compared to females, but both genders scored approximately the same on achievement test.

Kaur,S.(2014) conducted a study on 370 secondary school students of jalandhar district to identify the influence of attitude towards mathematics, gender and their interaction on

achievement in mathematics and academic stress. Tools used for data collection were Achievement test for mathematics by Jaiswal & Hassan (1978), Mathematics attitude scale by Yadav (1984), Academic stress scale by Bisht (1992). Findings of the study revealed that there was significant influence of attitude towards mathematics on achievement in mathematics and academic stress. Boys and girls were not found to be different in respect to achievement in mathematics and academic stress

Objectives of the study

1) To study the influence of attitude towards mathematics on achievement in mathematics of students.
2) To study the influence of gender on achievement in mathematics of students.
3) To study the interaction effect of attitude towards mathematics and Gender on achievement in mathematics of students.

Hypotheses

H_{01} : There is no influence of attitude towards mathematics on achievement in mathematics of students.

H_{02}: There is no influence of gender on achievement in mathematics of students.

H_{03} : There is no interaction effect of attitude towards mathematics and Gender on achievement in mathematics of students.

Methodology

Design of the study

In this study survey research design was used in this study. The survey research is one of the most important areas of measurement in applied social research.

Sample

Total sample of 600 secondary school students, both boys and girls from rural and urban area of jalandhar district were randomly selected.

Research tool used

Achievement in Mathematics of the students was measured by the Achievement in Mathematics scale by Singh, A. and Kumar, M.

(2009). Attitude of students towards Mathematics was measured by Attitude Towards Mathematics Scale by Sharma. Y.(2009).

Data Collection Procedure

Both the scales Achievement in Mathematics scale and Attitude towards Mathematics scales were administered on all the 600 participants of jalandhar district. Data collection was done and answer sheets were retrieved from the students.

Statistical Techniques Used

In order to see the significant difference in achievement of students in mathematics with respect to attitude towards mathematics, t-test was used. Chi-Square was used to find the significant difference in attitude of students towards mathematics with respect to gender& locality .

Analysis and Interpretation of Data

Hypothesis-1

There is no influence of attitude towards mathematics on achievement in mathematics among students

Table No. -1 Influence of Attitude towards Mathematics on Achievement in Mathematics

Source	Sum of Squares	Df	Mean Square	F	p-value
Attitude towards Mathematics (ATM)	839.06	1	839.06	11.675	.001*

***-significant at .05 level of significance**

Effect of Attitude towards Mathematics: It is observed that significant difference was found in the achievement in mathematics of IX class students with respect to the favorable and unfavorable attitude of students towards mathematics. The F-value was found to be 11.675 with p-value =.001, which means difference was significant at .05 level of significance. It is analyzed that there was the influence of favorable and unfavorable attitude

towards mathematics on achievement in mathematics. Therefore hypothesis that 'There is no influence of attitude towards mathematics on achievement in mathematics of students' stands rejected.

Table No.-2 Influence of Gender on Achievement in Mathematics

Source	Sum of Squares	Df	Mean Square	F	p-value
Gender	212.86	1	212.85	2.962	.086

Effect of Gender: There was no significant difference in the achievement in mathematics with respect to gender, as F value was found to be 2.962 with p value= .086 which was not significant at .05 level of significance. It is depicted that boys and girls did not differ significantly from each other on the variables of achievement in mathematics i.e. no gender difference was found on the achievement in mathematics. Therefore hypothesis that 'There is no influence of gender on achievement in mathematics of students' stands accepted.

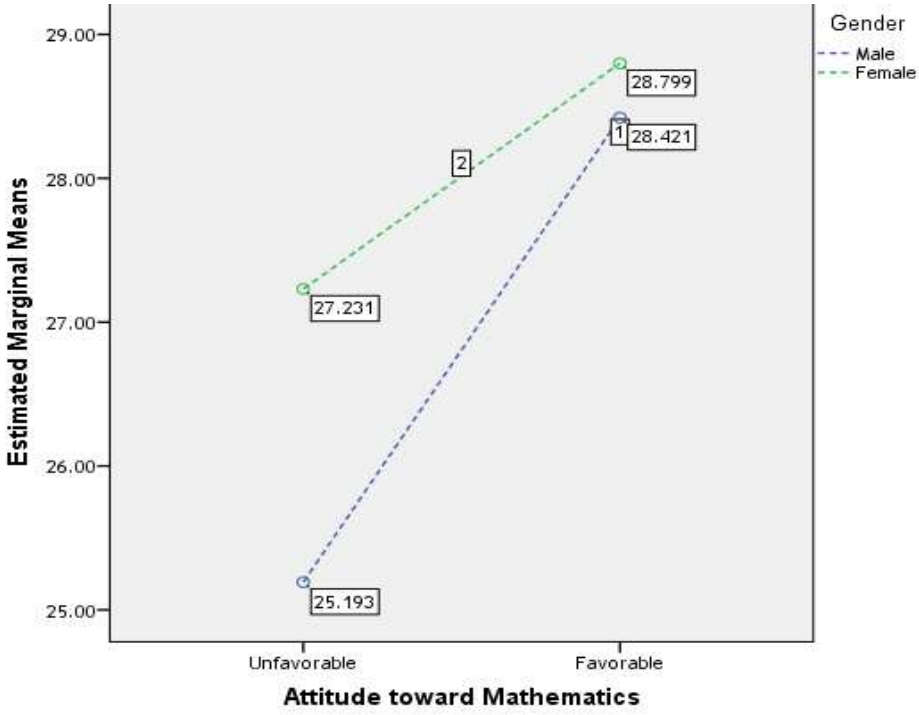
Table No.-3 Interaction Effect of Attitude towards Mathematics and Gender on Achievement in Mathematics

Source	Sum of Squares	Df	Mean Square	F	p-value
ATM* Gender	100.59	1	100.59	1.400	.237

Interaction effect of Attitude towards Mathematics and Gender: There was no significant difference in the achievement in mathematics with respect to the interaction effect of attitude towards mathematics and gender. As F value was found to be 1.40 with p- value=.237 which was not significant at .05 level of significance. Thus based on the above results, hypothesis 'There is no interaction effect of attitude towards mathematics and gender on achievement in mathematics among students' was accepted. It

is concluded that attitude towards mathematics and gender had no significant interaction effect on achievement in mathematics among students.

Figure-: Interaction effect of Attitude towards Mathematics and Gender on Achievement in Mathematics



Major Findings of the study

- There was influence of attitude towards mathematics on achievement in mathematics of students.
- There was no influence of gender on achievement in mathematics of students.
- There was no interaction effect of attitude towards mathematics and Gender on achievement in mathematics of students.

Conclusions

It was concluded from above results that significant difference was found in the achievement of students with respect to attitude of students towards mathematics. There was no significant difference in achievement in mathematics of boys and girls. There was no interaction effect of attitude towards mathematics and Gender on achievement in mathematics of students.

Thus the present study reveals that students with favorable attitude towards mathematics may perform better in mathematics subject as compared to the students with unfavorable attitude towards mathematics.

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