

**A STUDY OF SECONDARY SCHOOL STUDENTS'  
ATTITUDE TOWARDS MATHEMATICS IN RELATION  
TO THEIR ACHIEVEMENT AND PROFESSIONAL  
CHOICES**

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**ABSTRACT:**

The study explores the attitude of secondary school students towards mathematics in relation to their achievement and professional choices. The descriptive survey research method was used for the study, the sample consisted of 120 students there 60 girls and 60 boys from A.M.U. Girls High School and S.T.S High School respectively. The sample was drawn by stratified random sampling. For the collection of data researcher used the Occupation Aspiration Scale developed by Haller and Miller (1967) and Mathematics Attitude Scale prepared by the investigator. The findings of the study revealed that: (i) there exist a favourable attitude of secondary school girls and boys towards mathematics. (ii) Students having high achievement scores have a positive attitude towards mathematics. (iii) Students having positive attitude towards mathematics go for mathematics related professions. (iv) There is no significant difference in the attitude of science and arts stream of secondary school girls and boys. (v) There is no significant difference in the attitude of male and female of secondary school students towards mathematics.

**Key words: Secondary students, Attitude, Mathematics, Achievement and Professional choices.**

**Introduction:**

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Education is a process of development which drags a person from darkness, poverty and misery by developing his individuality in all its aspects, physical, mental, social and emotional. With this type of all-round development, he becomes a responsible, dynamic, resourceful and enterprising citizen of strong good moral character who uses all his capacities to develop his own self, his society and his nation to the highest extent by contributing his best to National honour, National glory, National culture and civilization of the Nation of which he/she is integral part.

Through education, vocational efficiency and professional competency are also achieved. Education gives knowledge about the various vocations and professions to the individuals to choose any one of them and achieve proficiency in it. As the child enters in the school, he offers courses which are predetermined by his parents and he has little idea of what he/ she will do in his /her future life. Parsons (1909) writes that an individual's vocational choice is his greatest decision and that it occurs at that time in his life when he is about to enter the world of work. Allport defines attitude as "a mental and neural state of readiness organized through experience exerting, a directive or dynamic influence upon individual's response to all objects and situation with which it is related." The attitudes of secondary school students' towards mathematics is highly influenced by its practical, cultural and recreational values. Academic achievement refers to the outcome of education -the extent to which a students, teacher or institution has achieved their educational goal.

The competence gain in the study of Mathematics is widely used in all spheres of human life. Mathematics plays a key role in shaping how individuals deal with the various spheres of private, social, and civil life (Anthony & Walshaw, 2009).

### **Concept of mathematics:**

Mathematics is a science of structure, order and relation that has evolved from counting, measuring and describing the shapes of objects. It deals with logical reasoning and quantitative calculation. Etymologically, the word "Mathematics" has been derived from the Greek word "Mathema" or "Mathematikos" which means learning, study science and additionally come to have the narrower and more technical meaning "Mathematical study".

### **Attitude and its formation:**

People form attitudes through their experiences in life. Social psychology explains how attitudes are formed using three major learning theories which are classical conditioning, operant conditioning and observational learning. Propounded by Ivan Pavlov, classical conditioning is a procedure for modifying behaviour in which repeated pairing of conditioned stimulus with an unconditioned stimulus leads to the development of a conditioned response (Ntim, 2010, Linero& Hinojosa, 2012). Classical conditioning entails neutral stimuli that naturally elicit a response. Children, for instance, become fans of football clubs of their fathers. They grow up believing that those particular football clubs are the best and develop the same passion for the clubs. Hence, we form attitudes according to how we are conditioned or how our experiences condition us. B.F. Skinner's Operant Conditioning theory is a form of learning in which a response is made in anticipation of a stimulus. In operant conditioning, reinforcement increases the likelihood that behaviour will be repeated (Ntim, 2010). Behaviours that are followed by positive consequences are reinforced and are more likely to be repeated than are behaviours and attitudes that are followed by negative consequences (Moris&Maisto, 2001).

#### **Attitude towards mathematics:**

Attitude towards Mathematics has cognitive, affective and behavioural components; and like any other kind of attitude, it can be formed through any of the three processes. A student can develop positive attitude towards Mathematics because he or she learns to associate positive experiences or events with it. Also, positive reinforcement creates room for the formation of positive attitude for Mathematics. And by no means is students' observation of teachers and teachers' behaviour especially in relation to Mathematics among the least of the factors that influence their attitude towards Mathematics.

#### **Significance of the Study:**

The central aim of education and guidance are co-terminus. Both makes attempt to bring about all round development of the individual by providing opportunities of optimal flowering of individual potentials. Mathematics and science are the necessary tools for modern development of human beings. No nation can progress in the absence of mathematics teaching. We can say that mathematics is the mother of all round development of a nation. Mathematics develops the reasoning ability among the students. It develops the scientific attitude. This study can help a lot

in findings out the student's attitudes towards mathematics. It can help in correlating subject selection according to the choice of the individual. Proper selection of subjects at secondary level is the major step of one's life as it decides other later steps. This research work can prove fruitful in bringing a substantial change in the students and parents outlook towards subjects in particular and education in general, and will save lives of many students from becoming unhappy and gloomy.

### **Objectives of the Study:**

- i. To assess the attitude of secondary school girls and boys towards mathematics.
- ii. To see the effect of achievement scores of mathematics on the attitude of secondary school girls and boys.
- iii. To find the relationship between achievement scores in mathematics and professional choices of secondary school girls and boys.
- iv. To find the relationship between attitude of secondary school girls and boys towards mathematics and their professional choices.
- v. To compare the attitude of science and arts stream secondary school girls and boys to mathematics.
- vi. To compare the attitude of male and female secondary school students towards mathematics.

### **Hypotheses:**

The study was conducted after formulating the following research hypotheses in the light of its above mentioned purpose:

**HO-1:** There exist no favourable attitude of secondary school girls and boys towards mathematics.

**HO-2:** There is no significant effect on achievement scores of mathematics in the attitude of secondary school girls and boys.

**HO-3:** There is no significant relationship between achievement in mathematics and professional choices of secondary school girls and boys.

**HO-4:** There is no significant relationship between the attitudes of secondary school girls and boys towards mathematics and their professional choices.

**HO-5:** There is no significant difference in the attitude of science and arts secondary school girls and boys towards mathematics.

**HO-6:** There is no significant difference in the attitude of male and female secondary school students towards mathematics.

**Delimitations of the Study:**

The present study is the only for the partial fulfillment of the requirements for the award of the degree of M.Ed. and not a full-fledged research. A full fledge research requires several years to yield fruitful results in concerned field. The duration of M.Ed. course is only one year during which a number of theoretical papers are also to be studied. Only a few months are devoted to the completion of dissertation. As a result, its scope becomes limited. The study was conducted in A.M.U. Girls High School and S.T.S. High School of Aligarh only. One cannot generalize the findings of this study to all the schools of Aligarh due to a number of differences in their conditions and circumstances.

**Review of Related Literature:**

**Bhatnagar, H (1983)** discovered that vocational interest was the chief factor in determining occupational choice among adolescent girls. This was pronounced among girls belonging to higher income group, urban and semi-urban differences were not significant.

**Sharma, A.N.(1986)** Studied the effectiveness of vocational exploration programme at secondary school level for vocationalisation of education. The study indicated that vocational exploration programme was highly significant in attaining its objectives.

**Biswal (1988)** has studied creativity in mathematics as a function of study habits (SHM) and pupil's perception of teacher's impression about their performance in mathematics (PPTIM).

**Doshi(1989)** has studied the possible relationship between achievement in mathematics and cognitive preference styles for all students , the questioning style is the last , while for the majority of arts and commerce students, the recall style is the first.

**Rahman (2003)** explored the influence of attitude of V-grade students on academic achievement in mathematics. The variables used in the study were gender, parental occupation, type of school and coaching and guidance.

**Sample:**

The sample of the present investigation was drawn from A.M.U. Girls High School and S.T.S. High School of district Aligarh. The sample comprised of 120 students (60 boys and 60 girls) and was drawn by stratified random sampling technique. For that descriptive survey method of research was used.

**Tools:**

For the collection of data researcher used, Occupation Aspiration Scale developed by Haller and Miller (1967) for measuring the level of occupational aspirations of the youth. Mathematics Achievement test is prepared by the investigator to test the achievement of students in mathematics marks (score) for the present study. The summation of marks or scores earned by a student was taken as his attitude scores in mathematics.

**Statistical Techniques:**

The data was analyzed by the researcher using following statistical techniques i.e. Mean, Standard Deviation (SD), Product Moment Coefficient of Correlation (r) and t-test.

**Analysis and Interpretation:**

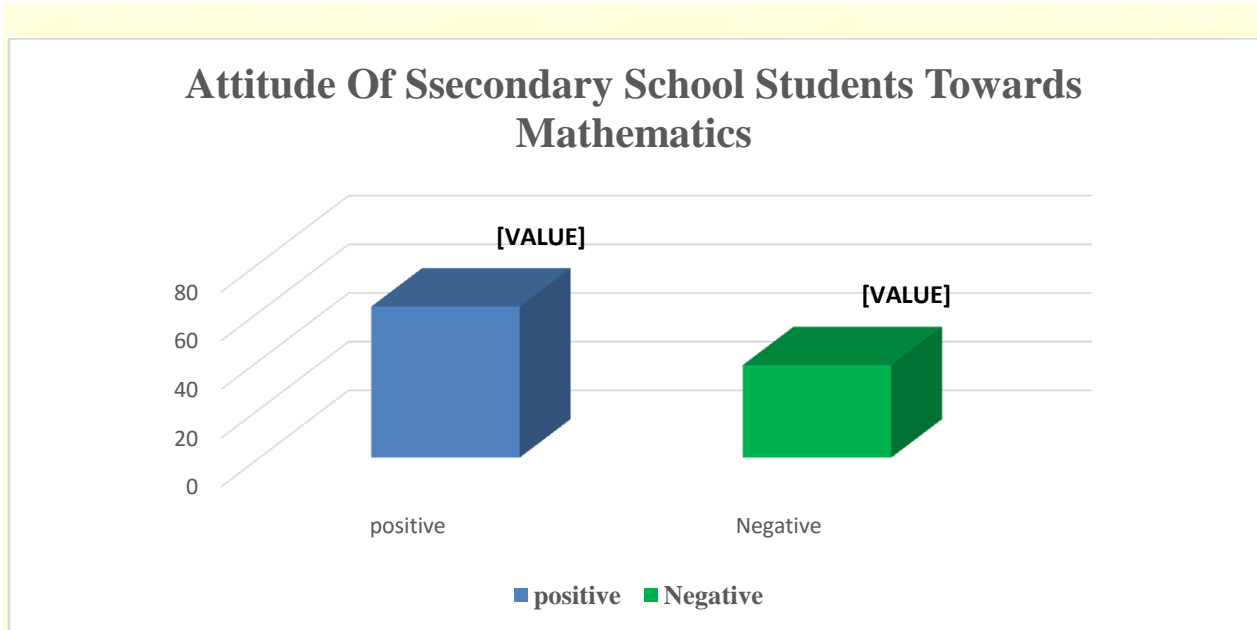
The analysis of the data is done by “keeping in mind” aims and objectives of the study. In this study, the data were critically analyzed and reported through textual discussion, tabular and graphical devices. Tables and figures are also used to clarify the significant relationship. They are so constructed that they are self-explanatory. The data were analyzed to assess the attitude of secondary school girls and boys towards mathematics in relation to their achievement in mathematics and professional choices. The achievement score of students in mathematics were systematically analyzed with the help of suitable statistical techniques in order to find answers to the questions raised in the study.

**Table 1:** The attitude of secondary school girls and boys towards mathematics.



**Percentage of positive and negative attitude of secondary school students towards mathematics**

No. of Students	Positive attitude	Negative attitude
120	62.03	37.97



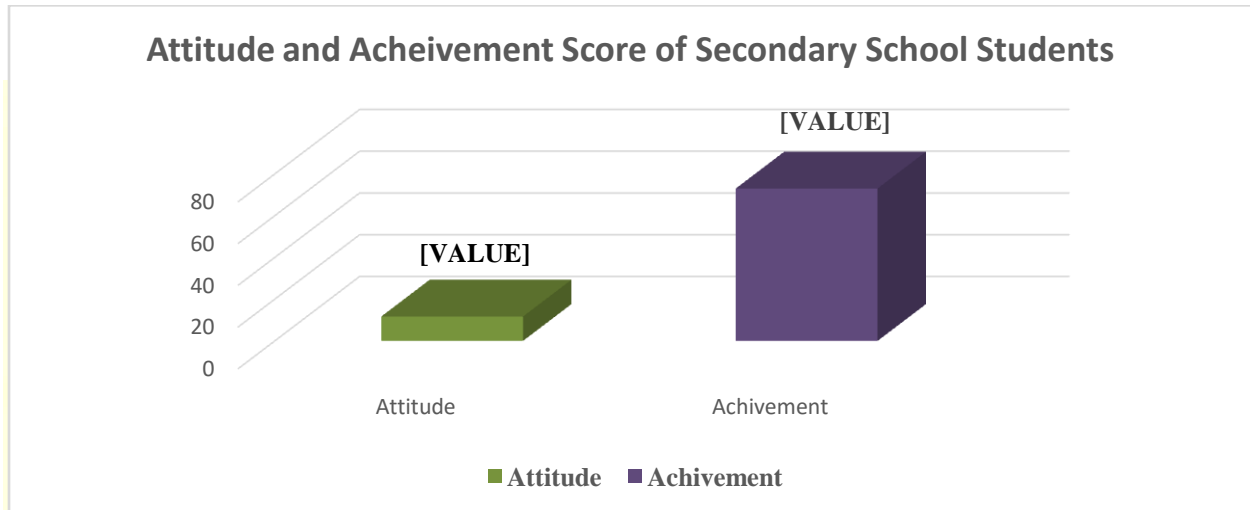
**Figure-I:** Percentage of Positive and Negative Attitude of Secondary school Girls and Boys towards Mathematics.

**Interpretation:** This result shows that 62.03 percent of students have a positive attitude and 37.97 percent of students have a negative attitude towards mathematics. So, the null hypothesis stated above that there does not exist any favourable attitude of secondary school girls and boys towards mathematics is rejected at 0.05 level of significance because the number of students having positive attitude towards mathematics is greater than the number of students having negative attitude towards mathematics.

**Table 2:** To see the effect of achievement scores of mathematics on the attitude of secondary school girls and boys.

**Coefficient of correlation between attitude and achievement scores of girls and boys in mathematics at secondary level**

Variable	N	Coefficient of Correlation(r)	Hypothesis
Attitude	120	330.66	Accepted
Achievement			



**Graph-II:** Mean Attitude and Achievement Scores of Secondary School Girls and Boys.

**Interpretation:** From the calculated Coefficient of Correlation i.e.;  $r=0.66$ , it is being revealed that there is a positive correlation between the attitude of secondary students towards mathematics and their achievement in it. Therefore, the null hypothesis stated above that there is no significant effect of achievement scores of mathematics on the attitude of secondary school girls and boys is rejected at 0.05 level of significance.

**Table 3:** To find the relationship between achievement in mathematics and professional choices of secondary school girls and boys.

**Coefficient of correlation between the achievement scores and occupational aspiration scores of girls and boys in mathematics at secondary level.**

Variables	N	Coefficient of Correlation(r)	Hypothesis



<b>Achievement and Occupational Aspiration Scores</b>	<b>120</b>	<b>0.41</b>	<b>Accepted</b>
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**Interpretation:** From the calculated Coefficient of correlation i.e.; “ $r=0.41$ ”, we find that there is positive Correlation between the Achievement of secondary school girls and boys in mathematics and their professional choices. Therefore, the null hypothesis stated above that there is no significant relationship between the achievement of mathematics and professional choices of secondary school girls and boys is rejected at 0.05 level of significance.

**Table 4:** To find the relationship between attitude of secondary school girls and boys towards mathematics and their professional choices.

**Coefficient of correlation between the attitude scores and occupational scores of secondary school girls and boys towards mathematics**

<b>Variables</b>	<b>N</b>	<b>Coefficient of Correlation(r)</b>	<b>Hypothesis</b>
<b>Attitude and Occupational Aspiration Scores</b>	<b>120</b>	<b>0.98</b>	<b>Rejected</b>

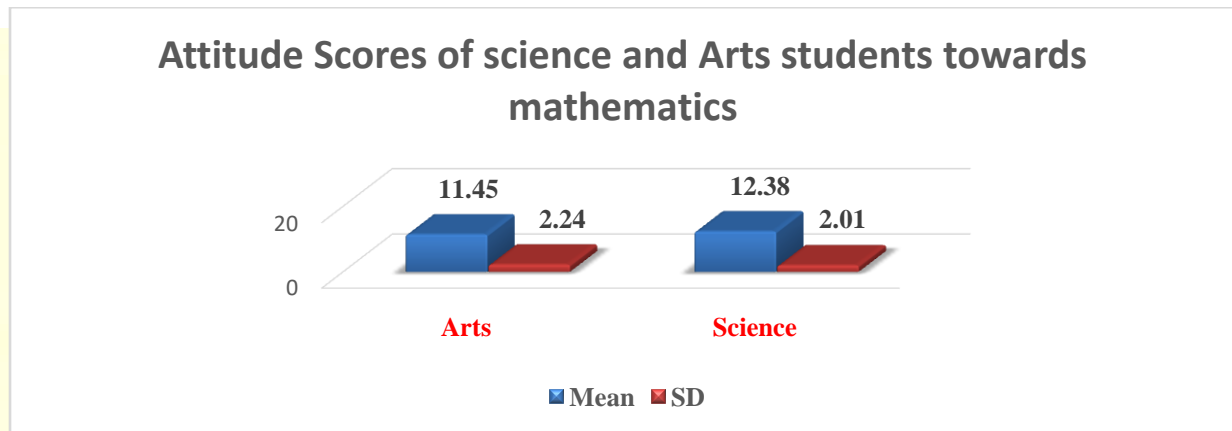
**Interpretation:** The calculated coefficient of correlation from Table-IV is 0.98 which show that there is a high positive correlation between the attitude of secondary school girls and boys towards mathematics and their professional choices. Therefore, the null hypothesis stated above there is no significant relationship between the attitude of secondary school girls and boys towards mathematics and their professional choices is rejected at 0.05 level of significance.

**Table 5:** To compare the attitude of science and arts secondary school girls and boys towards mathematics.

**Significance of difference between the attitude of science and arts secondary school girls and boys towards mathematics**

Stream	N	Mean Score	SD	Calculated t-value	Tabulated t-value	df	Level of Significance
Arts	60	11.45	2.24	2.401*	1.988	118	0.05
Science	60	12.38	2.01				

\*Significant at 0.05 level



**Graph-V:** Mean and SD Attitude Scores of Science and Arts Stream Secondary School Girls and Boys towards Mathematics.

**Interpretation:** It is depicted from above table (Table-V) that the calculated value of “t” is -2.4 that is smaller than the tabulated value (1.98). So, it shows that there is no significant difference in the attitude of science and arts secondary school girls and boys towards mathematics. Therefore the null hypothesis stated above that there is no significant difference in the attitude of science and arts stream secondary school girls and boys towards mathematics is accepted at 0.05 level of significance. But the mean score of attitude of science stream girls and boys is greater than the mean score of arts stream girls and boys.

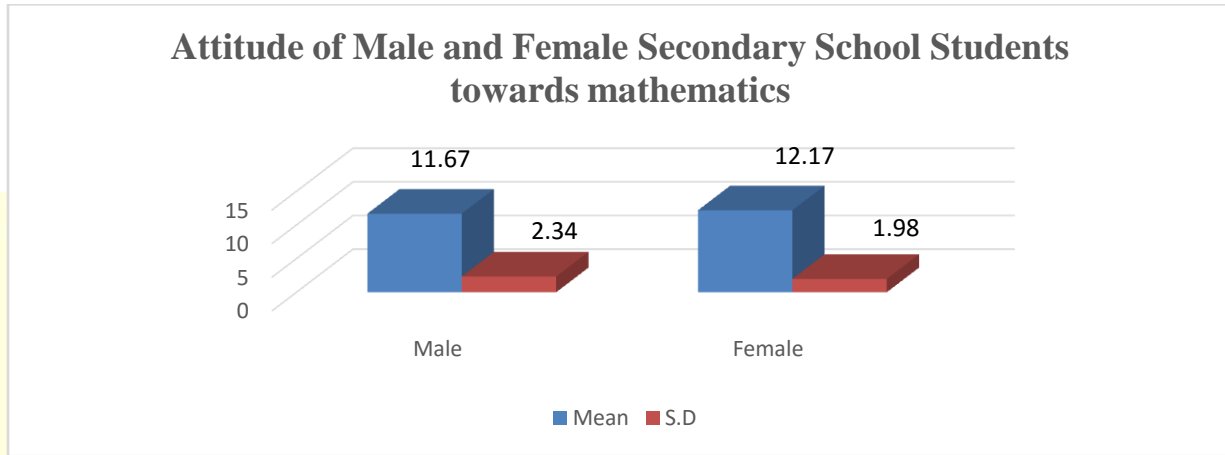
**Table 6:** To compare the attitude of male and female secondary school students towards mathematics.

**Significance of difference between the attitude of male and female secondary school students towards mathematics**

Gender	N	Mean Score	SD	Calculated t-value	Tabulated t-value	df	Level of Significance
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Male	60	11.67	2.34	1.26*	1.98	118	0.05
Female	60	12.17	1.98				

\*Significant at 0.05 level



**Figure-VI:** Mean and SD Attitude Scores of Male and Female Secondary School Students towards Mathematics.

**Interpretation:** It is depicted from above Table (Table-VI) that the calculated value of “t” is 1.26 that is smaller than the tabulated value (1.98). So, it shows that there is no significant difference in the attitude of male and female secondary school students towards mathematics. Therefore, the null hypothesis stated above that there is no significant difference in the attitude of male and female secondary school girls and boys towards mathematics is accepted at 0.05 level of significance. But the mean score of attitude towards mathematics of female students is greater than the mean score of male students.

**Findings:**

1. There exist a favourable attitude of secondary school girls and boys towards mathematics.
2. Students having high achievement scores have a positive attitude towards mathematics.
3. Students having positive attitude towards mathematics go for mathematics related professions.
4. There is no significant difference in the attitude of science and arts stream of secondary school girls and boys.

5. There is no significant difference in the attitude of male and female of secondary school students towards mathematics.

### Conclusion and Recommendation:

It is thus concluded that correlation analysis revealed that there is a positive correlation between the attitude of secondary students towards mathematics and their achievement in it. We find that there is positive correlation between the achievement of secondary school girls and boys in mathematics and their professional choices. Thus in the light of the research findings, we can make some suggestions to help students to develop positive attitude towards mathematics and higher rate of achievement.

Some of the recommendations are as follows:

1. Students should be given opportunity to make exercises of mathematics as much as possible.
2. Teacher should be provided opportunities to demonstrate and explain mathematical concepts and formula in the classroom effectively.
3. Students should be given opportunity to adopt the process of problem solving, instead of being only taught the solutions to problem.
4. Student should be given sufficient time to write down notes given by teacher, ask questions and express their own ideas in mathematics class.
5. Use of cooperative grouping also helps students to understand that others have the same problems as they do.
6. Teachers should create an environment in which students do not feel threatened in learning mathematics and allow them to relax.
7. Teachers should teach at a slow pace. It can help students better comprehend the material being taught.
8. Students should be advised to go for a profession of their interest.
9. Parents should actively participate while selecting a stream for their child.
10. Students should correlate their achievement scores with professional choices.

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