



ADOLESCENTS ATTITUDE TOWARDS MATHEMATICS IN RELATION TO THEIR MATHEMATICS ACHIEVEMENT

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Abstract

The present study explored the attitude towards mathematics in relation to their mathematics achievement of adolescents. 200 adolescents randomly selected from the government schools of Chandigarh comprised the sample of study. Scale of Attitude towards mathematics by Thakur (2009) and mathematics achievement scores of students of previous class were used for data collection. Descriptive and differential statistics were used for data analysis. The distribution of the attitude towards mathematics and mathematics achievement in present study was left skewed and right skewed respectively. The results found that adolescents girls have favorable attitude towards mathematics than their counter parts adolescents boys of government schools. But, there was no significant gender difference found in mathematical achievement of adolescents. Moreover, attitude towards mathematics was neither significantly nor positively related to mathematical achievement

Keywords: Attitude towards Mathematics, Mathematical Achievement

Introduction

Mathematics is an area of investigation which logically analyzes ordering, operational and structural relationship. (Gilfeather & Regato, 1999)

Mathematics is the science of numbers, their operations, interrelations, combinations and generalizations, abstractions of space configurations, their structure, measurement, transformation and generalizations. (Merriam Webster's Dictionary, 2008)

Adolescence

Adolescence is the most important and critical period of individual's development.

Adolescence is the period in human development that occurs between the beginning of puberty and adulthood. (Collins English Dictionary, 2000)

Thus, adolescence is a transitional period between childhood and adulthood characterized by great stress and strain.

Attitude

All individuals have some feelings towards the objects in their environment: Positive or Negative. These feelings may range from very mild responses which barely affect a person to strong emotional reactions which exert a marked directive effect on the individual and his behavior (Laycock & Munro, 1966).

Thakur (2006) in her study on effect of cooperative learning on attitudes, achievements and social skills of seventh graders with different cognitive styles found that there was difference in the attitudes exhibited by students when exposed to different instructional treatment (cooperative learning and conventional group learning). Students exposed to cooperative learning exhibited better attitudes than those in conventional learning.

Achievement

The word achievement means the end gains or level of success attained by an individual or group on the completion of a task whether it is academic, manual, personal or social.

Megaragee (2002) defined achievement test how well student have mastered the subject matter in a course of instruction.

Achievement in Mathematics

Mathematics achievement is higher or lower for some pupils as compared to others. This difference in achievement may be due to that each pupil possesses diverse skills, interests, aptitudes and learning styles. A pupil's learning to a large extent depends upon the ways of learning adopted by them.

Relationship between Mathematical Achievement, Gender and Attitude towards Mathematics

The various studies conducted on the relationship between mathematical achievement, gender and attitude towards mathematics are as follows:

Cotton (1992) in his study indicated that success in mathematics depends upon attitude towards mathematics.

Roslay (1992) found that the attitude of high school students towards the learning of mathematics and their achievement in mathematics are highly correlated and the urban boys and girls have made positive attitudes towards mathematics than the rural boys and girls.

Frazier (1999) in her study on one hundred and forty female students reported that high achieving female students report less anxious attitudes towards the usefulness of mathematics than low achieving students. In conclusion, this study discussed the future research and intervention strategies to positively affect mathematics attitude and achievement for female students.

Chen (2001) found different factor structures and different influences on mathematics achievement. He supported the effectiveness of home environment, attitude towards mathematics and educational aspirations emerged as the most important and consistent predictors of mathematics achievement.

Kaushik (2004) in her study on attitude towards mathematics in relation to intelligence achievement in mathematics and socio economic status found that attitude towards mathematics has positive and significant correlation with achievement in mathematics.

Xin and Jiangmin(2004) conducted a study to determine the causal ordering between attitude towards mathematics and achievement in mathematics of secondary school students. Results showed that achievement demonstrated causal predominance over attitude across the entire secondary school.

Krishan (2005) in his investigation on study habits and attitude towards mathematics as related to academic achievement in mathematics reported that there is a positive and significant correlation between attitude towards mathematics and achievement in mathematics.

Thomas (2006) conducted a study to determine the attitude towards mathematics and achievement by combining cooperative learning strategies with instruction delivered using an integrated learning system (ILS). 65 fifth grade students were randomly divided into two groups: cooperative and individual. Results revealed that the students using ILS for mathematics instruction performed better on standardized tests and were more positive towards mathematics.

Orhun (2007) in his study aimed to investigate whether there is a relationship between gender and learning style, mathematics achievement and attitude towards mathematics. The results of this study suggested that there were differences among learning modes preferred by female and male students, their mathematics achievement and their attitude towards mathematics.

Saha (2007) conducted a study on gender attitude towards mathematics, cognitive style and achievement in mathematics. It was found that all the three contribute to statistically significant difference in achievement in mathematics.

Kaur (2012) studied the impact of achievement in mathematics of urban and rural secondary students in relation to attitude for mathematics. She found that mathematical attitude have significant effect on achievement in mathematics.

Chawala and Kaur (2013) investigated that there is high positive correlation between the attitude towards mathematics and academic achievement of students it also showed that higher the attitude towards mathematics higher the achievements.

The review of related literature indicates mixed results. There is a positive and significant correlation between attitude towards mathematics and achievement in mathematics. Infact, some studies also observed that there were differences in mathematics achievement and attitude towards mathematics among female and male students.

Emergence of the Problem

Adolescence is the most important and critical period of individual's development. It is a period of intensive growth, stress and strains. Adolescents usually found mathematics as a difficult subject. Attitude towards mathematics is an important factor in determining the success in mathematics and this factor could also leads to deterioration in student's academic achievement. Thus, they were unable to cope up with their parents high expectations and as a result their attitude towards study becomes negative. Their performance gets worst day by day.

Some studies reveal that there is significant relationship between attitude towards mathematics and mathematics achievement whereas some studies are not in its favor. This difference in achievement may be due to that each pupil possesses diverse skills, attitudes, interests, aptitude and learning styles. Some studies also observed that there are gender differences in attitude towards mathematics and mathematics achievement. The present study will be helpful in studying relationship between attitude towards mathematics and mathematics achievement and gender.

Objectives

The objectives of the present study were:

1. To study the nature and distribution of attitude towards mathematics, mathematical achievement of adolescents.
2. To compare attitude towards mathematics and mathematical achievement of adolescent boys and girls.
3. To explore the relationship between attitude towards mathematics and mathematical achievement of adolescents.

Hypotheses

Based on above mentioned objectives, following hypotheses were framed:

- Attitude towards mathematics and mathematics achievement have normal distribution.
- There exists no significant gender difference in attitude towards mathematics of adolescents.
- There is no significant gender difference in mathematics achievement of adolescents.
- There exists significant relationship between attitude towards mathematics and mathematical achievement of adolescents.

Sample

Random Sampling technique was used. Chandigarh is divided into two phases. Government schools were selected randomly from these two phases, three from each phase. The total sample of 200 students was taken randomly from three government schools of Chandigarh, one from first phase and two from second phase as sufficient data was collected from these schools. The sample consisted of boys and girls of ninth class from government schools.

Tools Used

Following tools were used for collection of data:

- Scale of Attitude towards Mathematics by Thakur (2009).
- Mathematical achievement scores of previous class were taken from the school records.

Statistical Techniques Used

Descriptive statistics (i.e. mean, standard deviation, skewness and kurtosis), Differential statistics i.e. t-test, Product moment correlation were used for data analysis.

Analysis of Data and Interpretation of Results

TABLE 1

Mean, Standard Deviation, Skewness, Kurtosis of Attitude towards Mathematics and Mathematical Achievement

Variable	Mean	S.D	Skewness	Kurtosis
Attitude towards mathematics	140.81	21.749	- 0.138	- 0.227
Mathematical Achievement	48.975	11.329	1.124	1.329

Table 1 shows that skewness of first variable i.e. attitude towards mathematics is -0.138. As skewness is negative in case of first variable i.e. attitude towards mathematics, thus, the distribution is left skewed. Skewness of second variable i.e. mathematical achievement is 1.124. It is positive in case of second variable i.e. mathematical achievement, thus, the distribution is right skewed.

As in table 1, Kurtosis of first variable i.e. attitude towards mathematics is -0.227 and for second variable i.e. mathematical achievement is 1.329. Kurtosis is less than 0.263 for both variables Thus, the distribution is platykurtic.

TABLE 2

Mean, Standard Deviation and t-ratio of Attitude towards Mathematics and Mathematical Achievement of Boys and Girls of Government Schools

Variable	Gender	Mean	Standard Deviation	t-ratio
Attitude towards Mathematics	Boys	136.716	22.165	3.194**
	Girls	146.25	20.035	
Mathematical Achievement	Boys	48.611	10.714	0.485
	Girls	49.402	12.056	

Table 2 shows that t-ratio of attitude towards mathematics of students i.e. 3.194 is significant at both 0.01 and 0.05 level of significance. It is in the favor of girls because girls have higher mean i.e. 146.25 than mean of boys i.e.136.716. Therefore, the null hypothesis that there is no significant difference in attitude towards mathematics of boys and girls of ninth class of Government schools was not accepted for present study.

t-ratio of mathematical achievement of government school students i.e. 0.485 is not significant at both 0.01 and 0.05 level of significance. Thus, no gender difference exists in mathematical achievement. Therefore, the null hypothesis that there is no significant gender difference in mathematics achievement of adolescents was accepted for present study.

TABLE 3

Coefficient of Correlation between Scores on Attitude towards Mathematics and Mathematical Achievement of Total Sample (N=200)

Variable	Mean	Correlation
Attitude towards Mathematics	140.81	-0.0714**
Mathematical Achievement	48.975	

As shown in table 3, correlation between scores on attitude towards mathematics and mathematical achievement of total sample (n=200) comes out to be -0.0714. It shows that variables are neither positively nor significantly related to each other. Thus, the hypothesis that there is significant difference in attitude towards mathematics of government school students in relation to their mathematics achievement was not accepted for present study.

Major Findings of the Study

1. The distribution of the attitude towards mathematics and mathematics achievement in present study was left skewed and right skewed respectively.
2. Girls in the present study were found to have favorable attitude towards mathematics than their boys counter parts of government schools.
3. There was no significant gender difference in mathematical achievement of adolescents in present study.
4. It was found that attitude towards mathematics and mathematical achievement was neither significantly nor positively related to each other.

Educational Implications

The present study has following educational implications for teachers, parents, students and administrators:

- The findings of the present study may help the teachers to make a positive attitude towards mathematics.
- It helps the teachers in adopting suitable teaching methods in order to improve mathematical achievement of students.
- The teachers and parents can motivate the children and guide them to channelize their efforts in order to improve their mathematical achievement.
- Parent teacher meetings should be brought about frequently at schools where the parents should be educated or provided with information regarding the nature of their interaction with their children and its problems result on the attitude towards mathematics and their mathematical achievement.

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