JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

IMPACT OF ATTITUDE TOWARDS MATHEMATICS ON ACHIEVEMENT IN MATHEMATICS OF HIGH SCHOOL STUDENTS

1. Dr. Prakash Chandra Pandey 1st
Assistant Professor,
B.Ed. Department,
Amrapali University, Haldwani

2. Dr. Disha Parashar Pandey 2nd
Assistant Professor
B.Ed. Department,
Trinity Institute of Professional Studies, Haldwani

Abstract

Mathematics is an important subject in school curriculum. It is more closely related to our daily life as compared to other subjects. Mathematics also helps to develop the child as social and intellectual citizens, like other subjects. Mathematics is not meant only for development of mental abilities but also to develop their personality with some qualities like concentration, truthfulness, seriousness etc.

But it is often seen that due to less interest or negative attitude towards mathematics, the student, is not able to achieve as per expectation. Due to which the student himself remains under stress and along with his/her parents also get tensed about the future of their child.

However, there can be many reasons for the student not achieving marks as per expectation. Such as the student's home environment, school environment, teacher's behavior, level of intelligence, personality factors, attitude towards mathematics and economic status of the family, etc.

In this study, the researcher studying the impact of attitude towards mathematics on the achievement in mathematics subject a 10th grade student.

In this study, a sample of 600 students has been collected and duly analyzed using descriptive statistics and analysis of variance method. Outcomes of the study show that there is a significant impact of attitude towards mathematics on achievement in mathematics of 10th grade students.

Key Words: Attitude, Attitude towards mathematics, Achievement, and Achievement in mathematics.

Introduction

Education plays a pivotal role in all of our lives and paves the ways for all of us to reach our highest potential. The modern, development and industrialized world is running on the wheels of education. To be able to survive in the competitive world, we all need education as a light that leads the way.

Education for a child begins at home. It is a lifelong process that ends with death. Education certainly determines the quality of individual's life. Education improves ones knowledge, skill and develops the personality and attitude. Education is extremely essential for everyone to grow and succeed in life.

Education is helpful in redefining as well as reconstructing the present and future in the light of the past experiences. It is a natural, progressive and systematic development of all the powers of individual. Education is a process of enhancement of civilization and it is most important tool for survival. It is an education that can be treated as inner motivation and means of human resource development. Education is one of the most powerful weapons to attack on poverty.

In present competitive world quality performance has become the key factor for individual success. Every parent wants their child perform well in school education. This desire for a high level of performance in school education puts a lot of pressure on students, teachers, schools and the educational system. In fact, whole system of education revolves round the academic achievement of students. Thus, a lot of time and effort of the schools are used for helping students to achieve better in their scholastic endeavors.

Maximum number of failures exists at the end of the high school and intermediate courses. Obviously, dropouts are a drain on the economies of each state and the nation. State and local economies suffer further when they have less-educated populaces. This involves wastage of money and manpower. The nation's economy and competitive standing also suffers when there are high dropout rates. Dropouts represent a tremendous waste of human potential and productivity, and reduce the nation's ability to compete in an increasingly global economy. Failure of students in examination occurs a considerable lose on intellectual potency which hampering national development. Failure in examination is one the major cause of teen-age student suicide. Failure is thus a real problem. Failure in scholastic or academic achievement has raised several important questions for educational researchers working in the field of education, psychology and sociology.

Therefore, the key questions take place here that when school provides same facilities and same teacher to all students, then why some students secure good marks, some secure poor marks and a considerable proportion fail? Which factors are responsible for this failure? This study has made an attempt to answer these questions.

REVIEW OF LITERATURE

Aiken (1976) study attitude towards mathematics and learning in mathematics and found that statistically significant but not strong relationship between attitude towards mathematics and mathematics achievement.

Rosaly (1992) studied the relationship between attitude of students towards mathematics and achievement. In this study it was found that urban boys and girls had a more positive attitude towards mathematics than rural boys and girls. It was also found that girls were higher than boys in their achievement in mathematics. Significant and positive relationship was found between attitude towards mathematics and achievement in mathematics of high school students.

Ma (1997) studied relationships between attitude toward mathematics and achievement in mathematics. Finding of this study revealed that a reciprocal relationship existed between every attitudinal measure and mathematics achievement.

Ma & Kishor (1997) studied the relationship between attitude toward mathematics and achievement in mathematics. This study revealed that there is a positive and significant relation between mathematics attitude and mathematics achievement.

Hui-Ling (2001) conducted a cross-national study of factors influencing mathematics achievement for eighth grade students. In this study home environment, attitude towards mathematics and educational aspiration was found important and consistent predictors of mathematics achievement.

Köller, Baumert, & Schnabel (2001) studied relationship between academic interest and achievement in mathematics. Finding showed that interest in mathematics had no significant influence on the mathematics performance if the previous knowledge was controlled. The interest in mathematics was not found associated with students' choice of mathematics as a basic **Saha (2007)** investigated gender, attitude to mathematics, cognitive style and achievement in mathematics. It was found that all the three variables contribute significantly in achievement in mathematics.

Boyd *et al.* (2008) studied the narrowing gap in New York City teacher qualifications and its implications for student achievement in high poverty schools. Result showed that for the third grade students there was no significant relationship between students' attitude toward mathematics and students' achievement in mathematics.

Kadijevich (2008) studied dimensions of attitude towards mathematics with achievement in mathematics of earth grade students of 137346 students of 33 countries. and found that each dimension of mathematics attitude was correlated significantly and positively to mathematics achievement for almost all of the thirty-three countries.

Goe and Croft (2009) reported that those who have positive attitudes toward mathematics have a better performance in mathematics subject.

Khatoon and Mahmood (2010) investigated mathematics anxiety among secondary school students in India and its relationship to achievement in mathematics. Result of this study indicates that there is a positive relationship between mathematics attitudes and mathematics achievement. or as an advanced course at the upper secondary level.

OBJECTIVES

The major objective of this study is to measure the impact of attitude towards mathematics on achievement of high school students in mathematics. This objective is further bifurcated in the following sub objectives:

1. To find out impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade **rural male students.**

2. To find out impact of attitude towards mathematics on achievement in mathematics of 10th grade **rural female students.**

3. To finds out impact of attitude towards mathematics on achievement in mathematics of 10th grade **urban male students.**

4. To finds out impact of attitude towards mathematics on achievement in mathematics of 10th grade **urban female students.**

HYPOTHESIS

The following null hypothesis has been formed and tested:

1. **H_{01}:** "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10th grade **rural male students."**

2. **H_{02}**: There is no significant impact of attitude towards mathematics on achievement in mathematics of 10th grade **rural female students."**

3. **H_{03}**: There is no significant impact of attitude towards mathematics on achievement in mathematics of 10th grade **urban male students."**

4. **H_{04}**: There is no significant impact of attitude towards mathematics on achievement in mathematics of 10th grade **urban female students."**

RESEARCH METHODOLOGY

To achieve the above set of objectives, this study as followed the following research methodology:-

Data Source and Its Collection: The present study has been carried out on the 10th standard students for measuring the impact of attitude towards mathematics. For this purpose an attitude towards mathematics scale questionnaire, which is developed and standardized by Dr. V.K Rai, is administered on the 10th grade rural male rural female, urban male and urban female students.

Sample Unit and Sample Size and Sampling: Students studying in 10th grade are taken as the sample unit in this study. A sample of 600 students of grade 10th was selected from 15 Higher Secondary schools of Kumaun region of Uttarakhand, using simple random sampling technique.

Variables of the study: This study has been carried out with achievement in mathematics (Board marks of 10th grade students) as a dependent variable and as an independent variable attitude towards mathematics has been taken in the study.

Scale and Statistical Tools: To achieve objectives of the present study the following available scale have been used and data collected through this scale were analysed using descriptive statistics and analysis of variance: -

1. Attitude Toward Mathematics Scale developed and standardized by Dr. V.K. Rai (2007).
2. This study considered Board marks in mathematics as an achievement in mathematics.

DATA ANALYSIS AND INTERPRETATION

INFLUENCE OF ATTITUDE TOWARDS MATHEMATICS ON ACHIEVEMENT IN MATHEMATICS OF 10TH GRADE STUDENTS

To find out influence of attitude towards mathematics on achievement in mathematics of 10th grade students, analysis of variance was used. For this purpose, attitude towards mathematics scores were divided in three parts (Low, moderate and high) using formula $M \pm \sigma/2$. $M- \sigma/2$ was used as lower limit of moderate group and less than this score used as low group. $M + \sigma/2$ were used as upper limit of moderate group and higher than this score was considered as higher group. Analysis of variance was used to compare these three groups on achievement in mathematics of students. Results of analysis of variance for rural male, rural female, urban male and urban female were given in different sections below.

1. Influence of Attitude Towards Mathematics on Achievement in Mathematics of 10th Grade Rural male Students

Summary of descriptive statistics of rural male students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in **Table-1** and summary of analysis of variance for difference among rural male students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in **Table-2.**

Table-1

results of descriptive statistics of rural male students with low, moderate and high attitude towards mathematics on achievement in mathematics

Attitude towards Mathematics	N	Sum	Sum Squares	Mean	S.D.
Low	58	3066	247634.24	52.862	12.780
Moderate	61	3855.2	247634.24	63.200	8.150
High	31	2057.4	138319.24	66.368	7.690

Table-2

results of analysis of variance for difference among rural male students with low, moderate and high attitude towards mathematics on achievement in mathematics

Source of Variation	Df	Sum of Squares	Mean Square	F	Probability
Between	2	4833.683	2416.841	3.890	0.021
Within	147	91318.98	621.218		
Total	149	96152.67			

Table-2 shows that F ratio for difference among rural male students with low, moderate and high attitude towards mathematics is 3890. Probability of this F ratio is 0.021 which is much less than 0.05. This means that significant difference exists among rural male students with low, moderate and high attitude towards mathematics on achievement in mathematics.

This result indicates that attitude towards mathematics is positively associated with achievement in mathematics of rural male students.

H_{01}: "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade rural male students." **is rejected.**

2. Influence of Attitude Towards Mathematics on Achievement in Mathematics of 10^{th} Grade Rural female Students

Summary of descriptive statistics of rural female students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in Table-3 and summary of analysis of variance for difference among rural female students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in Table-4.

Table-3

results of descriptive statistics of rural female students with low, moderate and high attitude towards mathematics on achievement in mathematics

Attitude Towards Mathematics	N	Sum	Sum Squares	Mean	S.D.
Low	39	2234.6	134550.2	57.297	13.092
Moderate	56	3940.2	286392.92	70.361	13.092
High	55	4434.8	361710.08	80.633	8.735

Table-4

results of analysis of variance for difference among rural female students with low, moderate and high attitude towards mathematics on achievement in mathematics

Source of Variation	Df	Sum of Squares	Mean Square	F	Probability
Between	2	12438.07	6219.037	46.193	0.0000
Within	147	19791.04	134.633		
Total	149	32229.12			

Table-4 shows that F ratio for difference among rural female students with low, moderate and high attitude towards mathematics is 46.193. Probability of this F ratio is 0.0000 which is much less than 0.05. This means that significant difference exists among rural female students with low, moderate and high attitude towards mathematics on achievement in mathematics.

This result indicates that attitude towards mathematics is positively associated with achievement in mathematics of rural female students.

H_{02}: "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade rural female students." **is rejected.**

3. Influence of Attitude Towards Mathematics on Achievement in Mathematics of 10^{th} Grade Urban male Students

Summary of descriptive statistics of urban male students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in Table-5 and summary of analysis of variance for difference among urban male students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in Table-6

Table-5

results of descriptive statistics of urban male students with low, moderate and high attitude towards mathematics on achievement in mathematics

Attitude Towards Mathematics	N	Sum	Sum Squares	Mean	S.D.
Low	35	1565.2	74279.36	44.720	11.224
Moderate	70	4668	323254.8	66.686	13.169
High	45	3410	266045.76	75.778	13.180

Table-6

results of analysis of variance for difference among urban male students with low, moderate and high attitude towards mathematics on achievement in mathematics

Source of Variation	Df	Sum of Squares	Mean Square	F	Probability
Between	2	19744.84	9872.419	60.739	0.0000
Within	147	23893.04	162.538		
Total	149	43637.88			

Table-6 shows that F ratio for difference among urban male students with low, moderate and high attitude towards mathematics is 60.739. Probability of this F ratio is 0.0000 which is much less than 0.05. This means that significant difference exists among urban male students with low, moderate and high attitude towards mathematics on achievement in mathematics.

This result indicates that attitude towards mathematics is positively associated with achievement in mathematics of urban male students.

H_{03}: "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade urban male students." **is rejected.**

4. Influence of Attitude Towards Mathematics on Achievement in Mathematics of 10^{th} Grade Urban female Students

Summary of descriptive statistics and analysis of variance for difference among urban female students with low, moderate and high attitude towards mathematics on achievement in mathematics is given in Table-7 and Table- 8 respectively

Table-7

results of descriptive statistics of urban female students with low, moderate and high attitude towards mathematics on achievement in mathematics

Attitude Towards Mathematics	N	Sum	Sum Squares	Mean	S.D.
Low	42	2328.8	138039.12	55.448	14.744
Moderate	59	4092.4	293677.84	69.363	13.011
High	49	3800.2	300836.44	77.555	11.284

Table-8

Results of analysis of variance for difference among urban female students with low, moderate and high attitude towards mathematics on achievement in mathematics

Source of Variation	Df	Sum of Squares	Mean Square	F	Probability
Between	2	11197.82	5598.911	33.131	0.0000
Within	147	24842.12	168.994		
Total	149	36039.95			

Table-8 shows that F ratio for difference among urban female students with low, moderate and high attitude towards mathematics is 33.131. Probability of this F ratio is 0.0000 which is much less than 0.05. This

means that significant difference exists among urban female students with low, moderate and high attitude towards mathematics on achievement in mathematics.

This result indicates that attitude towards mathematics is positively associated with achievement in mathematics of urban female students.

H_{04}: "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade urban female students." **is rejected.**

Result of the study- Therefore, null hypothesis that "There is no significant impact of attitude towards mathematics on achievement in mathematics of 10^{th} grade female male urban students", **is rejected.**

FINDINGS AND CONCLUSION

On the basis of the data analysis this study has found that the factor (attitude towards mathematics) taken in this study has significantly correlated in the prediction of achievement in mathematics of 10^{th} grade students studying in Uttarakhand. Findings conclude that, a teacher may play an important role on the achievement in mathematics by converting student's negative attitude towards into positive attitude towards mathematics. Teachers can help students achieve good marks in mathematics subject by arousing the student's attitude towards mathematics.

SCOPE FOR FURTHER RESEARCH

The present study has been carried out in the state Uttarakhand taking a independent variable i.e. attitude towards mathematics in the study. This provide the direction for the other studies that may be conducted in other states as well as in Uttarakhand including other variables such as learning environment, maturity, cast, category, residential status and economic profile of the students.

REFERENCES

Aiken, L. (1976). Update on attitudes and other affective variables in learn-ing mathematics. *Review of Educational Research, 46*, 293-311.

Aiken, L. R. (1970). Attitudes towards mathematics. *Review of Educational Research*, *40*(4), 551–596.

Ajisuksmo, Clara R. P and Saputri, Grace R. (2017). The influence of attitudes towards mathematics, and meta-cognitive awareness on mathematics achievements. **Creative Education**, 8(3), https://www.scirp.org/reference/ReferencesPapers.aspx? ReferenceID= 2008359.

Ajzen, I. (1993). Attitude theory and the attitude-behavior relation. *New directions in attitude measurement*, 41-57.

Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological bulletin*, *84*(5), 888. http://www.thecre.com/tpsac/wp-content/uploads/2011/02/Appendix2_AttitudevsAction_ByAjzenFishbein1977.pdf

Allport G. (1935). Attitudes. In the *Hand book of social psychology*. Worcester, MA: Clark University Press. 2, 798-844

Bayaga, Anass and Wadesango, Newman (2014). Analysis of students' attitudes on mathematics achievement factor structure approach. International Journal of Educational Sciences, 6(1), 45-50. http://www.krepublishers.com/02-Journals/IJES/ IJES-06-0-000-14-Web/IJES-06-1-000-14-ABST-PDF/IJES-06-1-045-14-126-Bayaga-A/IJES-06-1-045-14-126-Bayaga-A-Tt.pdf.

Benton, William (1968). Attitude. In Encyclopaedia *Britannica*, Vol.2.

Cheung, K. C. (1988). Outcomes of schooling: mathematics achievement and attitudes towards mathematics learning in Hong Kong. *Educational Studies in Mathematics*, *19*(2), 209–219.

Di Martino, P., & Zan, R. (2010). Me and maths: Towards a definition of attitude grounded on students' narratives. *Journal of Mathematics Teacher Education*, 13(1), 27–48.

Dursun, Ş. (2015). Investigation of high school students' attitude and anxiety levels towards Mathematics in terms of some variables. *Educational Research and Reviews*, *10*(13), 1773–1780. http://doi.org/10.5897/ERR2015.2206.

Eshun, B. (2004). Sex differences in attitude of students towards mathematics in secondary schools," *Mathematics Connection*, 4, 1–13.

Hannula, M. S. (2002). Attitude towards mathematics: Emotions, expectations and values. *Educational Studies in Mathematics*, 49(1), 25–46.

Kadijevich, D. (2008). TIMSS 2003: Relating dimensions of mathematics attitude to mathematics achievement. http://www.doiserbia.nb.rs/img/doi/0579-6431/2008/ 0579-64310802327K.pdf

Karigi M.W. and Tumuti, S, (2015). Students' and teachers' attitude factors contributing to poor performance in mathematics in selected public secondary schools in Kiambaa Division of Central Province, Kenya. *Strategic Journal of Business and Change Management*, 2(58), 316-332.

Langat, Alphine C. (2015). Students' attitudes and their effects on learning and achievement in mathematics: a case study of public secondary schools in Kiambu County, Kenya. Master of Education Dissertation, Kenyatta University. https://ir-library.ku.ac.ke/bitstream/handle/123456789/10911/

Lawsha M, & Hussain W. (2011). Secondary students' attitude towards mathematics in a selected school of Maldives Institute of Education. *International Journal of Humanities and Social Science*, *1*(15), 277–281.

Ma,Xin (1997). Reciprocal relationships between attitude toward mathematics and achievement in mathematics. *The Journal of Educational Research*, 90 (4), 221-229.https://www.tandfonline.com/doi/abs/10.1080/00220671.1997.10544576.

Neale, D. C. (1969). The role of attitudes in learning mathematics. *Arithmetic Teacher*, 16, 631-640.

Nicolaidou, M. and Philippou, G. (2003). Attitudes towards mathematics, self-efficacy and achievement in problem solving. *European Research in Mathematics Education III*, M. A.Mariotti, Ed., 1–11, University of Pisa, Pisa, Italy.

Panerio, Jr.Conrado B. (2016). Attitudes and performance in mathematics. Munich Personal RePEc Archive. https://mpra.ub.uni-muenchen.de/99181/MPRA Paper No. 99181, posted Quaye, J. (2015). Exploring students' attitudes towards mathematics and mathematical achievement in secondary schools in England: the role of social class, gender and ethnicity. *Research in Mathematics Education*, 17(1), 59–60.

23 Mar 2020 08:43 UTC.