WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Influence of Gender, locality and Attitude Towards Mathematics on Achievement in Mathematics of High School Students

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ABSTRACT

Purpose of present study was to find out influence of gender, locality and attitude towards mathematics on achievement in mathematics. For this purpose, 600 students of grade 10th were selected from 10 secondary schools of Kumaon region of Uttarakhand, using simple random sampling technique. To collect data Attitude Toward Mathematics Scale developed and standardized by Rai (2007) Learning Environment Scale developed by Rai (2007) were used. To analysed data t-test and analysis of variance were used. This study revealed that influence of gender on achievement in mathematics is significant in favour of male students. While, influence of locality was not found significant on achievement in mathematics. Significant and positive influence of attitude towards mathematics was found on achievement in mathematics.

Keywords: achievement in mathematics, Attitude towards mathematics, gender, locality

Introduction

Mathematics is an important core subject in school curriculum. It is more closely associated with individual daily life in comparison to other subjects. Except mother tongue, mathematics is a single subject that related to individual daily life. Mathematics is the father of all sciences and mother of languages. Without mathematics science and technology are lam. It is a creation of human mind which is associated with ideas, processes and reasoning. It is not only Arithmetic, Algebra, Geometry, Trigonometry, Statistics and Calculus. It is a way of thinking and reasoning in logical, analytical, critical, creative and systematic way. It is a subject that is closely related to the development of science and technology. It is a key of the economic success of societies. It is essential for solving mathematical problems in any subjects. It is an essential aspect of human knowledge in most subjects like sciences, social sciences and even in arts.

Mathematics is a major contributor to human development and civilization. Mathematics creates good habits like clarity, brevity, accuracy, precision, certainty and discipline in learner. Success in mathematics is not only individual and professional development but also a national development. But it is truth that a considerable number of students fail every year at secondary level in mathematics subject. Failure in mathematics subject at secondary level is not a problem of India, but also for many countries. The factors influencing mathematics achievement has interest of teacher educators and researchers in the field of science and mathematics education since more than half century. There are several known and unknown factors affecting achievement in mathematics, but three factors attitude, gender and locality have been interesting factors of researchers.

This is general perception of people and also mathematics teachers that mathematics is a hard subject and can learned by highly intellectual learners. Most mathematics teachers say in classroom that mathematics is a hard subject and it demand much more time for learning. Due to this negative attitude of teachers and general people learners hesitate to learn mathematics. Similarly, it is also a general conception that mathematics is a male oriented subject and not suitable for female students. Both aspects are not true in present scenario.

Third factor is locality which is also important for researchers. People thinks that urban students have better facilities than rural students in learning mathematics and other subjects also. Due to better facility urban student achieve better than rural students in mathematics. Therefore, this is responsibility of educators and teachers working in mathematics education that they study gender, locality and attitude of learner in relation to mathematics achievement and enhance mathematics achievement of learners. Taking these views in mind investigators decided to study influence of gender, locality and attitude towards mathematics on achievement in mathematics.

Review of Related Literature

Studies of Gender and Location related to Achievement in Mathematics

Choudhury and Das (2012) studied influence of attitude towards mathematics and study habit on the achievement in mathematics of secondary school students and found that there was no significant influences of medium of instruction and sex on achievement in mathematics of the students.

Anjum (2015) study gender revealed that significant difference between girls and boys' children of upper primary on mathematics achievement in favour of girls students.

Charles-Ogan (2015) conducted an ex-post-facto descriptive survey for gender influences on mathematics achievement. Finding of this study indicates that there is no significant difference between boys and girls' students on achievement in mathematics.

Igbo, Onu and Obiyo (2015) study shows that gender has significant influence on students' academic achievement in favor of the male students.

Mutai (2016) concluded that significant difference exists between male and female students on mathematics achievement in favour of male students.

Nepal (2016) investigation revealed that significant differences not exist between male and female on level of mathematical thinking and the mathematics achievement. But significant difference was found between rural and urban students on the level of mathematical thinking and mathematics achievement in favour of urban students.

Awofala (2017) investigation indicates significant difference exists between male and female students in their Mathematics achievement in favour of the males.

Hooda and Devi (2017) study revealed significant effect of type of school, locality and gender on mathematics achievement of secondary school students in favour of government school, rural and female students respectively.

Recber, Isiksal and Koç (2018) was found that significant difference exists between male and female students on achievement in mathematics scores in favour of male students.

Ghasemi, Burley and Safadel (2019) study indicate that significant differences not exist between boys and girls' students of different countries on mathematics achievement.

Oribhabor (2019) study shows that significant difference exists between male and female students in their Mathematics achievement in favour of the males.

Yadav (2019) study indicate that the mathematics achievement of urban community schools' students is higher than the rural community schools' students.

Ahmed et al. (2020) study revealed that significant difference exists between boys and girls, rural and urban school student of tenth grade but these results are not significant in case of twelfth grade students.

Oluyemo et al. (2020) studied gender differences in mathematics interest and achievement. This study indicates that significant difference exists between male and female students in their achievement in mathematics in favour of male students.

Studies of Attitude Towards mathematics Related to Achievement in Mathematics

Savaş, Taş and Duru (2010) studied factors affecting students' achievement in mathematics of secondary school students of grades 6^{th}, 7^{th} and 8^{th} students. Results of this study revealed that students' attitude towards mathematics had statistically significant effects on students' mathematics achievement.

Choudhury and Das (2012) study revealed significant and positive influence of attitude towards mathematics on achievement in mathematics of secondary school students.

Ajisuksmo and Saputri (2017) was found significant and positive relationship between attitudes towards mathematics and mathematics achievement of students.

Simegn and Asfaw (2017) was found significant and positive relationship between attitude towards mathematics and students' achievement in mathematics.

Objectives

Following objectives were selected for the present study:

1. To study influence of the gender on achievement in mathematics of high school students.
2. To study influence of the locality on achievement in mathematics of high school students.

3. To study influence of the attitude towards mathematics on achievement in mathematics of high school students.

Hypotheses

Objective wise null hypotheses were framed in following way:

$H0_{1:}$ There is no significant influence of the gender on achievement in mathematics of high school students.

$H0_{2:}$ There is no significant influence of the locality on achievement in mathematics of high school students.

$H0_{3:}$ There is no significant influence of the attitude towards mathematics on achievement in mathematics of high school students.

Methodology

For the present study, a sample of 600 students of grade 10^{th} were selected from 10 secondary schools of Kumaon region of Uttarakhand, using simple random sampling technique. To collect data Attitude Toward Mathematics Scale developed and standardized by Rai (2007) Learning Environment Scale developed by Rai (2007) were used. To analysed data t-test and analysis of variance were used.

Results and Discussion

To find out influence of gender and location on achievement in mathematics, t-test was used. Findings of t-test for gender influence is given in Table-1. This table shows that t value for difference between male and female students is 6.03. Table value for significance at 0.01 level for 598 degree of freedom (df) is 2.585. Obtained value of t is higher than table value which indicates that significant difference exists between male and female students in their achievement in mathematics. This means that gender of students influences significantly to achievement in mathematics. Achievement in mathematics of female students was found higher than male students. Therefore, null hypothesis $H0_1$ is rejected

Table-1

Summary of t-test for influence of gender and locality on achievement in mathematics

		N	Sum	Sum of Squares	Mean	S.D.	t
Gender	Male	300	18621	1220917	62.07	14.732	6.03**
	Female	300	20831	1515206	69.437	15.141	
Locality	Rural	300	19588	1339991	65.293	14.262	0.732
	Urban	300	19864	1396132	66.213	16.419	

Table-1 also indicate that t value for difference between rural and urban student is 0.732 which is less than table value 1.963 for significant at 0.05 level and 598 df. Thus, significant difference not exist between rural and urban students in their achievement in mathematics. This means that locality include on achievement of students is not significant. Therefore, null hypothesis Therefore, null hypothesis $H0_2$ is accepted

Summary of descriptive statistics and analysis of variance for influence of attitude toward mathematics on achievement in mathematics are given in Table-2 and Table-3, respectively.

Table-2

Sum, Sum of squares, means and standard deviations of students with low, moderate and high attitude towards mathematics on achievement in mathematics

Attitude Towards Mathematics	N	Sum	Sum of Squares	Mean	S.D.
Low	174	9195	518253	52.845	13.634
Moderate	247	16631	1156766	67.332	12.234
High	179	13626	1061104	76.123	11.544

Table-3

Summary of analysis of variance for influence of attitude towards mathematics on achievement in mathematics

Source of Variance	df	Sum of Squares	Mean Square	F	Sig. Level
Between	2	48856.6	24428.3	156.535	0.01

Within	597	93165.9	156.057		
Total	599	142022			

Table-3 shows that F ratio for influence of attitude towards mathematics on achievement in mathematics is 156.535 which is higher than table value 4.641 for significant at 0.01 level, and 2, 597 df. This indicates that significant difference exists among students with low average and high attitude towards mathematics on achievement in mathematics. Mean of students with higher attitude towards mathematics is higher than students of low and average attitude towards mathematics on achievement in mathematics. This means that attitude towards mathematics is associated positively with achievement in mathematics. Therefore, null hypothesis $H0_3$ is rejected.

Discussion

This study revealed significant influence of gender on achievement in mathematics in favour of male students. Previous studies by Igbo, Onu and Obiyo (2015), Mutai (2016) and Awofala (2017) investigated the influence of gender on achievement in mathematics and they found that gender has significant influence on students' achievement in mathematics in favour of the male students. Present study finding supporting findings of these studies.

Studies by Anjum (2015), and Hooda and Devi (2017) findings are not line of findings of present study. They found that female student's achievement in mathematics is significantly higher than male.

Present study revealed that there is no significant influence of locality on achievement in mathematics. Sriniwasan (1999) and George and Amalraj (2016) also not found significant difference between rural and urban students in Mathematics Achievement. While, Nepal (2016), Hooda and Devi (2017) and Yadav (2019) studies indicate significant difference between rural and urban students in favour of urban students.

In present study significant differences among students with low, moderate and high attitude towards mathematics was found on achievement in mathematics. Previous studies by Savaş, Taş and Duru (2010), Choudhury and Das (2012), Ajisuksmo and Saputri (2017) and Simegn and Asfaw (2017) were found significant influence of attitude towards mathematics on achievement in mathematics. Findings of present study supporting findings of these studies.

Educational Implication

The implication of this study is fruitful for secondary school teachers, teacher educators and parents. School mathematics teachers should develop positive attitude towards mathematics of secondary school students. They aware parents also to motivate their children towards learning mathematics. Teacher educator should train their trainee regarding how to develop attitude towards mathematics of secondary school students. School teachers regular inspect achievement gap in male and female students and overcome this gap.

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