International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979; Impact Factor: RJIF 5.72
Received: 13-07-2020; Accepted: 28-07-2020; Published: 14-08-2020
www.allsubjectjournal.com
Volume 7; Issue 8; 2020; Page No. 178-182

Academic achievement in mathematics among rural and urban students: A study on secondary and higher secondary level students

Eusob Ali Ahmed[1*], Munmun Banerjee[2], Subir Sen[3], Prasanta Chatterjee[4]
[1] Department of Mathematics, Sapatgram College, Sapatgram, Assam, India
[2] Department of Education, Sapatgram College, Sapatgram, Assam, India
[3] Department of Education, Sidho-Kanho-Birsha University, Purulia, West Bengal, India
[4] Department of Mathematics and Centre for Mathematics Education, Visva-Bharati, Santiniketon, West Bengal, India

Abstract
The present study was to investigate the academic achievement in mathematics between rural and urban students of secondary and higher secondary level in Dhubri District of Assam, India. Random Sampling Technique was used in selecting students of secondary and higher secondary level schools, junior colleges and colleges, as sample. The Sample was comprised of 2405 tenth grade and 888 twelfth grade students, consisting of rural and urban students of both genders. Gender wise and locality wise comparisons were done by using descriptive and inferential statistics like mean, S.D. and independent samples t-test. Achievement in tenth and twelfth grade for the academic years 2018-19 and 2019-20 was taken as sample of the study respectively. The results revealed that there is a significant difference between boys and girls, students belonging to rural school and urban school, rural school boys and urban school boys, rural school girls and urban school girls, rural school boys and rural school girls and urban school boys and urban school girls of tenth grade but these results are not significant in case of twelfth grade students.

Keywords: mathematics achievement, gender, locality, secondary and higher secondary

1. Introduction
The world is interconnected and witnessing changes our thoughts and ideas over the period. Everyday mathematics shows these connections and possibilities. The earlier young learners can put these skills to practice, the more likely we will remain in innovation society and economy. Mathematics helps us understand the world and we use the world to understand mathematics. Thus, it is considered as a powerful tool for global understanding and communication.
Many studies reported that personal and environmental factors can encourage students' mathematics achievement. Two key personal reasons are math anxiety (Richardson & Suinn, 1972[22]; Tobias, 1978[25]) and attitude towards mathematics (Ma & Kishor, 1997[12]; Nicolaidou & Philippou, 2003[14]). Environmental issues include the role of teacher (Cheseboro, 2003[3]; Olatunde, 2009[18]), Teaching streategy (Tyanck & Cuban, 1995[26]) and parental role (Cruz, 2012[4]; Fan & Chen, 2001[8]; Kleanthous & Williams, 2010[11]). The work of Hu, (2003) [10] indicated that the rural schools face challenges that can lead to unfavorable educational outcomes for their students. One of such challenges as mentioned by Ertl and Plante, (2004) [7] is in terms of information and communication technology (ICT) usage, which is usually lacking in rural areas. It is observed by Nielson, (2004) [15] that rural students are advantaged by small class size and enjoy more individual attention from teachers than their urban counterparts. Gallaghar & Kaufman, (2005) [9] recommended that gender differences are still prevalent and required attention from researches. Njubi & Githua, (2013) [16] pointed out that there was no significant difference between male and female students, which is inconsistent with the study of Ding *et al*., (2007) [6]. It was discussed by Odiri, (2015) [17] that study habits encourage students' achievement in mathematics. He found significant difference between male and female students in mathematics achievement. Bhowmik and Banerjee, (2015) [2] observed that a statistical relation was found between achievements in mathematics and anxieties towards mathematics in terms of gender. Datt Pandey, (2017) [5] conducted, "A study of Mathematical Achievement of Secondary School Students", and found that male students were found better in their mathematics achievement than female students. He also found a significant difference of mathematics achievement between rural and urban of the same, which is similar with the finding of Mehra, (2004) [13]; Baskaran, (1991) [1]; Prakash, (2000) [21]; and Sing *et al*., (2003) [23] who found that urban students were better in their mathematical achievement in compared to the rural students. However, this finding is inconsistent with the finding of Patel, (2012) [19] who found that there was no significant difference in achievement of boys and girls of urban localities. Furthermore, he also found no significant difference between the mathematical achievement of rural males and urban males but significant is there in case of rural females & urban females. A very few researches available in Indian as well as abroad context do not focus on achievement in mathematics among secondary and higher secondary school students. Hardly any research has been done to know the main effects and interaction effects of locality and gender on achievement in mathematics among secondary and higher secondary school students. Thus, the present study is an attempt to investigate the achievement in mathematics among secondary and higher secondary school students with reference to locality

and gender.

2. Objectives of the Study

The following objectives have been formulated for the present study:

1. To study the level of achievement in mathematics between boys and girls students of tenth grade and twelfth grade.
2. To study the level of achievement in mathematics between students belonging to rural school and urban school of tenth grade and twelfth grade.
3. To study the level of achievement in mathematics between students belonging to rural school and urban school in respect to their gender of tenth grade and twelfth grade.

3. Hypotheses

The following null-hypotheses were considered for the present investigation:

Ho1: There is no significant difference in mathematics achievement between boys and girls students of tenth grade.

H_o2: There is no significant difference in mathematics achievement between boys and girls students of twelfth grade.

Ho3: There is no significant difference in mathematics achievement between students belonging to rural school and urban school of tenth grade.

Ho4: There is no significant difference in mathematics achievement between students belonging to rural school and urban school of twelfth grade.

Ho5: There is no significant difference in mathematics achievement between rural school boys and urban school boys of tenth grade.

Ho6: There is no significant difference in mathematics achievement between rural school boys and urban school boys of twelfth grade.

Ho7: There is no significant difference in mathematics achievement between rural school girls and urban school girls of tenth grade.

Ho8: There is no significant difference in mathematics achievement between rural school girls and urban school girls of twelfth grade.

Ho9: There is no significant difference in mathematics achievement between rural school boys and rural school girls of tenth grade.

Ho10: There is no significant difference in mathematics achievement between rural school boys and rural school girls of twelfth grade.

Ho11: There is no significant difference in mathematics achievement between urban school boys and urban school girls of tenth grade.

Ho12: There is no significant difference in mathematics achievement between urban school boys and urban school girls of twelfth grade.

4. Materials and Method

The main objective of this study was to investigate the academic achievement in mathematics of secondary and higher secondary level students of Dhubri District of Assam. The study at present has been planned a satisfied descriptive frame work. It targets at comprising the level of self-concept in respect to gender and locality. As such the method of the study was confined to a descriptive and analytical approach, the methodology of the investigation involves collection, tabulation and meaningful analysis of the data; and drawing out the appropriate inferences. Hence, description of the exploration is evidently combined with analysis, comparison, contrast, interpretation and evaluation.

4.1 Variables Studied

a. One output or dependent variable i.e. Achievement.
b. Two independent variables i.e. Gender (boys and girls) and Localities (rural and urban).

4.2 Population and Sample

All the students of tenth grade (secondary) and twelfth grade (higher secondary) studied in different government and private secondary schools, higher secondary schools, junior colleges and colleges in Dhubri District of Assam (India), which are affiliated to State Board of Assam, considered the population of the study.

A sample of 3293 students of mathematics stream were selected randomly out of which 2405 were of tenth grade students and rest of 888 were of twelfth grade students in Dhubri District of Assam (India) for the study. Of the 2405 tenth grade students, 1276 were boys and rest of 1129 were girls; and 1239 were belonging to rural school and rest of 1166 were belonging to urban school. Moreover, of the 888 twelfth grade students, 643 were boys and rests of 245 were girls; and 251 were belonging to rural school and rests of 637 were belonging to urban school. On the other hand, 54 secondary and higher secondary schools were randomly selected for the study of tenth grade students out of which 27 are rural schools and rests of 27 were urban schools. Moreover, 10 higher secondary schools, junior colleges and colleges were randomly selected for the study of twelfth grade students out of which 3 were rural and rests of 7 were urban. The distribution of the sample had been presented in the following tables.

Table 1: Showing the distribution of sample session-wise.

Grade	Session	Secondary/Higher Secondary Marks
Tenth Grade	2018-19	2019
Twelfth Grade	2019-20	2020

Table 2: Showing the distribution of sample of tenth grade.

Grade	Rural	Urban	Total
Tenth Grade	Boys=646	Boys=630	1276
	Girls=593	Girls=536	1129
Total	1239	1166	2405

Table 3: Showing the distribution of sample of twelfth grade.

Grade	Rural	Urban	Total
Twelfth Grade	Boys=187	Boys=456	643
	Girls=64	Girls =181	245
Total	251	637	888

4.3 Analysis of Data

The collected dada were systematically arranged in tabular form and then analyzed with statistical tools.

4.4 Statistics Used

All the statistics used in the study are as follows

- Descriptive Statistics: In order to find out the nature of sampling distribution, descriptive statistics were carried out for the variable. For this purpose, the statistics such as Mean, S.D. were calculated.

- Inferential Statistics: The 't'-test was implemented to find out whether there was any significant mean difference between achievement and students groups within the variables under consideration.

5. Results and Discussion

The results of the analysed data are presented below.

Table 4: Difference in academic achievement in mathematics between boys and girls of tenth grade and twelfth grade students.

Grade	Gender	N	Mean	S.D.	t-value	Level of significance
10th Grade	Boys	1276	53.72	19.164	5.147	Significant at 0.05 level
	Girls	1129	49.76	18.041		
12th Grade	Boys	643	29.71	11.829	.136	Not Significant
	Girls	245	29.83	11.272		

It might be said on the basis of Table-4 that there is a significant difference in mathematics achievement between boys and girls students of tenth grade i.e. boys have a higher mean academic achievement compared to girls. The present finding is similar with the studies of Prakash and Pandey, (1996) [21]; Ding *et al*., (2007) [6]; Odiri (2015), [17]; and Datt Pandey, (2017) [5]. It is interesting to be noted that no significant difference was found in case of twelfth grade students, which is similar with the studies of Njume and Githua, (2013) [16]; and Mehra, (2004) [13]. Hence the null hypothesis H_o1 is rejected and H_o2 is accepted.

Table 5: Difference in academic achievement in mathematics between students belonging to rural school and urban school of tenth grade and twelfth grade.

Grade	Locality	N	Mean	S.D.	t-value	Level of significance
10th Grade	Rural	1239	47.31	15.003	12.719	Significant at 0.05 level
	Urban	1166	56.73	20.978		
12th Grade	Rural	251	30.88	8.880	1.820	Not Significant
	Urban	637	29.30	12.581		

Table-5 discloses that 't'-values have been found to be significant in case of tenth grade students and hence there is a significant difference in mathematics achievement between students belonging to rural school and urban school i.e. urban school students have better performed in mathematics achievement in compared to the rural school students of tenth grade. This result is consistent with the result of Datt Pandey, (2017) [5]; Mehra, (2004) [13]; Baskaran, (1991) [1]; Prakash, (2000) [21]; Sing *et al*., (2003) [23]; and Sing and Sing, (2007) [24]. As in previous cases mentioned before, no significant difference is found in case of twelfth grade students, which is similar with the studies of Patel, (2012) [19]. Hence the null hypothesis H_o3 is rejected but H_o4 is accepted.

Table 6: Difference in academic achievement in mathematics between rural school boys and urban school boys of tenth grade and twelfth grade.

Grade	Category	N	Mean	S.D.	t-value	Level of significance
10th Grade	Rural School Boys	646	48.87	16.069	9.451	Significant at 0.05 level
	Urban School Boys	630	58.68	20.759		
12th Grade	Rural School Boys	187	30.79	9.352	1.481	Not Significant
	Urban School Boys	456	29.27	12.689		

Perusal of Table-6 revealed that there exist statistically significant difference between mathematical achievement mean scores of rural school boys and urban school boys of tenth grade. It means that urban school boys have better achievement in mathematics than rural school boys of tenth grade. However, this finding is not in the line of twelfth grade students i.e. there is no significant difference in mathematics achievement between rural school boys and urban school boys of Twelfth grade, which is in consonance with the result of Datt Pandey, (2017) [5]. Hence the null hypothesis H_o5 is rejected but H_o6 is accepted.

Table 7: Difference in academic achievement in mathematics between rural school girls and urban school girls of tenth grade and twelfth grade.

Grade	Category	N	Mean	S.D.	t-value	Level of significance
10th Grade	Rural School Girls	593	45.61	13.558	8.459	Significant at 0.05 level
	Urban School Girls	536	54.43	21.021		
12th Grade	Rural School Girls	64	31.14	7.387	1.080	Not Significant
	Urban School Girls	181	29.37	12.341		

Like previous result, it is observed from Table-7 that the girls students of rural school would differ significantly from the girls students of urban school of tenth grade in respect to their mathematics achievement, which is similar with the result of Datt Pandey, (2017) [5]. However no significant difference is found in case of twelfth grade students. Hence the null hypothesis H_o7 is rejected but H_o8 is accepted.

Table 8: Difference in academic achievement in mathematics between rural school boys and rural school girls of tenth grade and twelfth grade.

Grade	Category	N	Mean	S.D.	t-value	Level of significance
10th Grade	Rural School boys	646	48.87	16.069	3.851	Significant at 0.05 level
	Rural School Girls	593	45.61	13.558		
12th Grade	Rural School boys	187	30.79	9.352	.271	Not Significant
	Rural School Girls	64	31.14	7.387		

Table-8 discloses that 't'-values have been found to be significant in case of tenth grade students and hence there is

a significant difference in mathematics achievement between rural school boys and rural school girls i.e. rural school boys have better performed in mathematics achievement in compared to the rural school girls of tenth grade, whereas no significant difference was found in case of twelfth grade and hence the null H_o9 is rejected and H_o10 is accepted.

Table 9: Difference in academic achievement in mathematics between urban school boys and urban school girls of tenth grade and twelfth grade.

Grade	Category	N	Mean	S.D.	t-value	Level of significance
10th Grade	Urban School boys	630	58.68	20.759	3.465	Significant at 0.05 level
	Urban School Girls	536	54.43	21.021		
12th Grade	Urban School boys	456	29.27	12.689	.089	Not Significant
	Urban School Girls	181	29.37	12.341		

It is also observed from Table-9 that 't'-values have been found to be significant in case of tenth grade students and hence there is a significant difference in mathematics achievement between urban school boys and urban school girls i.e. urban school boys have better performed in mathematics achievement in compared to the urban school girls of tenth grade. However, no significant difference was found in case of twelfth grade, which is similar with the result of Patel, (2012) [12]. Hence the null H_o11 is rejected and H_o12 is accepted.

6. Conclusions

The major objective of the present study was to determine whether any differences were laid between 'boys and girls' and also between 'rural and urban' students of secondary and higher secondary students in relation to their mathematics achievement. The performance of descriptive and inferential statistics for the data, revealed the following findings:

- There is a significant difference between boys and girls of secondary students in respect to their mathematics achievement.
- The students belonging to rural school differed significantly to their urban school counterparts in secondary level in respect to their mathematics achievement.
- There is a significant difference between rural school boys and urban school boys of secondary level in respect to their mathematics achievement.
- There is a significant difference between rural school girls and urban school girls of secondary level in respect to their mathematics achievement.
- There is a significant difference between rural school boys and girls of secondary level in respect to their mathematics achievement.
- There is a significant difference between urban school boys and girls of secondary level in respect to their mathematics achievement.

It was found (Table-4-9) that, boys were performed better than girls and in cases of localities (Rural and Urban), urban students showed better achievement to their rural counterparts for tenth grade students. However, there is no statistically significant difference in performance was found for twelfth grade students in respect to their academic achievement in mathematics. In view of the above findings it may be concluded that the situation might be happened due to less prospect and restricted atmosphere in teaching learning and infrastructural conditions. To solve this inequality all stakeholders in the educational sector should be active to their responsibilities.

7. References

1. Baskaran K. Achievement motivation, attitude towards problem-solving and achievement in mathematics of standard X students in Devekottai Educational District. In NCERT, Fifth Survey of Educational Research (p. 1863). New Delhi: NCERT, 1991.
2. Bhowmik M, Banerjee B. Co- relational study on anxiety and achievement in mathematics of secondary school students' in Jangal – Mahal of West- Bengal, India. Basic Research Journal of Education Research and Review. 2015; 4(8):113-118.
3. Cheseboro J. Effects of teacher clarity and immediacy on student learning, receiver apprehension, and affect. Communication Education. 2003; 52(2):135-147.
4. Cruz YDL. Learning math with my father: A memoir. Journal of Unschooling and Alternative Learning. 2012; 6(11):20-33.
5. Datt Pandey B. A study of Mathematical Achievement of Secondary School
6. Students. International Journal of Advanced Research. 2017; 5(12):1951-1954.
7. Ding C, Song K, Richardson L. Do mathematical gender differences continue? Educational study, 2007, 279-295.
8. Ertl H, Plante J. Connectivity and learning in Canada's schools. Connectedness series (Statistics Canada Catalogue No. 56F000 4MIE, No. 11), 2004.
9. Fan X, Chen M. Parental involvement and students' academic achievement: A meta-analysis. Educational Psychology Review. 2001; 13(1):1-22.
10. Gallagher AM, Kaufman JC. (Eds.). Gender differences in mathematics: An integrative psychological approach. Cambridge: Cambridge University Press, 2005.
11. Hu S. Educational aspirations and post-secondary access and choice of students in urban, sub-urban and rural schools compared. Education Policy analysis archives. 2003; 11(14):10-16.
12. Kleanthous I, Williams J. Perceived parental influence on students' mathematical achievement, inclination to mathematics and disposition to study further mathematics. In M. Jourbert & P. Andrews (Eds.), Proceedings of the British Congress for Mathematics Education (BCME) (pp. 129–136). Manchester, England: BCME, 2010, 129-136.
13. Ma X, Kishor N. Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis. Journal for Research in Mathematics Education. 1997; 28(1):27-47.
14. Mehra JP. Difference in students' achievement in

mathematics between males and females of Burdwan District in West Bengal. Journal of Science Education. 2004; 12(6):21-26.
15. Nicolaidou M, Philippou G. Attitudes towards mathematics, self-efficacy and achievement in problem solving. European Research in Mathematics III. Thematic Group, 2003; 2:1-11.
16. Nielson W. Accessing senior science courses in rural BC: A cultural border-crossing metaphor. Paper presented at annual meeting of the Canadian Society for Studies, Winnipeg, 2004.
17. Njubi JN, Githua BN. Effects of practicing mathematical creativity enhancing learning / teaching strategy during instruction on secondary school students' mathematics achievement by gender in Kenya's Nakuru Municipality. 2013; 2(2):113-124.
18. Odiri O. Relationship of study Habits with mathematics achievement. Journal of Education and Practice. 2015; 6(10):168-170.
19. Olatunde YP. Relationship between teachers' attitude and students' academic achievement in mathematics in some selected senior secondary school in south western Nigeria. European Journal of Social Sciences. 2009; 11(3):364-369.
20. Patel BC. A Study of academic achievement of students in mathematics of Std-IX in relation to some psycho-social factors (Unpublished doctoral dissertation). Ganpat University, GanpatVidyanagar (Kherva), 2012.
21. Prakash Ved, Pandey Saroj. Influence of demographic variables on learners' achievement: A trend analysis of DPEP states. Indian Educational Review. 1996; 31(1):36-46.
22. Prakash S. A study of mathematical creativity and achievement of elementary school students in relation to problem solving ability, anxiety and socio demographic variables. In NCERT, Sixth Survey of Research in Education. New Delhi: NCERT, 2000.
23. Richardson FC, Suinn RM. The mathematics anxiety rating scale: psychometric data. Journal of Counseling Psychology. 1972; 19(6):551-554.
24. Sing S, Mali S, Sing AK. Achievement difference in class II students in Maths, with regard to Area, Gender, and social grounds during B.A.S and M.A.S in Gonda District. The Educational Review, March. 2003; 46(3):55-57.
25. Singh A, Singh AK. Impact of caste and habitat on achievement in mathematics at upper primary level school. Journal of Teacher Education and Research, 2007, 2(2).
26. Tobias S. Overcoming math anxiety. New York, NY: W. W. Norton & Co, 1978.
27. Tyanck D, Cuban L. Tinkering towards utopia: A century of public-school reform. Cambridge, England: Harvard University Press, 1995.