Influence of Home Environment in Achievement of Mathematics of Secondary Students

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Abstract: ***This paper attempts to study the effect of home environment on the academic achievement in Mathematics of 10th standard students. This study was conducted for a sample of 200 students belongs to North 24 Parganas district of West Bengal, to identify the influence of home environment that can affect students achievement. The researcher has tabulated certain data obtained from the test conducted, and suitable analysis was carried out on the same using descriptive and inferential statistics. This study reveals a positive correlation between the home environment and academic achievement of the students towards mathematics.***

Keywords: Home Environment, Academic Achievement, Mathematics

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INTRODUCTION:

"Success is not measured by what you accomplish but by the opposition you have encountered, and the courage with which you have maintained the struggle against overwhelming odds."

— Orison Swett Marden

"As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality."

— Albert Einstein

Our environment increasingly becoming technologically based which in turn depends mainly on improvements in science and Mathematics. Mathematics is the foundation of science and technology that have made our life more rapid, sophisticated of comfort. Mathematics is used in a number of areas, because it provides a precise way to describe complicated situations and analyses difficult problems. That is why **Kothari Commission (1966)** has rightly recommended the study of Mathematics compulsory for all, for the first 10 years of schooling.

Defining student achievement and factors that impact progress is critical to becoming a successful man. Student achievement measures the amount of academic content a student learns in a determined amount of time. Each grade level has learning goals or instructional standards that educators are required to teach. The purpose of the present study was to examine the effects of three school-related constructs—motivation, attitude, and academic engagement—on 10th-grade students' achievement in mathematics. Although cognitive abilities of the students and their home backgrounds are important predictors of achievement, in recent years affective variables have emerged as salient factors affecting success and persistence in mathematics. Results supported the positive effects of the two motivation factors, home environment and academic achievement in mathematics achievement. The strongest effects were those of academic achievement depends on their home environment.

1.1. Objectives of the study:

1. To study and find out the problems faced by the secondary students in their mathematical achievement influences on home environment.
2. To study and compare the secondary students about their level of mathematical achievement under different categorical variables of locality (Rural and Urban) and Gender (Male and Female) with respect to their home environment.
3. To find out the achievement in mathematics among the rural secondary boys and girls with respect to their home environment.
4. To find out the achievement in mathematics among the urban secondary boys and girls with respect to their home environment.
5. To study the relationship among Rural and Urban secondary students (boys and girls) in their mathematical achievement influences on home environment.

1.2. Hypotheses:

In keeping with objectives of the study the following research hypotheses are formulated against empirical data:

Ho1: There is no significant difference of the secondary students in their mathematical achievement influences on home environment.

Ho2: There is no significant difference about their level of mathematical achievement under different categorical variables of locality (Rural and Urban) and Gender (Male and Female) with respect to their home environment.

Ho3: There is no significant difference achievement in mathematics among the rural secondary boys and girls with respect to their home environment.

Ho4: There is no significant difference achievement in mathematics among the urban secondary boys and girls with respect to their home environment.

Ho5: There is no significant relationship among Rural and Urban secondary students (boys and girls) in their mathematical achievement influences on home environment.

1.3. Methodology of the study:

In any form of research, the methodology involved in the entire process is of paramount importance and any conceived research problems, methodology is the path which a researcher follows to address that particular problem. The scope of research methodology is wider than that of research methods. Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.

1.3.1. Population:

All Bengali medium secondary school students (IX-X) of North 24 Parganas district in West Bengal affiliated by W.B.B.S.E.

1.3.2. Sample and Sampling Procedure:

The sample of the study comprised 200 students- 50 from each of urban boys, urban girls, rural boys and rural girls of secondary class (IX-X) selected from the four schools convenient sampling will be considered as sampling technique.

1.3.3. Sample Frame:

No. of school	**Types of secondary school**	**Gender / Location**	**Boys**	**Girls**	**Total no. of students**
2	Government aided	Urban	50	50	100
2	Government aided	Rural	50	50	100
Total no. of students			100	100	200

1.3.4. Variables of the Study:

In this study, the investigator will consider the following variables-

1.3.4.1. Major Variables:

i. Home Environment. **ii.** Mathematical Achievement.

1.3.4.2. Categorical Variables:

i. Locality: (a) Rural and (b) Urban **ii.** Gender (a) Male and (b) Female

1.4. Tools:

1.4.1. Influence of Home Environment Scale (IHES):

This tool will be constructed by the investigator with the help of his supervisors. The item will be constructed on the basis of the data collected from the secondary students. The categories of responses 'strongly agree', 'agree', 'disagree', 'strongly disagree' and '4', '3', '2', '1' were the respective scores awarded for the responses to positive items.

1.4.2. Students Achievement in Mathematics (SAM):

The item will be constructed on the basis of the data collected from the secondary students of class VIII-IX pass school students from the school record.

1.5. Data collection Procedure: Convenient Sampling Technique:

The researcher will be visited to the secondary schools personally and the students will be given short instruction regarding the feeling in of their response after that the tool (IHES) will give to them and the required approximately 60 minutes to completing.Also, Students Achievement in Mathematics(SAM) will be constructed on the basis of the data collected from the secondary students of class VIII-IX pass school students from the school record.

1.6. Techniques of data analysis & data interpretation:

The collected data was analyzed and interpreted using various statistical measures. Descriptive Statistics such as Mean, Median, Mode, SD and inferential statistics such as t-Test: Sample Assuming Two-equal variances, Correlations will be employed (as required) in this study.

1.7. Analysis and Interpretation of data:

1. 7.1 Software Used:

The raw data were tabulated in MS Excel 2007 and analysis of data was done through MS Excel 2007 too.

1.7.2. Descriptive statistics

Table3.T.1 Descriptive statistics of the Home Environment:

NAME OF THE SCALE	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
HOME ENVIRONMENT	200	45	69.47	68.00	67.0	9.5264	0.379	-0.398

The descriptive statistics of the home environment (Table 4.T.1) shows that the mean score is 69.47 for secondary level (class IX and X) school students with standard deviation of 9.5264. The median value is calculated as 68.0 for secondary level (class IX and X) school students. The mode 67.0 indicates that the most repeated score in the academic interest 58. The calculated skewness (0.379) and kurtosis (-0.398) values for secondary level (class IX and X) school students are low indicating the slightly negatively kurtosis and slightly flat nature of the score distribution.

Table3.T.2 Descriptive statistics of the Achievement in Mathematics:

NAME OF THE SCALE	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
ACHIEVEMENT IN MATHEMATICS	200	45.0	24.22	21.5	14	11.968	1.455	2.458

The descriptive statistics of the achievement in mathematics (Table 4.T.2) shows that the mean score is 24.22 for secondary level (class IX and X) school students with standard deviation of 11.968. The median value is calculated as 21.5 for secondary level (class IX and X) school students. The mode 14 indicates that the most repeated score in the achievement in mathematics 14. The calculated skewness (1.455) and kurtosis (2.458) values for secondary level (class IX and X) school students are low indicating the slightly positively skewed and slightly flat nature of the score distribution.

Table3.T.3 Descriptive statistics of the Home Environment with respect to Locality (Urban and Rural):

NAME OF THE SCALE	LOCALITY	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
HOME ENVIRONMENT	URBAN	100	40.0	69.48	68.0	70.0	8.894	0.472	-0.305
	RURAL	100	44.0	69.46	67.5	67	10.163	0.317	-0.493

The descriptive statistics of the home environment (Table 4.T.3) shows that the mean scores are 69.48 and 69.46 for secondary level (class IX and X) school students with standard deviation of 8.894 and 10.163. The median value is calculated as 68 and 67.5 for secondary level (class IX and X) school students. The mode 70.0 and 67.0 indicates that the most repeated scores in the home environment 70 and 67. The calculated skewness (0.472, 0.317) and kurtosis (-0.305,-0.493) values for secondary level (class IX and X) school students are low indicating the slightly negatively kurtosis and slightly flat nature of the score distribution.

Table3.T.4 Descriptive statistics of the Achievement in Mathematics with respect to Locality (Urban and Rural):

NAME OF THE SCALE	LOCALITY	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
ACHIEVEMENT IN MATHEMATICS	URBAN	100	48	23.86	22	22	10.485	1.183	1.216
	RURAL	100	68	24.58	19.5	14	13.331	1.531	2.552

The descriptive statistics of the achievement in mathematics (Table 4.T.4) shows that the mean scores are 23.86 and 24.58 for secondary level (class IX and X) school students with standard deviation of 10.485 and 13.331. The median value calculated as 22.0 and 19.5 for secondary level (class IX and X) school students. The mode 22 and 14 indicates that the most repeated score in the achievement in mathematics 22 and 14. The calculated skewness (1.183,1.531) and kurtosis (1.216,2.552) values for secondary level (class IX and X) school students are low indicating the slightly positively skewed and slightly flat nature of the score distribution.

Table3.T.5 Descriptive statistics of the Home Environment with respect to Gender (Boys and Girls):

NAME OF THE SCALE	GENDER	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
HOME ENVIRONMENT	BOYS	100	45	70.04	70	67	8.854	-0.034	-0.104
	GIRLS	100	39	68.9	66	62	10.166	0.696	-0.450

The descriptive statistics of the home environment (Table 4.T.5) shows that the mean scores are 70.04 and 68.9 for secondary level (class IX and X) school students with standard deviation of 8.854 and 10.166. The median value calculated as 70 and 66 for secondary level (class IX and X) school students. The mode 67 and 62 indicates that the most repeated score in the home environment 67 and 62. The calculated skewness (-0.034,0.696) and kurtosis (-0.104,-0.450) values for secondary level (class IX and X) school students are low indicating the slightly negatively skewed and slightly flat nature of the score distribution.

Table3.T.6 Descriptive statistics of the Achievement in Mathematics with respect to Gender (Boys and Girls):

NAME OF THE SCALE	GENDER	NUMBER OF SAMPLE	RANGE	MEAN	MEDIAN	MODE	S.D.	Skewness	Kurtosis
ACHIEVEMENT IN MATHEMATICS	BOYS	100	67	24.63	20	11	13.972	1.543	2.180
	GIRLS	100	41	23.81	22	22	9.610	0.820	0.046

The descriptive statistics of the achievement in mathematics (Table 4.T.6) shows that the mean scores are 24.63 and 23.81 for secondary level (class IX and X) school students with standard deviation of 13.972 and 9.610. The median value is calculated as 20 and 22 for secondary level (class IX and X) school students. The mode 11 and 22 indicates that the most repeated score in the achievement in mathematics 11 and 22. The calculated skewness (1.543, 0.820) and kurtosis (2.180, 0.046) values for secondary level (class IX and X) school students are low indicating the slightly positively skewed and slightly flat nature of the score distribution.

1.7.3. Hypotheses Testing And Analysis Through T-Test: Two-Sample Assuming Equal Variances

$H_0$1: There is no significance differene between urban and rural of secondary students with respect to their home environment.

Table 3.T.7 showing the significant of difference between the mean scores of urban and rural of secondary level school students with respect to their home environment.

Testing of Hypothesis	Test Variable	Groups	N	Mean	S.D	df	t value	Sig. value (2 tail)	Remark
$H_0$1	Home Environment	Urban	100	69.48	8.894	198	0.0148	0.988	P= .988 at 0.05 level
		Rural	100	69.46	10.163				

From the above table (Table 4.T.4), the results of independent samples t-tests reveal that the calculated t value is 0.0148 and p value is 0.988 which is greater than 0.05 at 0.05 level of significance (p>0.05). Hence $H_0$1 significant (p=0.988) at 0.05 level. So, for the scores on home environment between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant effect between urban and rural students with respect to their level of home environment.

$H_0$2: There is no significance difference between urban and rural of secondary students with respect to their achievement in mathematics.

Table 3.T.8 showing the significant of difference between the mean scores of urban and rural of secondary level school students with respect to their achievement in mathematics.

Testing of Hypothesis	Test Variable	Groups	N	Mean	S.D	df	t value	Sig. value (2 tail)	Remark
$H_0$2	ACHIEVEMENT IN MATHEMATICS	Urban	100	23.86	10.485	198	-0.424	0.671	P=0.671 at 0.05 level
		Rural	100	24.58	13.331				

From the above table (Table 4.T.8), the results of independent samples t-tests reveal that the calculated t values for $H_0$2 significant (p=0.671) at 0.05 level. So, for the scores on achievement in mathematics between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant difference between urban and rural students with respect to their level of home environment.

$H_0$3: There is no significance difference between boys and girls of secondary students with respect to their home environment.

Table 4.T.9 showing the significant of difference between the mean scores of boys and girls of secondary level school students with respect to their home environment.

Testing of Hypothesis	Test Variable	Groups	N	Mean	S.D	df	t value	Sig. value (2 tail)	Remark
$H_0$3	Home Environment	Boys	100	70.04	8.854	198			P=0.399at 0.05 level

		Girls	100	68.9	10.166		0.845	0.399	

From the above table (Table 4.T.9), the results of independent samples t-tests reveal that the calculated t values for $H_0$3 significant (p=0.988) at 0.05 level. So, for the scores on academic interest between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant difference between boys and girls students with respect to their level of home environment.

$H_0$4: There is no significance difference between urban and rural of secondary students with respect to their achievement in mathematics.

Table3.T.10 showing the significant of difference between the mean scores of urban and rural of secondary level school students with respect to their achievement in mathematics.

Testing of Hypothesis	Test Variable	Groups	N	Mean	S.D	df	t value	Sig. value (2 tail)	Remark
$H_0$4	ACHIEVEMENT IN MATHEMATICS	Boys	100	24.63	13.97	198	0.483	0.629	P=0.629 at 0.05 level
		Girls	100	23.81	9.61				

From the above table (Table 4.T.10), the results of independent samples t-tests reveal that the calculated t values for $H_0$4 significant (p=0.988) at 0.05 level. So, for the scores on academic interest between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant difference between boys and girls students with respect to their level of achievement in mathematics.

1.7.4. Hypothesis Testing And Analysis Through Pearson Coefficient Or Correlation And Multiple Regression

Ho5: There has no significant relationship among Rural and Urban secondary students (boys and girls) in their achievement in mathematics influences on home environment.

Table3.T.11 Descriptive statistics:

NAME OF THE SCALE	NUMBER OF SAMPLE	MEAN	S.D.
HOME ENVIRONMENT	200	69.47	9.5264
ACIEVMENT IN MATHEMATICS	200	24.22	11.968

The descriptive statistics of the home environment and achievement in mathematics (Table 4.T.11) shows that the mean scores are 69.47 and 24.22 for secondary level (class IX and X) school students with standard deviation of 9.5264 and 11.968.

Table 3.T.12 Pearson Coefficient Or Correlation And Multiple Regression

		HOME ENVIRONMENT	ACHIEVEMENT IN MATHEMATICS
HOME ENVIRONMENT	Pearson Correlation	1	0.0415**
	Sig. (2-tailed)		.000
	N	200	200

ACHIEVEMENT IN MATHEMATICS	**Pearson Correlation**	**0.0415****	**1**
	Sig. (2-tailed)	**.000**	
	N	**200**	**200**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The coefficient of correlation between home environment and achievement in mathematics of secondary level school students is calculated as .0415 (Table 4.T.12) which is significant at 0.01 level. It indicates that the school students' home environment and academic achievement in mathematics are not significantly related. Therefore, the hypothesis is not rejected and it can be concluded that there is no significant relationship between home environment and academic achievement in mathematics of secondary level (class IX and X) school students.

1.8. Major Findings:

1.8.1. The calculated t value is 0.0148 and p value is 0.988 which is greater than 0.05 at 0.05 level of significance ($p>0.05$). Hence $H_0 1$ significant ($p=0.988$) at 0.05 level. So, for the scores on home environment between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant difference between urban and rural students with respect to their level of home environment.

1.8.2. The calculated t value is -0.424 and p value is 0.671 which is greater than 0.05 at 0.05 level of significance ($p>0.05$). Hence $H_0 2$ significant ($p=0.671$) at 0.05 level. So, for the scores on achievement in mathematics between urban and rural students, the null hypothesis is rejected. It can be commented that there exists significant difference between urban and rural students with respect to their level of achievement in mathematics.

1.8.3. The calculated t value is 0.845 and p value is 0.399 which is greater than 0.05 at 0.05 level of significance ($p>0.05$). Hence $H_0 3$ significant ($p=0.988$) at 0.05 level. So, for the scores on home environment between boys and girls students, the null hypothesis is rejected. It can be commented that there exists significant difference between urban and rural students with respect to their level of home environment.

1.8.4. The calculated t value is 0.483 and p value is 0.629 which is greater than 0.05 at 0.05 level of significance ($p>0.05$). Hence $H_0 4$ significant ($p=0.671$) at 0.05 level. So, for the scores on achievement in mathematics between boys and girls students, the null hypothesis is rejected. It can be commented that there exists significant difference between urban and rural students with respect to their level of achievement in mathematics.

1.8.5. The coefficient of correlation between home environment and achievement in mathematics of secondary level school students is calculated as .0415, which is significant at 0.01 level. It indicates that the school students' home environment and academic achievement in mathematics are not significantly related. Therefore, the hypothesis is not rejected and it can be concluded that there is no significant relationship between home environment and academic achievement in mathematics of secondary school students.

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1.9. Limitations of the Study:

In this particular sector, students improve their skill of objective thinking, power of expression and ability of writing. This sector of the curriculum, although in small time frame, made us not only learn, but also go through various steps of research work.

In this study, the researcher dealt with secondary school students' home environment and their academic achievement in mathematics. The students' gender and locality were considered as categorical variables. The main objective of this study is to find out the relationship between secondary school students' home environment and their academic achievement in mathematics'. Apart from that, the major variables are considered under above mentioned categorical variables.

Descriptive Research Methodology with survey technique has been used in the present study. The present study is quantitative in nature. The researcher has taken 200 samples for this study. After analysis the data, it is shown that very low positive correlation exists between secondary school students' home environment and their academic achievement in mathematics'.

1.10. Discussion and conclusion

1.9.1. There exists significant effect between urban and rural students with respect to their level of home environment.

1.9.2. It can be remarked that there exists significant effect between urban and rural students with respect to their level of home environment.

1.9.3. It can be stated that there exists significant effect between boys and girls students with respect to their level of home environment.

1.9.4. It can be commented that there exists significant effect between boys and girls students with respect to their level of achievement in mathematics.

1.9.5. It can be concluded that there is no significant relationship between home environment and academic achievement in mathematics of secondary school students.

As suggested by NCTE, Ramakrishna Mission Sikshanamandira has included dissertation as an integral part of the M.Ed. curriculum. It gives us opportunity to get a firsthand experience about a research work.

In this particular sector, students improve their skill of objective thinking, power of expression and ability of writing. This sector of the curriculum, although in small time frame, made us not only learn, but also go through various steps of research work. It is very much helpful for our future endeavors

REFERENCES

[1] Kaul, L., (2010). *Methodology of Educational Research.* New Delhi, Vikas Publication.

[2] Kothari, C. R. & Garg, G., (2014). *Research Methodology: Methods and Techniques.* Third Edition. Delhi, New Age International Publication.

[3] Mangal S. K., (2009). *Statistics in Psychology and Education.* Second Edition, New Delhi, PHI Learning Private Ltd.

[4] Mangal S. K., (2011). *Essentials of Educational Psychology.* Fifth printing, New Delhi, PHI Learning Private Ltd.

[5] Adesehinwa, O. A. (2013). Effects of family type (monogamy or polygamy) on students' academic achievement in Nigeria. Intl J. of Psychology and Counselling, 5 (7), 153 – 156 DOI 10.5897/IJPC10.012 ISBN 2141 – 2499

[6] Babara, K.T. (1982). Home environment and learning quantitative synthesis. Journal of Experimental Education, 50(3): 120 128.

[7] Adesehinwa O. A. and Aremu, A. O. (2010). The relationship among predictors of child, family, school, society and the government and academic achievement of senior secondary school students in Ibadan, Nigeria. Procedia Soc. Behav. Sci. 5, 842 – 849.

[8] Akinsanya, O. O., Ajayi, K. O. and Salomi, M. O. (2011). Relative effects of parentaloccupation, qualification and academic motivation of wards on students achievement in senior secondary school mathematics in Ogun State. British J. of Arts and Soc. Sc., 3(2), 242 – 252. ISBN: 2046 - 9578

[9] Diaz, A. L. (2004). Personal, family, and academic factors affecting low achievement in secondary school.

[10] Best, J.W. (2001), "Research in Education" (6th Ed.), New Delhi, Prentice Hall of India.