

Influence of Gender and Parents Education Level on Mathematics Achievement of Madhyamik Passed Students in South 24 Parganas, West Bengal

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Abstract

This study investigated the influence of the parents' level of education on Mathematics achievement of secondary education (Madhyamik) students in South 24 Parganas district of West Bengal. The study utilized a descriptive and inferential survey research design. A sample of 430 Class XI students from 12 schools participated in the study. The sample of the study was selected through simple random sampling techniques. The mathematics score of the Madhyamik examination was used to assess the academic achievement of mathematics. The data were analysed using t-test and F-test inferential statistics on MS Excel and SPSS-23. The result showed that Mathematics achievement was not gender-independent. Male students generally achieved higher mathematics scores, than female students. Further, data showed that the parents' education levels have significant influence on the mathematics achievement. The finding indicated that higher parents' education were indeed amenities to the acquisition of higher scores in mathematics.

Keywords: Parents level of education, mathematics achievement, secondary education

Introduction

Education has an indispensable role in nation-building as well as improvement of an individual character. It is a tool which can be used for the future generation to inculcate value, sense, proficiency and competencies. Education of a child needs very serious endeavor. A child spends most of his time at home with the members of family and the diverse type of environment he or she is brought in also assimilates their emotional and cognitive development. The learners, teachers, schools and parents all play a vital character in the process of learning. The academic background of the parents' is such an inspiring factor for a child and influences his/her future.

Parents' level of education may have impact on children's academic achievements. However, for parents to positively motivate

their children to execute better, they need to have the means and be aware of the need for education so that enough support in terms of material and finances can be given to their wards (Bakari, 1997). According to Davis – Kean (2005) parental educational status is a necessary predictor of children's educational and behavioral outcomes. Studies by Grisemer, Kirby and Williamson (1994) and Okantey (2008) reported that parents' status of education is a strong predictor of academic achievement of students. According to Young and Smith (1997) students of well-educated parents on an average achieve better on academic assessment tests than students of only high-school-educated parents. Khan, Iqbal and Tasneem (2015) pointed out that there is a relationship between the parents' level of education to their children's academic performances. A mother's education has a higher dominance than father's, so mother's

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education is more significant. Ogoye (2007) reported at Mombasa, Kenya, that illiterate parents were unable to guide their children with homework.

Literature review

Qadri (2018) in Hyderabad district conducted a study of parental educational level and academic performance of 500 secondary school students. He used their last examination results to measure academic achievement of students. The result indicated that there is a significant association between parents' education and level of academic performance of students.

Imam & Singh (2015) conducted a study in central Uttar Pradesh on the influence of gender, parental education on mathematics achievement of 1127 secondary school students. The results indicate that male as well as female students were equally good in mathematics achievement. However, he found that children of highly educated parents are likely to have significantly higher mathematics achievement scores as compared to the children of lesser educated parents.

Kundu (2017) in Bankura district conducted a study of parents' educational status and students' performance of geometry on 351 Class XI learners. The result indicated a significant difference between parent qualification and student geometry thinking. **However, he found that higher parental qualifications resulted in higher levels of geometric thinking of students.**

Panneer Selvam (2013) in Taluk of Namakkal districts studied effect of parental education and students' achievement on 150 Class XI students. He used an achievement test of vector analysis of 50 marks. The result showed that there is no significant difference between male and female, rural and urban, literate and illiterate parents of higher secondary students with respect to the impact of parents' education. However, he found a significant difference among government, aided and higher secondary

students with respect to influence of parents' education.

Nigure and Amollo (2017) in Nairobi, conducted a study influence of parents' education level on academic achievement of pre-school children in Embakasi on 27 parents, 27 children and 5 teachers. The result indicated that most parents had low academic performance since majority of them were KCSE certificate holders and hence were not suitable to assist their children on academic matters leading to poor academic performances.

Amuda and Ali (2016) in North eastern state of Nigeria conducted a study on parent's level of education and academic achievement of NCE students of colleges of education on 1200 sample out of a population 13529 NCE students from six colleges. The result indicates that father's and mother's levels of education were not significant predictors of academic achievement. However, they found that there was no significant relationship between parents' level of education and academic performance.

Baliyan, Rao and Baliyan (2012) conducted a study on the influence of parental education on the performance of 168 senior secondary students in Botswana. The result indicates that the level of father's education was found to be higher than that of the mother's. However, they found that mother's and father's education levels have significant impact on the achievement of students in mathematics which indicate that these factors are significant predictors of the achievement of student mathematics.

Azhar, Nadeem, Naz, Parveen (2013) conducted a study on the influence of parental education and socio-economic status on the performance of 250 university students in Pakistan. The results indicate that the students belonging to strong financial status perform better than those who face financial problems. However, they found that parental education boosts up their children's achievements.

The literature review identifies studies

that suggest parental education influences students' achievements in Mathematics and other studies that don't. This entire section could be significantly condensed by stating the conclusion and then referring the studies that arrived at such conclusion, instead of repeating this for each study.

Rationale of the study

The secondary level is vital because it is the gateway to a successful professional and social life. **As the researcher is a mathematics teacher-educator, he got attracted to find out the possible reasons among the Class XI standard students, if there exist any gender differences influence of parents' education level achievement in mathematics.** The research is restricted to the students of Class XI, as they are at an essential stage where, after the completion of first public examination they will be ready to study various streams of study there by paving the way for their future career.

Based on the literature review, the limited research carried out the parents' education level and their academic performance in mathematics of students especially in India. Hence this present study focuses on parent educational status and academic performance in mathematics that has a **dynamic** value in teaching-learning the **parents' children dynamic.**

Objectives of the study

- i To measure the level of parents' education of Madhyamik-pass students.
- ii To find out the difference between male and female with respect to academic achievements in mathematics of Madhyamik-passed students.
- iii To find out the relationship between father's education and academic achievements in mathematics of Madhyamik-passed students.
- iv To find out the relationship between

mother's education and academic achievements in mathematics of Madhyamik-passed students.

Hypotheses

H0G: There is no significant difference in academic achievements of Madhyamik-passed students in mathematics between the two gender groups.

H0F: There is no significant difference in academic achievements of Madhyamik-passed students in mathematics among the five-father education level.

H0M: There is no significant difference in academic achievement of Madhyamik passed students in mathematics among the five-mother education level.

Methodology

Research Design:

The study was a survey based on quantitative techniques. The researcher surveyed parents' level of education and academic performance in mathematics of Class XI students.

Sample of the study

Population of the study consisted of Madhyamik-passed students in South 24 Parganas.

The population of this study comprise of boys and girls studying in Class XI in West Bengal Council of Higher Secondary Schools of South 24 Parganas. Two subdivisions from the five subdivisions of South 24 Parganas district were randomly selected. Two blocks from each sub division were randomly selected. Three schools were randomly selected from each block.

The sample consisted of 430 Class XI learners all of whom were present on that particular date of data collection from 12 schools. Formal approvals from the school heads were obtained in order to conduct this research.

Table 1 : Multistage random sampling strategy employed across South 24 parganas district numerically.

District	Sub-divisions	Blocks	No. of Schools	No. of Students
South-24 Parganas	Baruipur	Baruipur	3	125
		Sonarpur	3	119
	Diamond Harbour	Mandir Bazar	3	95
		Magrahat -II	3	91
			Total:12	Total : 430

Table 1A : Streams-wise and Gender-wise distribution of participating students

Gender	Streams			Total
	Science	Arts	Commerce	
Male	93 (34.8%)	80 (30.0%)	94 (35.2%)	267 (62.1%)
Female	37 (22.7%)	89 (54.6%)	37 (22.7%)	163 (37.9%)
Total	130 (30.2%)	169 (39.3%)	131 (30.5%)	430(100%)

Delimitation of the study

Sample was collected from schools affiliated to West Bengal Council of Higher secondary Education, in only South 24 Parganas district of West Bengal.

Tool employed

'The Interview Schedule' it consisted of particular information about the participants that is name, age, gender, stream, name of school, medium of instruction, marks obtained in mathematics in Madhyamik examination, father's and mother's education level, etc. The interview schedule was administered on an individual basis in quiet and peaceful environments. The respondent was first put to light conservation and the interview schedule was gradually and orally administered.

Data analysis

The researcher personally visited the schools for the collection of data. The interview schedule was administered to the sample and the responses were scored and tabulated, and subjected to descriptive and inferential statistics.

Objective:

- i To measure the level of parents' education of Madhyamik-passed students.

The mathematics scores and parents' education levels were tabulated and analysed with reference to:

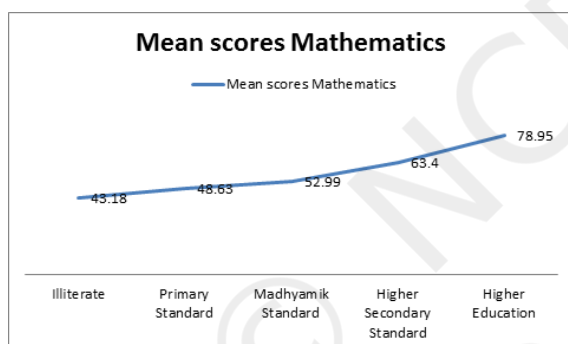
- Father's education level-wise analysis
- Mother's education level-wise analysis

Table 2 : The descriptive statistics of father's education level pertaining to the 430 samples are shown below:

Father's education Level	Illiterate	Primary Standard	Madhyamik Standard	Higher Secondary Standard	Higher Education
N=430	19 (4.4%)	114 (26.5%)	109 (25.3%)	57 (13.3%)	131 (30.5%)
Math Scores: Mean	43.18	48.63	52.99	63.40	78.95
Math Scores: Std. Div.	14.91	20.49	20.49	21.34	19.93
95% confidence interval for Mean	38.75 to 48.51	43.42 to 52.95	49.10 to 56.88	57.74 to 69.07	75.50 to 82.39

(Source: Primary data from field study)

From the above table, it is inferred that there are 4.4 per cent minimum number of fathers who are illiterate, 26.5 per cent of fathers have primary-standard education level, 25.3 per cent of fathers have madhyamik-standard education level, 13.3 per cent of fathers are having higher secondary standard education level and maximum 30.5 per cent number of fathers are higher educated.

**Figure 1** Father's education level-wise mean achievement scores in

Mathematics

Only participations with comparatively low scores in mathematics had fathers who were

Table 3 : Descriptive statistics of mother's education level pertaining to the 430 samples

Mother's education Level	Illiterate	Primary Standard	Madhyamik Standard	Higher Secondary Standard	Higher Education
N=430	45(10.5%)	138 (32.1%)	102 (23.7%)	61 (14.2%)	84(19.5%)
Math Scores: Mean	44.07	49.15	56.25	69.05	85.79
Math Scores: Std. Div.	16.59	18.61	18.97	20.24	16.27
95% confidence interval for Mean	39.08 to 49.05	46.02 to 52.28	52.52 to 59.97	63.87 to 74.23	82.25 to 89.32

illiterate.

Some of the students whose fathers were illiterate achieved better marks but had not obtained full marks. Students with higher scores in mathematics had a remarkable number of fathers who were graduates or were more educated. Average mathematics score of participants is 43.18 had fathers who were illiterate. Average mathematics scores of participants is 48.63 had fathers who were Primary standard education level. Average mathematics scores of participants is 52.99 had fathers who were Madhyamik standard education level. Average mathematics scores of participants are 63.4 and 78.95 had fathers who were higher secondary and higher education level respectively. Participation of students with illiterate fathers those who were to comparatively better in education levels were average mathematics scores monotonically increasing. Thus, this indicated that the fathers' education level was related to the students' mathematics achievement.

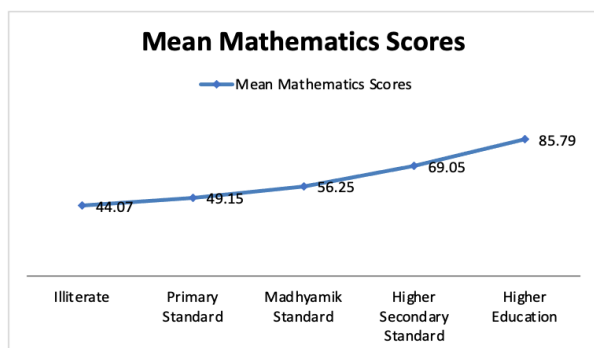


Figure: 2 Mother's education level-wise mean achievement scores in Mathematics

Only participations with comparatively low scores in mathematics had mother who were illiterate. Some of the students whose mothers were illiterate achieved better marks but not obtained full marks. Students with higher scores in mathematics had a remarkable number of mothers who were graduates or were more educated. Average mathematics scores of participants is 44.07 had mothers who were illiterate. Average mathematics scores of participants is 49.15 had mothers who were Primary standard education level. Average mathematics scores

of participants is 56.25 had mothers who were Madhyamik standard education level. Average mathematics scores of participants are 69.05 and 85.79 had mothers who were higher secondary and higher education level respectively. Participation of students whose mothers had illiterate to comparatively better in education levels were average mathematics scores monotonically increasing. Thus, this indicated that the mothers' education level was related to the students' mathematics achievement.

Objective:

- ii To find out the mean difference between male and female with respect to academic achievement in mathematics of madhyamik-passed students.

The null hypothesis is

H_{0G} : There is no significant difference in academic achievement of madhyamik-passed students in mathematics between the two gender groups.

The descriptive and inferential statistics of mathematics achievement scores pertaining to each gender is shown below:

Table 4 : Significant difference between Male and Female of Madhyamik passed students with respect to achievement in mathematics.

Gender	N	Mean	Std. Div.	t- value	Df	Sig (2 tailed)
Male	267	64.01	22.46	4.341	428	.000
Female	163	54.17	23.35			(Significant)

The t-test shows that the difference between the gender groups is significant at 1% level. Thus, H_{0G} is to be rejected, and there is a significant difference in mathematics achievement between male and female. Table 4 shows that male shows higher mathematics achievement than female. Hence, it can be concluded that, there exists a significant gender wise difference in mathematics achievement in favour of the male.

Objective:

- iii To find out the relationship between father education and academic achievement

in mathematics of Madhyamik passed students.

The null hypothesis is

H_{0F} : There is no significant difference in academic achievement of Madhyamik-passed students in mathematics among the five-father education level.

The inferential statistics of mathematics achievement scores pertaining to each father's education level is shown below:

Table 5: Significant difference among father's education level of Madhyamik-passed students with respect to achievement in mathematics.

ANOVA

Table 5 : One Way Mathematics Achievement by Father's Education Levels0

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	77222.062	4	19305.516	52.882	.000
Within Groups	155152.889	425	365.066		
Total	232374.951	429			

The F test shows that the difference in mathematics achievement among the father's education level is significant. Therefore, H₀ is to be rejected, and this is a significant difference in mathematics achievement among different father's education level.

To find out where this difference lies, the t-tests were carried out between 'Illiterate and Primary standard', 'Primary standard and Madhyamik standard', 'Madhyamik standard and Higher secondary standard' and 'Higher secondary standard and Higher education' Levels. These tests

show that 'Primary standard and Madhyamik standard', 'Madhyamik standard and Higher secondary standard' and 'Higher secondary standard and Higher education' levels are significant at 1 per cent level but 'Illiterate and Primary standard', is not significant.

Since the table is self-explanatory, the textual descriptions can be made far more concise. Also, the ANOVA tables can be clubbed with the earlier table/graph showing the data collected on Maths scores and parental education levels.

Table 6 : A summary of the t- tests is as follows:

Mathematics Achievement between different Father's education levellevel			
Illiterate and Primary Standard	Primary Standard and Madhyamik standard	Madhyamik Standard Higher secondary standard	Higher Secondary Standard and Higher education standard
t-value: 0.625 Sig.: .533 Not significant	t-value: -2.846 Sig.: 0.005 Significant*	t-value: -3.065 Sig.: .003 Significant*	t-value: -4.810 Sig.: .000 Significant*

- : 1% level of significant

Therefore, one may conclude that the mothers' education level has an influence on the students' mathematics achievement. That is, mothers with higher education are more likely to have children with higher mathematics achievement. Unfortunately, children of mothers who are illiterate appear to suffer in this regard.

Objective:

- To find out the relationship between mother education and academic achievement in mathematics of Madhyamik passed

students.

The null hypothesis is

H_{0M}: There is no significant difference in academic achievement of Madhyamik passed students in mathematics among the five-mother education level.

The inferential statistics of mathematics achievement scores pertaining to each mother's education level is shown below: Table 5: Significant difference among mother's education level of Madhyamik passed students with respect to achievement in mathematics.

Table 7 0: One-way Mathematics Achievement by Mother's Education Level

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	89914.479	4	22478.620	67.060	.000
Within Groups	142460.472	425	335.201		
Total	232374.951	429			

The F test shows that the difference in mathematics achievement among the mother's education level is significant. Therefore, HOM is to be rejected, and this is a significant difference in mathematics achievement among different mother's education level.

To find out where this difference lies, the t- tests were carried out between 'Illiterate and Primary standard', 'Primary standard and Madhyamik standard', 'Madhyamik standard and Higher secondary standard' and 'Higher secondary standard and Higher

education' levels. These tests show that 'Primary standard and Madhyamik standard', 'Madhyamik standard and Higher secondary standard' and 'Higher secondary standard and Higher education' levels are significant at 1 per cent level but 'Illiterate and Primary standard', is not significant. Since the table is self-explanatory, the textual descriptions can be made far more concise. Also, the ANOVA tables can be clubbed with the earlier table/graph showing the data collected on Mathematics scores and parental education levels

Table 8 : A summary of the t- tests is as follows:

Mathematics Achievement between different Mother's education level			
Illiterate and Primary Standard	Primary Standard and Madhyamik standard	Madhyamik Standard Higher Secondary standard	Madhyamik Standard Higher Secondary standard
t-value: -1.633 Sig.: .104 Not significant	t-value: -2.895 Sig.: .004 Significant*	t-value: -4.066 Sig.: .000 Significant*	t-value: -5.515 Sig.: .000 Significant*

Conclusion

Based on the findings of this study, it was concluded that the students' performance in Mathematics is influenced by the qualifications of their parents. In other words, the main source of acculterization, by reasoning, attunes to the adoption of knowledge by the students in the family (Kundu & Ghose, 2015). In this case, the acquisition of visual spatial skill and numeracy ideas depends on the educational level of the both father and mother. Comparatively more educated parents are more likely to belief of the gravity of

mathematics on their children's lives. Thus, they transmit their positive feelings and attitudes to their children (Hong, You & Wu, 2010). Once students are exposed to positive mathematics feelings and attitudes, their intrinsic motivation towards mathematics can increase (Gottfried, Gottfried, & Oliver, 2009) and they want to be in concord with the present findings. For example, Demir, Kilic and Unal (2010) find that students whose parents are highly enlightened and manifested to mathematics in their lives tend to show more success in mathematics than peers whose parents are less acquainted and not exposed to mathematics. Because

highly acquainted parents know the learning requirements and provide opportunities for the congenial educational ambience for their children (Alomar, 2006), their children are exposed earlier to mathematics in the most effective educational environment.

The above data analysis revealed that females lag behind males in mathematics achievement. This is not surprising, given the social background from which the sample was taken. Mathematics is supposed to be a subject with male bias (Alex & Mammen, 2014); subject which can propel boys into careers. Females are not expected to like mathematics, but to be inclined towards more 'cultural' pursuits like the study of humanities and arts. Thus, perceived gender roles play a decisive part in the preference of subjects of study. This, in fact, is not peculiar to Indian cultures alone, but rampant in most other parts of the world (Billington, 2007; Wentzel, 1998). However, perceptions in the contemporary world have changed, and more girls are inclined to take up careers that may require mathematical and geometrical skills (Eisenberg, Martin and Fabes, 1996). Psychologically speaking, literature indicates that girls are less skillful at visual activities than boys (Corballis,

1997; Harris et al. 2000; Milivojevic, Hamm and Corballis, 2009). Other literature refutes this idea and attributes the gender-wise difference to social drawbacks (Halat, 2006; Alex and Mammen, 2014). This idea is reinforced by data which show that the gender gap is closing over recent times as people learn to circumvent social mores (Panneer Selvam, 2013, Eisenberg, Martin and Fabes, 1996).

The 'Genetic inheritance versus Environmental factor to human development' debate is one of the oldest issues in psychology. The debate has not been solved and it remains that with the right kind of nurturance children may be able to develop with more awareness and greater rational sense and hence enhanced power of conceptualisation. Consequently, children of educated parents have the favour of being enveloped within an ambience of discourse that is directly or indirectly affected by their cultivated knowledge. Educators are constantly concerned with the inharmonious performance of the learners in different branches of mathematics. The inferences of this research identified a remarkable factor that could explain why learners experience difficulties with school mathematics.

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