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Factors influencing academic achievement in Mathematics

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Abstract
Mathematics is just not only the subject to study at schools but it is a life line for future India as it accelerate the social, Economical and technological growth of nation in general and an individual in particular. The study period was 2016-17. Data is collected through questionnaire. Only 89 of the respondents from the universe responded. Multiple regression analysis was employed to test the formulated hypothesis. The study found that variables Caste, Attendance and Favourite subject were shown significant in academic achievement of the student in Mathematics. Among the three significant independent variables Attendance registered highest impact followed by Caste and favourite subjects in academic achievement of the student in Mathematics.

Keywords: academic achievement, co-curricular activity, extracurricular activity, mathematics

Introduction

Majority of parents of secondary classes have been experiencing that their children work day in day out to complete their assignments, projects, activities etc., suggested by their school teachers in Mathematics but still they lag behind in this subject and unable to gain confidence at the cost of even their childhood. They attend the regular classes at school and also attend private tuitions yet their performance in mathematics is not up to the mark. Most of the students spend more than half of their free time for this subject alone leaving other subjects for gaining confidence and improve academic achievement in Mathematics but still they couldn't. These perceptions speak the importance and relevance of the subject Mathematics in daily life.

For the progress of the nation, economic and technological growth is pivotal with social harmony. Mathematics is just not only the subject to study at schools but it is a life line for future India as it accelerate the social, economical and technological growth of nation in general and an individual in particular. Mathematics is the subject that not only enhances confidence in other subjects besides preparing the generation for future India. Therefore every individual had an inner feeling that once they excel in mathematics they can do much better in all subjects in school curriculum and lead the life comfortably.

Correlation with other subjects had placed Mathematics at summit. It is difficult to say this particular domain or that does not have correlation with Mathematics. Mathematics is correlated with Physics, Chemistry, Biology, Engineering, Social Sciences, Languages, Art, Music, Architecture, Medicine, Accounting what else. Everything in nature had direct or indirect association with this amazing subject. Therefore every parent had an expectation that their children should excel in this dominated subject.

To excel in any subject many factors play vital role viz., schools, environment, teachers, gender, caste, religion, parents education, financial status of parents, employment of parents, attendance to the school, rural urban residence, number of siblings, co curricular activities, extracurricular activities besides their interest in the subject. Mathematics had no exception from these factors.

Muhammad Daniyal *et al*. (2012) [3] concluded in their study that "participation in the co-curricular activities, sports and athletics improve the performance of students in their studies".

Marsh & Kleitman (2002) [2], stated in their study that "most of the co-curricular activities have found to be good in constructing and enhancing academic performance of the students although they do not have direct relationship with their academic subjects".

Broh (2002) [1] concluded that "impact of the sports activities on the academic studies is inconsistent".

Naheed Zahoor (2007) [5] found that " School Building and Infrastructure, available Facilities and Amenities, School Discipline that encompasses Students, Teachers and the Head of Schools, the Socio-economic Status of Student's Parents and overall School Environment carry considerable weight in determining the Student's Performance and in turn the choice of school".

William Tyler (1975) [4], in his study stated that "the school environments make little difference to achievement, credentials and to life chances. He further stated that education is often considered as a process of achievement and personal growth, and as a means for the enlargement of life chances".

Therefore the investigator intended to study the factors influencing the academic achievement in Mathematics and as such the present study is entitled as Factors Influencing Academic Achievement in Mathematics.

Objectives

The objective of the present study is to find out the factors influencing the academic achievement in Mathematics.

Hypotheses

The following hypotheses were formulated to find out the factors influencing the academic achievement of the students in Mathematics.

H_1: Religion has a significant effect on academic achievement of the student in Mathematics.

H_2: Caste has a significant effect on academic achievement of the student in Mathematics.

H_3: Father's qualification has a significant effect on academic achievement of the student in Mathematics.

H_4: Mother's qualification has a significant effect on academic achievement of the student in Mathematics.

H_5: Family income has a significant effect on academic achievement of the student in Mathematics.

H_6: Gender has a significant effect on academic achievement of the student in Mathematics.

H_7: Attendance to the school has a significant effect on academic achievement of the student in Mathematics.

H_8: Rural urban residence has a significant effect on academic achievement of the student in Mathematics.

H_9: Favourite subject has a significant effect on academic achievement of the student in Mathematics.

H_{10}: Number of siblings in the family has a significant effect on academic achievement of the student in Mathematics.

H_{11}: Extracurricular activities have a significant effect on academic achievement of the student in Mathematics.

H_{12}: Cocurricular activities have a significant effect on academic achievement of the student in Mathematics.

Methodology

For this study the students on the rolls of class X students of Kendriya Vidylaya and ST Mary School in Kotnoor- D village of Kalabuargi district form the universe. All the students in the universe were considered for data collection. The study period was 2016-17. Data is collected through questionnaire. Only 89 of the respondents from the universe responded. The collected data was classified and tabulated according to the socio-economic variables as per the requirements of the objective. Multiple regression analysis was employed to test the formulated hypothesis.

Discussion

Table 1: Distribution of respondents by the gender and attendance based on Rural-urban residency.

		Residence					
		Rural			**Urban**		
		attendance			**attendance**		
		above 75%	**50 % to 75%**	**Less than 50%**	**above 75%**	**50 % to 75%**	**Less than 50%**
		Count	Count	Count	Count	Count	Count
Gender of student	Male	23 (65.71%)	8 (88.89%)	0 (0%)	25 (60.98%)	3 (75.00%)	0 (0%)
	Female	12 (34.29%)	1 (11.11%)	0 (0%)	16 (39.02%)	1 (25.00%)	0 (0%)
	Total	35 (100.00%)	9 (100.00%)	0 (0%)	41 (100.00%)	4 (100.00%)	0 (0%)

***Source*:** Primary data.

Table-1 states the distribution of respondents by gender and attendance based on rural urban residency. All students have registered more than 50% attendance irrespective of gender while as 81.36 percent of boys and 90.32% of girls have registered more than 75percent attendance. Like any other place Kendriya vidyalaya, Kalaburagi had also registered number of boys were proportionately much higher than number of girls studying in class X.

To test the hypothesis academic achievement of the student in mathematics by different factors, the variable academic achievement is considered as dependent variable where as demographic, social, financial, educational, institutional specific variables were considered as independent variable. Multiple regression analysis was employed to test the formulated hypothesis.

The results of the multiple regression analysis were presented in the following tables.

Table-2 presents the values of R, R square and adjusted R squares. R is considered as one of the measures of the quality of the prediction of dependent variable. In the present study R value of 0.684 indicates good level of prediction. Hence the independent variables considered in the study viz., Religion, Caste, Father's qualification, Mother's qualifications, Father's employment, Mother's employment, Family income, Gender, Attendance, Residence, Favourite subject, Number of siblings in the family, Extra Curricular Activity and Cocurricular activity clearly explain their effect on the academic achievement in mathematics.

To check further whether the overall regression model used in the present study good fit for the data or not, ANOVA test is conducted and the results were presented in the following table.

Table 2

Model Summary[b]										
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**					**Durbin-Watson**
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**	
1	**0.684[a]**	**0.467**	**0.368**	**1.773**	**.467**	**4.697**	**14**	**75**	**.000**	**1.737**
a. Predictors: (Constant), Cocurricular activity, mothers employment, fathers employment, caste, No of siblings in the family, Favourite subject, Gender of student, Extra Curricular Activity, attendance, religion, Residence, family income, mothers qualifications, fathers qualification										
b. Dependent Variable: Academic Achievement										

***Source*:** SPSS output.

Table 3

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	206.728	14	14.766	4.697	.000[b]
	Residual	235.761	75	3.143		
	Total	442.489	89			
a. Dependent Variable: academic achievement						
b. Predictors: (Constant), Cocurricular activity, mothers employment, fathers employment, caste, No of siblings in the family, Favourite subject, Gender of student, Extra Curricular Activity, attendance, religion, Residence, family income, mothers qualifications, fathers qualification						

Source: SPSS output

Form the table-3, it is clear that the independent variables taken in the present study were statistically significant in predicting the dependent variable i.e., academic achievement as p value is less than 0.005.

The table -4 explains the statistical significance of each independent variable. Accordingly the variables Caste, Attendance and Favourite subject were shown significant and rest were not shown in any significance in the present study. Among the three significant independent variables Attendance registered highest impact followed by Caste and favourite subjects in academic achievement.

Table 4

Coefficients[a]										
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**95.0% Confidence Interval for B**		**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	**Tolerance**	**VIF**
1	(Constant)	14.843	2.102		7.061	.000	10.655	19.031		
	Religion	-.303	.856	-.035	-.354	.724	-2.008	1.401	.737	1.356
	Caste	.496	.222	.211	2.236	.028	.054	.937	.802	1.247
	Fathers qualification	-.161	.284	-.076	-.567	.572	-.726	.404	.391	2.561
	Mothers qualifications	-.119	.234	-.064	-.508	.613	-.585	.347	.449	2.229
	Father's employment	-.040	.074	-.050	-.550	.584	-.187	.106	.857	1.166
	Mother's employment	.029	.136	.022	.215	.831	-.242	.300	.659	1.517
	Family income	-.431	.267	-.208	-.614	.111	-.963	.101	.426	2.348
	Gender	-.034	.191	-.017	-.176	.861	-.414	.347	.769	1.300
	Attendance	1.362	.582	.223	2.340	.022	.203	2.521	.785	1.274
	Residence	-.374	.450	-.084	-.832	.408	-1.270	.521	.691	1.447
	Favourite subject	.158	.076	.192	2.093	.040	.008	.309	.841	1.188
	Number of siblings in the family	.073	.096	.071	.760	.450	-.119	.265	.817	1.223
	Extra Curricular Activity	-.267	.193	-.129	-.387	.170	-.651	.117	.820	1.219
	Cocurricular activity	-.126	.158	-.075	-.795	.429	-.440	.189	.807	1.239
a. Dependent Variable: Academic Achievement										

***Source*:** SPSS output.

In this study, it is also found that there is no collinearity exists among the independent variables as Variance Inflated Factor (VIF) shown in the table is within the limit of 10.

Conclusions

The study found that there exists no collinearity among the independent variables viz., Religion, Caste, Father's qualification, Mother's qualifications, Father's employment, Mother's employment, Family income, Gender, Attendance, Residence, Favourite subject, Number of siblings in the family, Extra Curricular Activity and Cocurricular activity.

The study found that variables Caste, Attendance and Favourite subject were shown significant in academic achievement of the student in Mathematics while as the remaing stated independent variables were not shown in any significance in the present study. Among the three significant independent variables Attendance registered highest impact followed by Caste and favourite subjects in academic achievement of the student in Mathematics.

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