

EFFECTS OF HOUSEHOLD FACTORS AND TYPE OF
SCHOOL MANAGEMENT ON EDUCATIONAL
PERFORMANCE OF PRIMARY SCHOOL CHILDREN IN
NAVI MUMBAI

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Abstract:

Present paper attempts to find the effects of household level socioeconomic factors and type of school management on the educational performance of primary school children of Navi Mumbai. The city has three types of management of primary schools, namely, Zillha Parishad; Navi Mumbai Municipal Corporation and Private. The total number of primary schools (having Class 1 to 7) in Navi Mumbai were 121. A sample of 24 schools was selected using Simple Random Sampling method. Through personal visits to selected schools and in each of the class from 1st to 7th two students -- one “brightest” and the other “poorest” in the class were identified by class teacher. The households of these two types of students were contacted and data on socioeconomic characteristics were collected from 336 [i.e, 2x7x24] students’ households. **Logistic regression** is used to find the effects of selected household variables and type of school management on the dependent variable with two outcomes – brightest student and poorest student. At household level parents education and father’s job had dominant effect on their child’s educational performance; whereas, children of ZP schools had relatively better performance as compared to students of NMMC or Private schools.

Key Words: Education; Primary School; logistic regression; Performance

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1. Introduction

Academic achievement determines the student's performance in the class. It gives children an opportunity to develop their talents, improve their grades and prepare for the future academic challenges. It has been found that socioeconomic factors at their household level play a significant role in student's overall growth and development. It is rightly said that a child's learning starts from home which leaves an everlasting impact throughout his/her life. Economically less privileged or unemployed parents may not meet the needs of their children fully. Inadequate resources available may create conflict in the family. Such a state of affairs may influence the parent-child relationship and subsequently the academic achievements of the child.

Most of the studies take into consideration only quantitative aspects of education. So far very few attempts have been made to analyse relationship between level of socioeconomic development and quality of education. For a long time, educators and researchers debated on which school or household variables influence students' achievement. According to the study of Kingdon (1996) on Indian children, home background and school influence were found both important contributors to student's achievements. In a study of US children, Bauer (2004) pointed out that student performance may be affected by a number of factors, including what's taught in school, - A student's native intelligence and out-of-school learning opportunities that are heavily influenced by a student's home environment.

A binary logistic regression models is developed to measure the impact of household level socioeconomic factors of the students on their educational performance in the class. This paper tries to answer the question "Are the socioeconomic factors at parental level responsible for extreme (brightest, dullest) educational performance of student?" The academic performance of primary student is determined by the marks obtained by students in final exam. There are hardly any studies which has employed logistic regression on primary school result although logistic regression analysis may be successfully applied in social science, demography and biostatistics.

2. Review of Literature

Hailpern and Visintainer (2003) applied the logistic regression to a study of risk factors associated with periventricular leucomalacia and intraventricular hemorrhage in neonates. Eboli

and Mazzulla (2009) developed the model using the logistic regression approach to explore a methodology useful for measuring airport service quality by taking into account the passenger's point-of-view. Strombergsson (2009) applied the logistic regression to a study children's recognition from their own recorded voices. The application to data is from a study of children's ability to identify which of 4 recordings is their own voice. 45 children participated as subjects. Das and Rahman (2011) developed an ordinal logistic regression model to identify the determinants of child malnutrition. Saha and Sarmah (2012) developed the stochastic model of grading pattern, where grades are supposed to be influenced by environmental parameter. Balfanz and Byrnes (2006) studied the mathematics achievement gap in high-poverty middle schools of United States. The binary logistic regression model revealed that classroom and school level factors are able to affect the mathematics achievement gap than other. Students at schools implementing the whole-school reform models made greater progress in closing the mathematics achievement gap than at the other 23 high-poverty, high-minority schools in their district.

3. Methods and Material

This paper analyse academic achievement of students of primary schools of Navi Mumbai- a planned city adjacent to financial capital of India –Mumbai. Among the primary schools in the city, there are 121 schools having class 1 to class 7. A representative sample of 20% of schools has been selected using random number tables from the list of each of the three types of schools management. The data of academic performance of 11078 students who appeared in exam was collected from class 1 to class 7 from each 24 schools through structured questionnaire. There were 3699 students from 7 Navi Mumbai Municipal Corporation (NMMC) school, 2677 students from 10 Zilha Parishad (ZP) schools and 4702 students from 7 private schools. After obtaining the subject wise grade for each student, the overall marks obtained by the students was calculated by the author. The address of the students who stood first and last in final examination was obtained from every school. Thus 14 households (class one to seven) of those students, who got maximum marks and who secured minimum marks in final exam were surveyed for each school. The socioeconomic data from the household such as age, sex, education, marital status, employment status, type of job and income, relation with the head of the households of member

of the family was collected from the 336 [24 schools]*{14 students from each school}} households.

It is hypothesised that academic performance of students are affected by household level socioeconomic parameters viz. father's and mother's education level, household income, type of occupation of father along with the effect of type of school management.

4. Rationale of Selection of Variables in the Model

4.1 Dependent variable

Academic achievement or (academic) performance of student is the outcome which is dependent on a host of factors – both at household level and school level of education. An assessment of quality of primary education can best be judged by performance of students in examination. India's education system is predominantly examination-oriented, where passing examinations is the benchmark for academic performance of student. There is no internal system of monitoring learning achievements at other levels within an education system in India.

4.2 Predictors: Household Factors

The socioeconomic background of households is an important factor in determining the educational performance of student in school and thus the quality of education. A child that comes from an educated family would like to follow the steps of his/her family members which may have direct bearing on his/her educational performance in school. The role of parents is equally important in inculcating high social, cultural and ethical values in making their children a good future citizen of the country. Further, educated parents may motivate their children to be regular and punctual in attending the school. Their meeting with teachers from time to time to enquire the progress of their child may improve his/her educational performance and thus may find the school a better place of learning.

4.2.1 Fathers Education

There is an impact of father's education on child's learning outcomes. The parent's involvement in a child's education makes a very positive difference. Children get motivation and inspiration from father and this create enthusiasm in children not only in academics but in other activities of their overall growth and development. Studies revealed that children, whose father was graduate or more, had better educational performance than those who did not had even school education. Several studies (see Goldman, 2005, Roopnarine et al, 2006) have shown direct association between father's education and child's learning achievement, such as better exam / test / class

results; greater progress at school; better attitudes towards school and teachers and also higher educational aspirations. Therefore father's education is a vital factor in academic achievement of student.

4.2.2 Mother's Education

The mother of a child may be the role model for him/her. Her education may affect directly on child's development and his/her overall growth. The direct effect of mother's education not only helps the child in getting mother's guidance in completing school's home work/assignment but also creates home learning environment. Magnuson and McGroder (2000) found that in US an increase in mother's education is significantly and positively associated with child's academic school readiness, and negatively associated with his/her academic problems. Therefore mother's education can be considered as one of the important factors in academic performance of the student.

4.2.3 Father's Occupation

A number of researchers have found a positive association between father's occupation and child's educational achievement and attainment. If father had better occupation (white collar job) then the child is likely to have better educational performance at School. A child may acquire high achievement motivation from the father who had better job as compared to those children whose father was in blue collar occupations. Hence father's occupation seems to have effect on student academic performance.

4.2.4 Household Income

Household income may have effect on academic achievements of student. Firstly, higher income households have a choice of selection of school (generally the child of such family goes to a Private School); secondly parents can provide better study material including computer; thirdly; they may provide the child a tutor or send him/her to coaching classes, In this way household income plays a significant role in learning and overall growth and development of the child. Past research has established that low-income students are at a disadvantage in terms of educational attainment (Jonathan, 2012). This is in conformity with the findings of Lang and Ruud (1986) who demonstrated that people from a background of lower socioeconomic status tend to progress through school more slowly than the general population. Thus household income seems to be an important factor in influencing the academic achievement of student.

4.2.5 Type of School Management

Academic performance of students depends on type of school management. Generally, the policies of the school management are responsible for quality of education. These policies thus make a difference through different types of management of schools. Studies have reported association between type of management and educational performance of students.

The superiority of one type of school management depends on the role of school processes and climate in shaping achievement in different types of schools. Several studies have evaluated the quality of education of private and public schools. Lubienski and Lubienski (2006) reported that public-school students scored lower on average than non-public-school students. Type of school management plays an important role in quality of education. We have considered here three types of school management namely private (which charge fees) and two kinds of public schools namely NMMC and ZP where education is free¹.

5 . Model Specification and Estimation

The basic form of logistic function is

$$P = \frac{1}{1+e^{-z}} \quad (1)$$

where P is the performance of student- a predictor variable and e is the base of the natural logarithm, equals to 2.71828.... .

Equation (1) is an estimated model, so that P is an estimated probability. If numerator and denominator of the right side of (1) are multiplied by e^z , the logistic function in equation (1) can be written alternatively as

$$P = \frac{e^z}{1+e^z} = \frac{\exp(Z)}{1+\exp(Z)} \quad (2)$$

Where, $\exp(Z)$ is another way of writing e^z . Equation (1) or equivalently (2) is graphed in Figure 1.

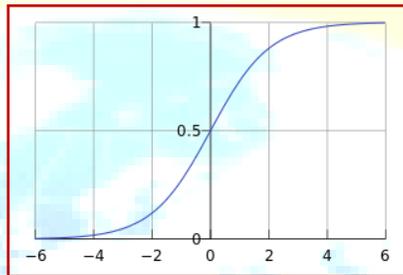
¹ The NMMC schools are situated in urban area (Thane district) and ZP schools are located in rural area (Raigadh district) in Navi Mumbai. Private schools are placed all over Navi Mumbai.

A property of logistic function, as specified by equation (1), is that when Z becomes infinitely negative, e^{-Z} becomes infinitely large, so that P approaches 0. When Z becomes infinitely positive, e^{-Z} becomes infinitely small, so that P approaches unity.

When $Z = 0$, $e^{-Z} = 1$, so that $P = 0.5$. Thus the logistic curve in Figure 1 has its “centre” at $(Z, P) = (0, 0.5)$.

Figure 1 Logistic Curve

$$P = \frac{1}{1 + e^{-Z}}$$



To the left of the point $(0, 0.5)$, the slope of the curve (i.e., the slope of a line tangent to curve) increases as Z increases. To the right of this point, the slope of the curve decreases as Z increases. A point with this property is called inflection point.

Suppose if Z is a cause of P . Then the slope of curve at a particular value of Z measures the effect of Z on P at that particular value of Z . Therefore, to the left of the inflection point, the effect of Z on P increases as Z increases. To the right of the inflection point, the effect of Z on P decreases as Z increases. The effect of Z on P attains its maximum at the inflection points. Effects are not constant over the range of the predictor variable, as they are in the simple bivariate regression model. Another property of the logistic curve is that it is symmetric about its inflection point.

a) The Multivariate Logistic Function

Equation (1) is bivariate. Let Z , is a linear function of a set of predictor variables:

$$Z = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_k X_k \quad (3)$$

Z is not the response variable in this equation. This expression can be substituted for Z in the formula for the logistic function in equation (1):

$$P = \frac{1}{1+e^{-(b_0 + b_1 X_1 + b_2 X_2 + \dots + b_k X_k)}} \quad (4)$$

All the basic properties of the logistic function are preserved when this substitution is done. The function will range between zero and one and achieves its maximum rate of change with respect to change in any of the X_i at $P = 0.5$.

As a simple example, suppose that equation (3) assumes the very simple form $Z = -X$. Then equation (4) becomes

$$P = \frac{1}{1+e^X} \quad (5)$$

When $Z = -X$, as in equation (5), the graph of P against X is a reverse sigmoid curve, which is one at $-\infty$ and 0 at $+\infty$.

As a slightly more complicated form, suppose equation (3) takes the form $Z = a + bX$, where a and b are the parameters that are fitted to data:

$$P = \frac{1}{1+e^{-(a+bX)}} \quad (6)$$

Equation (6) can be rewritten as

$$P = \frac{1}{1+e^{-b(a/b+bX)}} \quad (7)$$

From which it is evident that the curve is centered at $X = -a/b$ instead of $X = 0$. The constant term a/b shifts the curve to the left or right, depending on whether a/b is positive or negative, and the coefficient b stretches or compresses the curve along the horizontal dimension, depending on whether $|b|$ (the absolute value of b) is less than or greater than 1. If b is negative, the curve goes from 1 to 0 instead of 0 to 1 as X increases.

Logistic regression calculates the probability of success over the probability of failure; the results of the analysis are in the form of odds ratio. The odds ratio is a measure of effect size (Westergren, 2001) describing the strength of association or non-independence between two binary data values. It is used as a descriptive statistics, and plays an important role in 'logistic regression'. Unlike other measures of association for paired binary data such as the relative scores, the odds ratio treats the two variable being compared symmetrically, and can be estimated using some type of non-random samples.

The odds ratio may be presented as

$$L_i = \ln [P_i / (1 - P_i)] \quad (8)$$

With $P_i = P [X_i = 1] = 1 - P [X_i = 0]$, where X_i is the independent variable corresponding to i th for $i = 1, 2, \dots, n$.

6. Application of the Binary Logistic Regression Model

The binary logistic regression was performed with dependent variable of total marks obtained in final examination; in presence of independent variables say categories of father's education and mother's education, type of school management, categories of monthly income of household and type of job of father. The aim of logistic regression was to know, whether there was effect of socioeconomic variables on the academic performance of students.

Table 1 showed the frequency distribution of four categorical variables namely type of school, combination of education of father and mother, household income and type of job of father. The type of job of mother was not taken into consideration because very few (<3%) mothers were working. All the predictors were categorical variables.

The software package namely Statistical Package for Social Sciences (SPSS) has been used to develop the logistic regress model. The sample size was 336 household. The frequency of dependent binary variable was 168 for each brightest and dullest student. The frequency of type of students by categories of predictor variables was given in Table 1.

Table 1 Frequency and Percentages of Predictor Variables by Type of Student in the Standard 1 to 7

Type of School	Student Type	N	Percent
Private	Bright	49	50%
	Dull	49	50%
	Total	98	100%
NMMC	Bright	49	50%
	Dull	49	50%
	Total	98	100%
ZP	Bright	70	50%
	Dull	70	50%
	Total	140	100%
Parent's Completed Years of Education			
If both father's and mother's education is <10yrs	Dull	115	61%
	Bright	73	39%
	Total	188	100%
If father's or mother's education is <10yrs	Dull	18	36%
	Bright	32	64%
	Total	50	100%
If both father's and mother's education is >10yrs	Dull	35	36%
	Bright	63	64%
	Total	98	100%
Average Monthly Income of Households in Rupees			
<7000	Dull	37	44%
	Bright	47	66%
	Total	84	100%
7001- 9999	Dull	46	52%
	Bright	43	48%
	Total	89	100%
10000-19999	Dull	39	58%
	Bright	28	42%
	Total	67	100%
>20000	Dull	46	48%
	Bright	50	52%
	Total	96	100%
Type of Job of Father			
Blue collar	Dull	57	41%
	Bright	83	59%
	Total	140	100%
White collar	Dull	111	57%
	Bright	85	43%
	Total	196	100%

6.1 Creation of Dummy Variables Selected for Logistic Regression

Dependent Variable

Dullest Student (secured lowest marks in the class) – 0 ---Reference Category

Brightest Student (secured highest marks in the class) – 1

Predictors

a) Type of School Management

S0: ZP School

S1: NMMC School

S2: Private School

The three categories of school have 2 (i.e. 3-1) dummy variables which are defined as

$R = S0 = (0, 0)$ --Reference Category

$D1=S1 = (1, 0)$ -- if NMMC School

$D2=S2 = (0, 1)$ -- if Private School

b) Education of Parents

F: Father's education

M: Mother's education

Let

F1: Father's education < 10 years of schooling

F2: Father's education > 10 years of schooling

M1: Mother's education < 10 years of schooling

M2: Mother's education > 10 years of schooling

Now, the combinations of these as three categories of Parent's education as follows:

Parent's Education

$R = F1.M1$ ---- ($D1 = 0; D2 = 0$) --Reference Category

$D1 = F2M1$ or $M2F1$ ----- ($D1 = 0; D2 = 1$)

$D2 = F2M2$ ---- ($D1 = 1; D2 = 0$)

c) Monthly Income of Households in (Rs.)

I1: if monthly income is less than or equal to 7000 --Reference Category

I2: if monthly income lies between 7001- 9999

I3: if monthly income lies between 10000-19999

I4: if monthly income is more than or equal to 20,000

d) Type of Job of father

This a binary variable and divided as follows:

Blue collar - 0 --- Reference Category

White collar -1

7. Results

The Wald statistic and the corresponding significance level test, frequency, the significance of each of the covariate and predictors taken as dummy variables in the model were shown in the Table 2. If the Wald statistic is highly significant (i.e., less than 0.01) and significant (i.e., less than 0.05) then the variable is said to be highly significant/significant in the model. Table 2 showed, the predictor variables, type of schools, categories of completed years of father's education and mother's education and monthly income of households and type of job of father had significantly affected the results of students in examination.

Table 2 revealed, the effect of NMMC school management had lowest on quality of education with respect to the effect of management of ZP schools. However the management of private schools seems to have influenced more towards the quality of education than that of NMMC School. The result clearly revealed that the management of ZP schools had greatest influence on quality of education.

Table 2: Logistic Regression Analysis: The Coefficients and Effects (Odds Ratios) of Predictors Obtained from the Estimated Binary Multiple Logistic Model, on the Student Performance in the Class.

Predictor Variable	B	N	S.E.	Wald	Sig.	Exp(B) Effect (Odds Ratio)
Type of School						

ZP (Ref)**	---	140		16.05	0.000	1.00
NMMC**	-2.06	98	0.86	15.77	0.000	0.13
Private**	-1.16	98	0.84	18.18	0.000	0.85
Parent's Education						
F & M <10yrs (Ref)**	---	188		24.60	0.000	1.00
F or M <10yrs **	1.58	50	0.43	13.78	0.000	5.00
F & M >10 yrs **	2.34	98	0.50	22.06	0.000	10.37
Monthly Income in (Rs.)						
<7000 (Ref)**	----	84		17.85	0.000	1.00
7001- 9999**	2.47	89	0.62	16.13	0.000	1.09
10000-19999*	1.42	67	0.41	11.94	0.001	1.24
>20000*	0.72	96	0.34	4.39	0.036	1.49
Type of Job of Father						
Blue Collar (Ref)*	---	196				1.00
White Collar *	0.56	140	0.38	2.28	0.013	1.76
Constant	0.19		0.24	0.63	0.43	1.21

*Significant at $P < 0.05$; ** highly significant at $P < 0.001$;

Academic performance of student was not only affected by type of school management but also by education of parents, occupation of father and income of family members. This may be due the fact that socioeconomic status of students of private school was better than NMMC School and ZP School. Also socioeconomic status of students of NMMC School was better than that of ZP School.

The odds ratio (i.e. the Effect) showed an increasing trend: it increased with the increase in parent's education. The student whose father and mother both had higher education (more than 10 years) had the brightest performance in the final examination followed by those whose father

or mother had education less than 10 years. These results were in relation to the reference category where the education of both father and mother was less than 10 years. Also, the education as predictor variable was found highly significant.

Again, the income of father had positive association with the educational performance of student. The results showed the probability that the brightest student of the class with father's income between Rs. 7001/- and Rs. 9999 was 9 percent more than that whose father's income was less than Rs. 7,000/- (Reference Category). Likewise, the probabilities of the brightest student of the class belonging to the families where the household income was between Rs 10,000/- and Rs. 19,999/- and 20,000/ or more were 24 percent and 49 percent more, respectively, as compared to the reference category where father's income was less than Rs.7000/-. The finding clearly revealed that higher income of father had positive influence on academic performance of student and the effect of this predictor variable on educational performance of the student is found statistically highly significant.

Therefore we may conclude that household income has a strong effect on the educational performance of students. If we compare the effect of parent's education with that of household income, than the impact of parent's education had influenced more on academic performance of student.

Table 2 showed that the type of job of father had also influenced the academic score of student. The result showed that the chances of the father of the student would be in a white collar job was 76 percent more than that of blue collar job. The student whose father was in white collar jobs had 76 percent higher probability of better educational performance as compared to those students whose father was engaged in blue collar occupation. However, the type of job of father was also found statistically significant.

8. Discussion

Table 2 reveals that parents' education had significantly influenced on the academic achievement of students. It was found that parents' education had played the dominant role in influencing student's academic achievement. It was observed from the result that as level of education of

parents increases the influence on academic performance of student also improved. Because the parents may be in a better position to be second teachers to the child; and even guide and counsel the child on “how to give his/her best performance?” and also sense the educational needs and requirements of their child and fulfil them. . This observation suggested that students of educated parents might performed better than students of uneducated parents.

The findings were not in line with Pandey (2008). According to him academic achievement of students were not affected by educational level of parents. The study was conducted on 92 higher secondary students of Mizoram tribes.

The findings were in agreement of the results of Omolade , Kassim, Salomi, Modupe (2011). Their study investigated the relative effects of parents’ education on students’ achievements in senior secondary school Mathematics in Ogun State, Nigeria. The result revealed that parents’ education has the highest significant influence on the academic achievement of students in Mathematics.

The results in Table 2 also revealed that type of school management stood next to parents’ education that predicted academic achievement of student. This may be because; management is responsible for making policies conducive for academic environment of school. The management also decides the criteria of admission, appointment of teachers, their trainings, curriculum, providing infrastructure facilities etc. Therefore school management is a very strong factor in influencing the academic achievement of student.

A number of studies found that private schools were better than public schools and some studies had reported on the contrary. In fact, in India, there is wide spread poverty and socio-economic inequality and that could be the possibility of diverse findings on this issue as observed by Biswal (2011). The findings were, however, in line with the studies of Tooley, James and Dixon (2003), Peterson and Llaudet, (2006) and Yanhong, (2008) which showed that private / public school is an influential factor in affecting students’ academic achievement.

The results further provided that family income was another important variable affecting the academic achievement of student. The students whose parents belonged to the high income status might get better grade than their counterparts whose parents had low income status. This is

because parents with high income status might have enough income which can be used to provide the needed materials and support for their children in order to arouse their interest in education. On the contrary, the parents with low income; whose major part of income goes to meet the basic needs e.g., shelter and food, of the family. They may not have financial resources to purchase books and/or required stationery for their child. Even if a child is weak in any subject, his/her parents may not have money to engage a tutor or send to a coaching centre.

Lacour and Tissington (2011) found that in United States, the factors affecting student achievement include income, source of income, and the mother's education level. Although many poor students score below average on assessment measures, instructional techniques and strategies implemented at the classroom, school, and district level. Government can help to diminish the achievement gap by providing students with necessary assistance in order to achieve high performance in academics.

9. Conclusion

To recapitulate, the most important factors associated with the educational achievement of students appeared to be socio-economic factors at household level. These factors include parental educational level, type of management of school, family income and occupation of father. This conclusion noticeably pointed to the fact that differences in socio-economic background of students breed achievement gaps.

The important findings were, type of school management, parent's education, household income and father's occupation were found important determinants of academic performance of students. The variable parent' education was the most potent predictor of students' achievement in final examination. However, according to the of importance of the predictors influenced the educational performance of students, the variables can be placed in order as: type of school management; father's education, household income and father's occupation in a decreasing order of magnitude, made significant contributions to the prediction of students' academic achievement in primary education.

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References

1. Biswal, S. (2011), Secondary Education in India: Development Policies, Programmes and Challenges, *Consortium for Research on Educational Access, Transitions and Equity* (CREATE), Research Monograph No. 63.
2. Balfanz R. Byrnes V. (2006) Closing the Mathematics Achievement Gap in High-Poverty Middle Schools: Enablers and Constraints, *Journal of Education for Students Placed At Risk*, 11(2), 143–159.
3. Bauer, S. C. (2004). Should Achievement Tests be Used to Judge School quality? *Education Policy Analysis Archives*, University of New Orleans, 1-17.
4. Das, S. and Rahaman M. (2011). Application of ordinal logistic regression analysis in determining risk factors of child malnutrition in Bangladesh, *Nutrition Journal* 2011, **10**:124. Eboli, L. and Mazzulla, G. (2009). An ordinal logistic regression model for analyzing airport passenger satisfaction, *EuroMed Journal of Business*, Vol. 4 (1), 40 – 57.
5. Goldman, R. (2005). Fathers' Involvement in their Children's Education, cost published by NFPI (National Family and Parenting Institute), London, ISBN 1 903615 38.
6. Jonathan, E. (2012). The Relationship Between Childhood Family Income, Educational Attainment and Adult Outcomes, *MMSS Senior Thesis, Northwestern University*, 1-40.
7. Hailpern, S. M. and Visintainer P. F. (2003). Odds ratios and logistic regression: further examples of their use and interpretation, *The Stata Journal*, 3 (3), 213-225.
8. Kingdon, G. (1996). The Quality and Efficiency of Private and Public Education: A Case-Study of Urban India, *Oxford Bulletin of Economics and Statistics*, 58 (1), 57–82.

9. Lacour, M. and Tissington, L. D. (2011). The effects of poverty on academic achievement, *Educational Research and Reviews*, 6 (7), 522-527.
10. Lang, K. and Ruud, P. (1986). Returns to Schooling, Implicit Discount Rates and Black-White Wage Differentials, *The Review of Economics and Statistics*, 68, 41-47.
11. Lubienski, C. and Lubienski, S. T. (2006). Charter, Private, Public Schools and Academic Achievement: New Evidence from NAEP Mathematics Data, *National Center for the Study of Privatization in Education, Teachers College, Columbia University*, New York.
12. Magnuson, K. A. and McGroder, S. M. (2000). The Effect of Increasing Welfare Mothers' Education on their Young Children's Academic Problems and School Readiness, *Joint Center for Poverty Research, Northwestern University; Research Network of the National Institute of Child Health and Human Development*, 1-31.
13. Omolade, A. O., Kassim, A.O. and Modupe, S. O. (2011). Relative Effects of Parents' Occupation, Qualification and Academic Motivation of Wards on Students' Achievement in Senior Secondary School Mathematics in Ogun State, *British Journal of Arts and Social Sciences*, 3(2), 242-252.
14. Strombergsson, S. (2009), Binary Logistic Regression and its application to data from a study of children's recognition of their own recorded voices, *Term paper in Statistical Methods*, 1-8.
15. Pandey, R.C. (2008). Academic achievement as related to achievement motivation and parental background, *Indian Psychol. Rev.*, 70 (4), 213-216.
16. Peterson, P. E. and Llaudet, E. (2006). On the Public-Private School Achievement Debate, *Annual American Political Science Association*, PEPG 6 (2), 2-51.
17. oopnarine, J. L., Krishnakumar, A., Metindogan, A. and Evans, M. (2006). Links between parenting styles, parent-child academic interaction, parent-school interaction, and early academic skills and social behaviors in young children of English-speaking Caribbean immigrants. *Early Childhood Research Quarterly*, 21(2), 238-252.
18. Saha, G. and Sarmah, P. (2012): Stochastic Modeling of the Grading Pattern in Presence of the Environmental Parameter, *Electron. J. App. Stat. Anal.*, 5(1), 108 – 120.

19. Tooley, J. and Dixon, P. (2003). *Private Schools for the Poor: A Case Study from India*, Published by Cf BT Research and Development Committee, ISBN: 0-86160-012-6.
20. Westergren, A., Karlsson, S., Andersson, P., Ohlsson, O. and Hallberg, I. (2001). Odds Ratio, *Journal of clinical Nursing*, 10, 257-269.
21. Yanhong, Z. (2008). *A view inside primary schools : World education indicators (WEI) cross national study*, Publisher: UNESCO, Paris, pp 1-290.

