Determination of Major Social Status Predictors on Students' Academic Performance Using Logistic Regression

Udokang Anietie Edem[1], Odeyemi Joseph Bamidele[2], Onikola Isaac Oluyemi[3], Oladele Semilore Ezekiel[4]

[1, 2, 3, 4]Department of Statistics, The Federal Polytechnic Offa, Kwara State, Nigeria

Abstract— *This research work is to determine the effect of social status on academic performance of students. The study covered eight secondary schools in Kwara South Senatorial zone with a total number of 389 students. Questionnaire and test made up of English, Mathematics, Biology and Basic Sciences were administered to the students through their class teachers. The statistical tool used for the analysis was binary logistic regression analysis to determine if there is significant effect of students' social status on their academic performance. Many social status indicators were identified among the students out which it was discovered that duration of extra lesson, breakfast at home and mode of transportation to school have significant effect on students' academic performance. Therefore parents/guardians should put more effort in taking care of their children/wards. Government and proprietors should provide adequate transport system where it does not exist to bring students to school.*

Keywords— *Academic performance, Learning, Logistic regression, Social status.*

I. INTRODUCTION

In every community of people there exist different categories of people with different social status. Among students, in a class or school, there are different social statuses even as determined and recognized by class members.

This study is to verify whether some social factors as identified among secondary school students has any impact on students' academic performance.

Sauder, Lynn and Podolny (2012) defined social status as relative respect, competence and defense being accorded to people, groups and organisation in a society. In the perspective of this study the social status as concern group of people (students) will be considered for study.

This recognition is given to individuals of the group based on social economic factors either from them or from their family background. Students at this level of education are not independent but depending on their parents and guardians.

Social status came to the fact that some people are being viewed as being more or less valued among members of the group or society (Simandan, 2018). The value has to do with what the students can afford. In the cause of this study, some indicators or factors that determine social status among secondary school students were identified as hours of extra lesson, breakfast to school, mode of transportation to school, distance to school, lunch in school and head of household. The academic performance were measured based on the identified social factors.

This study is to determine some of these social status indicators as factors that has significant effects on academic performance among secondary school students.

II. LITERATURE REVIEW

The responsibility of training a child always lies in the hand of the parents based on what they can provide for their wards. It is then generally believed that socio-economic background of the parent has direct impact on the academic performance of the students. This is congruent with the common assertion by sociologist that education can be an instrument of cultural change which is being taught from home. Cultural heritage and values are transmitted from one generation to another through education (Mammud, 2010).

Social status includes economic, sociological, educational, occupational, residential environment, marital status of parents, on children's academic performance. School systems in low social status communities are often under-resourced and thus may negatively affect student's academic progress (Aikens, and Barbarin, 2008). It is often observed too that inadequate parental education affects children's academic performance.

Social status is in the psychological literature is commonly conceptualized in terms of socioeconomic standing by measuring various combinations of income, education, and occupation (Grusky, 2001). Low socio-economic status and its correlates, such as lower education, poverty and poor health, ultimately affect our societies as a whole. Research indicates that children from low social status households and communities develop academic skills more slowly compare to children from higher socio-economic status group (Morgan, Farkas, Hillemeier, and Maczuga, 2009).

Aiken and Barbarin (2008) noted that, the school system in low social economic status communities are often under resource and have negatively affected student's academic progress. Families from low social economic status communities are less likely to have the financial resource or time available to provide children with academic support.

Many rural and sub-urban dwellers can no longer pay the school fees of their children. Instead they are made to engage in subsistence farming and become housemaids or engage in other menial jobs to support their academic pursuit. The health

status of the children which could also be traceable to parental socio-economic background can be another factor that can affect the academic performance of the student.

Adewale (2002) had reported that in a rural community where nutritional status is relatively low and heath problem are prevalent, children academic performance is greatly hindered. This assertion is again hinged on nature of parental socio-economic background.

The highlight of Program for International Student Assessment (PISA) (2000) revealed that home background influence academic and educational success of students. Status reinforces the activities and functioning of the teacher and students. The quality of parents and home background of student goes a long way to predict the academic performances of student. Child from poor home may suffer because there may be no money to pay school fees, purchase book, uniforms, and other schools materials, such child may play truant. In work of Ovansa (2014) revealed that parent socio-economic status influenced the academic performance of the students. Meaning that good parenting supported by strong economic home background could enhance strong academic performance of the child.

This study focus on the social status as reflected on the students which may be as a result of family background, environmental factors and other socio-economic factors.

III. SAMPLING TECHNIQUES

The secondary schools in Ilorin South senatorial districts were stratified into two strata; private secondary schools and public secondary schools. A total of eight schools were selected. Out of the eight schools, three were selected from private schools and five from public schools using simple random sampling technique.

Twenty five (25) students were selected each from JSS II and SSS II at random by the class teacher if they are more than 25 students in a class. In a class that is 25 or less than 25 students all of them were selected.

IV. DATA COLLECTION

The data collected for this study was from 389 students of JSS II and SSS II from the selected schools. The data on social status was collected through the administration of questionnaire to the students. The data collected on academic performance was from general academic test with questions from core subjects. These are English, Mathematics, Basic Technology and Basic Science for JSS II and English, Mathematics and Biology for SS II.

The general academic test was impromptus, conducted without prior information to the students. Therefore the performance might be quite different from other test/other examinations by the same students, where students have time table to prepare for examinations ahead of time.

V. LOGISTIC REGRESSION

Logistic regression or logit regression is a type of probabilistic statistical classification model. Frequently, logistic regression is used to refer specifically to the problem in which dependent variable is binary.

Binary logistic regression is a type of regression application that the response variable has only two outcomes: an event did or did not occur. A regression model with this type of response can be interpreted as a model that estimates the effect of the independent variable on the log of the odd of the probability of event occurring.

Consider the model

$$p = \frac{e^{(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)}}{1 + e^{(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)}} \tag{1}$$

$$1 - p = \frac{1}{1 + e^{(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)}} \tag{2}$$

$$\frac{p}{1 - p} = \frac{1}{1 + e^{(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k)}} \tag{3}$$

$$\log\left(\frac{p}{1 - p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k \tag{4}$$

(Chatterjee and Hadi, 2006)

VI. PRESENTATION OF DATA

The frequency distribution of students based on the six considered social indicators are shown in Table 1 to 6 of the appendix with their respective percentage distribution.

Also in the appendix is Table 7 which shows the level of performance of student in the eight (8) selected schools of Kwara south. The number of failure is 219 students and passes is 170 students from the general test given to the students with 43.7% success rate.

VII. ANALYSIS OF DATA

Table 1: Variable in the Equation

Variables in the Equation		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1ᵃ	Duration of extra lesson	0.275	0.103	7.161	1	0.007	1.317
	Breakfast to school	-0.63	0.242	6.794	1	0.009	0.532
	Mode of transport to school	0.227	0.09	6.333	1	0.012	1.255
	Distance to school	-0.095	0.156	0.374	1	0.541	0.909
	Lunch in school	0.285	0.247	1.333	1	0.248	1.329
	Head of household	-0.374	0.273	1.875	1	0.171	0.688
	Constant	-0.334	0.683	0.239	1	0.625	0.716

From Table 1 duration of extra lesson, breakfast to school and mode of transport are the predictors that are contributing significantly to the students' academic performance. The odd ratio of extra lesson is 1.317 which indicate that an increase in extra lesson by one hour will lead to approximately 0.32 times more likely to pass. In the case of breakfast to school the odd ratio is 0.532, meaning that adding a meal as breakfast will result to approximately 0.47 less likely to pass. The mode of transportation odd ratio is 1.255, hence having a positive impact on performance.

Whereas, distance to school, lunch in school and head of the

household of student do not have significant contribution to the academic performance of the students.

VIII. GOODNESS OF FIT TEST

Table 2: Goodness of fit (Hosmer and Lemeshow Test)

Step	Chi-square	Df	Sig.
1	6.2	8	0.025

The inferential goodness-of-fit test by the Hosmer–Lemeshow (H–L) with chi-square test statistic of 6.2 and degree of freedom 8 having a p-value of 0,025 suggest that the model is well fit to the data.

IX. CONCLUSION

The logistic regression analysis can be a powerful analytical technique for use when the outcome variable is dichotomous. The effectiveness of the logistic model is demonstrated by fitness through the goodness-of-fit test. The major social status predictors of student' academic performance are duration of extra lesson, breakfast at home and mode of transportation to school.

X. RECOMMENDATIONS

The social status of a students is a reflection of his/her back ground. Therefore, parents should not deprive their wards of their necessities which they can afford. Those that cannot afford should thrive harder to provide for them.

The school feeding programme should be introduced in all primary/secondary schools to ensure that students are prepared for the days' lesson while over feeding should be avoided.

The school proprietors and other stakeholders make adequate transportation with affordable price to students especially those from long distance.

APPENDIX

Table 1: Frequency distribution students by hours of extra lesson

	Duration	Frequency	Percent
	An Hour	68	17.5
	2Hours	132	33.9
	3 Hours	95	24.4
Valid	More than 3 Hours	94	24.2
	Total	389	100

Table 2: Frequency distribution of students with or without breakfast to school

	Breakfast	Frequency	Percent
	Yes	281	72.2
Valid	No	108	27.8
	Total	389	100

Table 3: Frequency distribution of students by mode of transportation to school

	Mode of Transportation/Code	Frequency	Percent
	By foot (1)	205	52.7
	Bicycle (2)	18	4.6
Valid	Motor bike (3)	98	25.2
	School Bus (4)	68	17.5
	Total	389	100

Table 4: Frequency distribution of students by distance to school

	Distance/Code	Frequency	Percent
	Close (1)	55	14.1
Valid	Not too far (2)	144	37
	Very far (3)	190	48.8
	Total	389	100

Table 5: Frequency distribution of students with or without lunch in school

	Lunch/Code	Frequency	Percent
	Yes (1)	289	74.3
Valid	No (2)	100	25.7
	Total	389	100

Table 6: Frequency distribution of students by head of household

	Head/Code	Frequency	Percent
	Parent (1)	325	83.5
Valid	Guardian (2)	64	16.5
	Total	389	100

Table 7: Summary of the Academic Performance of Student

Academic Performance		Frequency	Percent
Valid	FAIL	219	56.3
	PASS	170	43.7
	Total	389	100.0

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