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Influence of Gender and Socio-Economic Factors on Students Performance in Mathematics in Shomulu Local Government Area of Lagos State

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Abstract
Mathematics is not only compulsory in primary and secondary schools but a sin qua non for gaining admission to any tertiary institution in Nigeria. This study examined the influence of gender and scio-economic factors on students' performance in mathematics in shomulu Local Government Area of Lagos state. The study used the survey design in the collection of data. The method of data analysis adopted in this study was based on Lewin's 1979 interaction theory which is expected to influence the dependent variable, that is performance in mathematics, and the explanatory variables are gender and socio-economic factors. Multiple equations are adopted because, according to Pyndyck and Rubinbfeld (1995), a dynamic equation provides a better representation of the real world. The researcher concluded there is significant difference between the students' gender and performance in mathematics. It was recommended the boys and girls should be given equal opportunities in studying mathematics and other related discipline, and parents whose academic background are low should make efforts to improve themselves educationally so that they would be able to cater for the education needs of their children.
Keywords: Gender, Socio-economic, Students, Performance, Mathematics

Introduction

Mathematics is the key to the successful study of science and science related subjects. The subject is not only compulsory in primary and secondary schools but a sin qua non for gaining admission to any tertiary institution in Nigeria. The recognition and attention accorded the subject at all levels of education stems from the fact that, it is the bedrock of development in modern society of the world (Pius, 2013, Nwachukwu, 2013). Mathematics had been described as part of man's cultural heritage and therefore a tool for explaining the world of space and numbers needed by not only scientists, housewives, businessmen as well as petty traders but also in the non-science disciplines.

The poor performance of students in Mathematics in public and internal examinations is becoming abysmal and of paramount and great concern to the researcher and has been traced to a number of factors, such as; inadequate material for learning and teaching the subject, low motivation of students, peer influences, negative attitude of students toward the subject, socio-economic status of parents- level of income, educational background, family size and type. In considering the social influences on performance in subject such as mathematics, Orubu (2012), McCarthy (1998) and Hyde et al (2013) are of the view that females tend to perform more than males in certain subjects, because they tend to have better skills and attend classes more regularly. However, Hyde and Mertz (2013) have an opposite view that in most societies, mathematics and other science subjects are generally considered as male disciplines, and that this societal mindset is largely responsible for why female do not well in such subject. There seems to be some consensus, that socio-economic factors such as family, income, educational level, family type and size do influence performance of students, whether they are male or female (Ugwu 2010, Olagunju, (2011), Eigbta 2011). According to Dion (2010), parents' educational and income level is positively correlated with mathematics performance. Sabina 2010 also noted that the size of the family into which a child is born determines to a large extent what he or she will achieve in life. Amazing factors influencing education in Nigeria, Adigwe (2011) noted that there is significant different difference between academic performance of polygamous and monogamous families and however recommends that government should make adequate arrangement for the services of guidance and councillors at all level of education. Evidence from the empirical literature does not generally support the influence of gender on academic performance. Thus while studies by colon and Igwe (2011), Nwachukwu (2013), Onwuakpa and Adeboye (2010) support male superiority in mathematics and science-related subjects. Other researcher such as keevens (2009), Fennema (2010), Osefehinti (2012), agreed that income has a significant effect on the performance of students in terms of academics.

Purpose of the study

The study is aimed to the influence of Gender and Scio-economic factors on students' performance in mathematics in Shomulu Local Government Area of Lagos.

Research hypothesis

In pursuance of the objectives on the study, the following research hypotheses were formulated.

1. There is no significant difference between the students' gender and performance in mathematics.
2. There is no significant difference between the level of education and performance in mathematics.
3. There is no significant difference between the level of income and performance in mathematics
4. There is no significant difference between the size of the family and performance in mathematics
5. There is no significant difference between the type of family and performance in mathematics.

Area of the study

The population was made up 4309 senior secondary students drawn from 10 secondary schools in Shomulu Local Government Area of Lagos state.

Design of the study

The study used the survey design which involves the collection of data.

Sample and Sampling Procedure

A total of 300 students forming the sample size of the study from ten (10) senior secondary schools were randomly chosen for the study that is thirty students from ten secondary schools.

Data Collection and Analysis

The researcher and the teachers participated in the field administration and retrieval of the 300 economics question papers from the selected schools. The questions were based in West Africans Examination Council (WAEC), 2012 and 2013 and National Examination Council (NECO) 2012 and 2013 which were randomly given to students. The instrument for the study is the questionnaire on gender/socio economic factors for the SSS III students. The questionnaire sought to gather information on the student's gender, level of education of student's parents, the income of student's parents and the family type. The performance of each student was matched with the questionnaire and the test instrument was subjected to screening by experts in the Nigerian educational research and development council (NERDC) to ensure face validity, the test-retest technique was used to measure the reliability of the instrument, with a correlation coefficient of 0.65. The method of data analysis adopted in this study was based on Lewin's 1979 interaction theory which is expected to influence the dependent variable. The dependent variable is performance in mathematics, while the explanatory or independent variables are gender and socio-economic factors. Multiple equations will be adopted because, according to Pyndyck and Rubinbfeld (1995), a dynamic equation provides a better representation of the real world that is relatively richer than a single equation model. E-view software is employed in analyzing the model; the functional form of the model for the study is presented thus:

$$PERMATH = f(GEN, INC, EDU, FAMZ, FAMT) \quad \ldots 1$$

Transforming equation one to linear expression in order to facilitate estimation, the model becomes:

$$PERMATH = B_o + B_1\,GEN + B_2\,PLINC + B_3\,EDU + B_4\,FAMZ + B_5 I\,FAMT + U_t \quad \ldots 2$$

Where;

B_o=Intercept

GEN =gender

PLI*NC* =parents level of income

EDU = educational background of parents

FAMZ =family size

FAMT =family type

UT=Stochastic error term

PERMATH = performance of students in mathematics

The model is transformed to logarithm and the final model for estimation and the variables used as well as their definitions are given as:

$$LOGPERMATH = B_o + B_1\,LOGGEN + B_2\,LOGPLINC + B_3\,LOGEDU + B_4\,LOGFAMZ + B_5\,LOGFAMT + U_t \quad \ldots 3$$

Where:

LOGGEN = logarithm of gender

LOGPLINC = Logarithm of parents level of income

LOGEDU = Logarithm of educational background of parents

LOGFAMZ = family size

LOGFAMT = family type

LUE = Logarithm of stochastic error term

LOGPERMATH = logarithm of performance of students in mathematics

B is the parameter to be estimated. The F and T statistics were used to test the statistical significant of the estimated parameters. As a preliminary analysis, the researcher used the person correclation coefficient to mirror how the results of the regression analysis would look like. Performance was measured as the actual score obtained by each student in economics questions distributed to them. A dummy variable was used to capture gender (male-1; female-0), family type (monogany-1; polygamy-0), while an ascending scale was used to measure family size, the educational attainment of parents, summing method for all income-earning parents was used to measure the income effect.

Data Analysis and Findings

The model above shows a good fit for the performance of students in mathematics with R squared (R2) value of 0.765292 that is 75.53%, the explanatory variable explains changes in the performance of students. The adjusted R2 also supported the claim with a value of 0.7222644 or 72.27 %. This shows that explanatory variables explain the behavior of the dependent variable at 72.26% level of confidence. The calculate F statistics values of 23.15 which is greater than any value in the F-table implies that all the variables co-efficient in the above regression result are all stationary significant. The Durbin-Watson (DW) statistics as shown in the regression result is 1.702165 which approximately 2. This implies the absence of multi-collinearity. The standard deviation (SD) is 2.48. The value of the probability (F-statistics) is 0.00 which implies that the probability of rejecting or accepting the result is 0% and 100% respectively.

From the regression results, the gender of students is found to be positively related to performance of students in mathematics with a co-efficient of 1.25 which is statistically significant as indicated by the P value of 0.0138. This is indication show that there is significant different between the performance of male and female. This findings was supported by Adeboye (2010), Nwachukwu (2013), Onwuakpa and Adigwe (2010) oruba (2012). The educational background of parents of students is positively related to performance of students in mathematics with a co-efficient of 1.11 which is statistically significant. This is indication show that there is significant difference between the educational background of parents and performance student. This finding was supported by Orubu (2012), McCarthy (1998) and Hyde et al (2013). It is also seen that the parent level of income is positively related to performance of students in mathematics with a co-efficient of 1.16 which is statistically significant. This is indication show that there is significant different between the educational background of parents and performance student. This finding was supported by omoh 2009, Okakor, 2010, Osefehinti 2010. The size of the family is found to be negatively related to performance of students in mathematics with a co-efficient of -2.11 which is statistically significant. This is indication show that there is significant different between the size of the family and performance student. This finding was supported by (Pius 2013, Mefun 2009, Eigbta 2011). The type of the family is found to be positively related to performance of students in mathematics with a co-efficient of 0.998 which is statistically significant. This is indication show that there is significant different between the type of the family and performance student. This finding was supported by (Ugwu (2010), Olagunju, (2004), Eigbta 2011).

Conclusion

The researcher concluded that:

1. There is significant difference between the students' gender and performance in mathematics,
2. There is significant difference between the level of education and performance in mathematics
3. There is significant difference between the level of income and performance in mathematics,
4. There is significant difference between the size of the family and performance in mathematics,
5. There is significant difference between the type of family and performance in mathematics.

This study therefore confirms the generally held view that gender and socio-economic factors influence the level of performance of students in mathematics.

Recommendation

Based on the findings, the following recommendations were made:

1. The boys and girls should be given equal opportunities in studying mathematics and other related discipline.
2. All parents should make efforts to improve themselves educationally and also of income earning, so that they would be able to cater for the education needs of their children.
3. Polygamous family should be discouraged because children from monogamous homes are mostly to do better academically
4. Effort should be made by parents to be have fewer children that they can cater for so as to give their children full education

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Table 1
Regression result
Dependent Variable: INPERMAT
Method: Least Squares
Date: 06/06/12 Time: 13:26
Sample: 2 301
Included observations:300

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.862036	2.064342	4.777326	0.0000
INGEN	1.245300	0.150604	1.628777	0.0138
INPLINC	1.162200	0.340327	0.476601	0.0371
INEDU	1.116938	0.651747	1.713759	0.0969
INFAMZ	-2.109243	0.543212	-1.043211	0.0000
INFAMT	0.998355	0.191911	5.202174	0.0000

R-squared	0.755292	Mean dependent var	15.32647
Adjusted R-squared	0.722664	S.D. dependent var	2.483840
S.E. of regression	1.308057	Akaike info criterion	3.506526
Sum squared resid	51.33035	Schwarz criterion	3.728718
Log likelihood	-56.36420	F-statistic	23.14878
Durbin-Watson stat	1.702165	Prob(F-statistic)	0.000000

The model is INPERMAT = 0.9862035766 + 0.2452996509*INGEN+ 0.162200917*INPLINC + 1.116937949*INEDU – 2.10924154323*INFAMZ+ 0.99835506*INFAMT

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