

The Influence of Primary School Background on Students' Achievement in Junior Secondary School Mathematics in Akwa Ibom State, Nigeria

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Abstract: Primary education is the foundation to every educational system. It tends to exert influence on students' academic achievement even at the post primary education. This study investigates the influence of primary school background on mathematics achievement of secondary school students. The study adopted survey research design method, while multi stage sampling procedure was used to select students from JSS 1 in public and private secondary schools in Akwa Ibom State. Mathematics achievement test comprising multiple-choice test type and short answer item type were administered to the selected students; their responses were marked and analyzed using independent T-test as well as two-way analysis of variance. Results show that, the average achievement in the mathematics test by students with rural primary school background was 39.6 while those with urban primary school background had the mean score of 48.9. A t-value of 6.70 was obtained, which was statistically significant at $P < 0.005$. It was therefore interpreted that, students of urban primary school background achieved significantly higher than students with rural primary school background in the JSS1 mathematics. Also, students with private primary school background outperformed students with public primary school background as result shows mean achievement of 48.21 and 41.17 respectively. This yielded t-value of 5.00, and was statistically significant at $P < 0.005$. The main effect and the interactive effects of school location and school type (proprietorship) on mathematics achievement were statistically significant at $P < 0.005$. Therefore, primary school background significantly influences students' achievement in secondary school mathematics. The study recommends that, public primary school should be properly funded and supervised, while regular inspection should be carried out in rural primary schools (private and public) to ensure compliance with standards.

Keywords: Primary school, School location, Mathematics, Achievement and Secondary school

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I. Introduction

Primary Education is an aspect of education offered in an institution to every child between ages 3-11. However, the National Policy on Education stipulates aged 6 to 11 plus as age for primary education (FGN, 2004a). Primary education is the foundation for which the child acquires basic literary and manipulating skills useful for the next level of education. Therefore, primary education is supposed to create awareness among the pupils, opens avenues for opportunities as well as self-advancement and improvement and reduces chronic and inter-generational hunger and poverty. According to Anero (2014), primary education is designed to meet the basic learning needs of pupils. These needs include cognitive and intellectual aspects as well as the social and emotional development of pupils. In doing so, it is intended to prepare pupils to benefit from secondary education. The goal of achieving universal primary education is especially important because educational attainment has been noted as a key index to measure overall economic growth of a Nation (Gustafsson et al., 2011; Abdullahi & Abdullah, 2014; Athanasius, 2018). Due to high premium placed on primary education, the FGN (2004b) signed the bill known as the Compulsory Free, Universal Basic Education bill number 66, volume 91. These high expectations from the primary education have force parents to look for schools that would meet their aspirations. Unfortunately, the manipulating skills offered by most primary schools proved not to be solid enough to provide the needed pivot for secondary school mathematics.

Brown and Porter (2011); Khusna and Heryaningsih (2018), see mathematics as the language that can be used to describe ideas and relationships which helps to measure events in the environment objectively and quantitatively. Mathematics should develop flexibility of thinking that guarantees effective tackling contemporary issues. Mathematics enable students to solve problems that would be seemingly impossible and therefore provides links with other subjects in science and technology. Mefor (2014) opined that, mathematics relates to every aspect of the universe from the smallest to the largest. In addition, Gowers (2008) and Unameh,

(2011) in Tshabalala and Ncube, (2013) noted that mathematics is the bedrock for scientific, technological, economic advancement and political development of any nation. Hence, mathematics is taught as compulsory subject at the primary and secondary level of education. Mathematics is needed for better appreciation of time, value for and counting of money and votes, measurement of weight and physical fitness. In the view of Unameh (2011), mathematics is intimately connected to daily life and everybody's lifelong planning. Therefore, it is obvious that mathematics is a subject that education and human life cannot function effectively without.

The background for mathematical advancement is supposed to be provided at the primary education to ensure hatch free study of mathematics at the secondary education. However, most primary schools have failed in this aspect and in search of quality primary education; it is a common place that parents move children from one primary school to another. Currently, there is a general drift of pupils' enrolment from public to private primary schools in Akwa Ibom State. This drift is on the increase irrespective of government effects at improving public primary schools through the various universal basic education projects as well as the free and compulsory education programme for public primary school pupils in the State. In the light of this observed drift in pupils' enrollment, this research is conducted to determine students' achievement in mathematics using their primary education background.

II. School Background and Academic Achievement

School background entails both school type and school location. The school types considered in this study is the private and public schools, while the school location is urban or rural school. Obviously, teaching facilities provided in schools vary with the school background and may influence students' academic achievement. According to Ematoron (2004) teaching facilities are resources in schools that aid teaching and learning. They are physical and spatial enablers of teaching and learning which when effectively utilized can improve students' academic achievement. Some school facilities are school buildings, equipment, water, electricity, libraries, furniture and recreational facilities among others. Kleinfield (1985); Lambdin (2009); Davies and Hersh (2012) found that school location determines the quality of students' education, experience or achievement in school. Nigerian children from the rural settlement were not able to write and speak simple English like children from urban areas. This is in contrast to their counterparts who were brought up in literate homes and are able to speak English before going to school (Obianuju, 2000; Howley, 2001; Akubuiro, 2002). Schools established and/or run by governments are public schools, while those established and manage by individuals, organizations and mission bodies are referred to as private schools. The influence of school background on students' academic achievement has been very controversial as researchers held strong polarization in students' academic achievement and school background. For instance, Kim and Placier (2004), observed a significant difference in academic achievement between private and public schools. Whereas, Lukbienski and Lubienski (2005) discovered that, public and private schools show no significant difference in Mathematics achievement. Bassey, Udom and Ekpoh (2005) asserted that, private schools are always known for profit maximization, which is the reason for indiscriminate admission of students without ensuring that necessary facilities are in place. However, private schools have better monitoring and supervision of teachers, which complement the inadequate facilities and qualified manpower. This effective supervision of staff, pupils and maintenance of available facilities could aid students' academic achievement.

III. Purpose of the study

This study is aimed at investigating the influence of primary education background on mathematics achievement of Junior Secondary School (JSS) 1 students. The aim of the work was achieved using the following objectives:

1. to determine if the location of primary schools significantly influenced students' achievement in mathematics,
2. to investigate the effect of primary school type on students' achievement in secondary school mathematics,
3. to determine the interactive effects of primary school location, primary school type and students' achievement in mathematics

IV. Research questions

In order to achieve the purpose of the study, the following research questions were constructed:

1. Does primary school location significantly influence students' mathematics achievement in junior secondary school?
2. what are the effects of primary school type on students' mathematics achievement in junior secondary school?
3. how do primary school location, primary school type interact to influence students' achievement in junior secondary school mathematics?

Research hypotheses

1. There is no significant influence of primary school location on students' achievement in junior secondary school mathematics.
2. There is no significant difference in students' achievement in junior secondary school mathematics and their primary school type (public and private).
3. Students' mathematics achievement in junior secondary school is not significantly influenced by their primary school location and their primary school type (public and private).

V. Methodology

The following methodologies were deployed for the investigation.

Research Design

The survey research design was used for the study. A survey design is a quantitative method whereby a researcher poses some set of predetermined questions to an entire group, or sample, of individuals of homogenous characteristics (Fowler, 2009, Anikweze, 2009; Isangedighi, 2012). Therefore, survey design provides a quantitative description of trends, aptitudes, opinions, feelings, or achievement of a population by studying a sample of that population at a particular time.

Population of Study

The population of the study consists of all JSS1 students of 2017/2018 academic session in public and private secondary schools in Akwa Ibom State.

Sampling technique

The study adopted the multistage sampling procedure to select the sample size for the study. This procedure combined stratified random sampling, simple random sampling, purposive sampling and proportionate sampling technique.

Sample Size

A total of 20 schools comprising 10 public and 10 private schools in Akwa Ibom State were used for the study. From the 10 public schools, 6 schools were selected from the urban areas, while 4 were picked from the rural areas. Also, 6 private schools were selected from the urban while 4 private schools were chosen from rural areas. The study used a total of 500 students comprising 220 males and 280 females.

Research Instrument

To measure the influence of students' primary education background on their achievement in secondary school mathematics, a structured questionnaire consisting of Part A and Part B was constructed. Part A was the meant to generate data on students' primary education background, while Part B was mathematics achievement test comprising of equally rate 40 multiple-choice items and 10 short answer item types. The achievement test items were constructed from JSS1 first term mathematics scheme of work. The students were tested at the 12th week of resumption of first term 2017/2018 academic session. This was to ensure that the students cover reasonable portion of the scheme of work. In addition, JSS1 was preferred because the researchers believed they are heavily influenced by their primary school background knowledge. Each multiple-choice test item had 3 distractors and a key, giving a total of 4 - options. The responses were coded using binary system for dummy variables and Part B was marked based on the options. Every correct option chosen was scored 1 mark, and total score per student was collated and analyzed. Analysis was done employing independent t-test and two ways analysis of variance (2-WAY ANOVA) using SPSS version 25.

Validity and reliability of instrument

For the purpose of examining the validity of the instrument, a test blue print was prepared to determine if the questions in the multiple-choice mathematics test adequately addressed the topics in the JSS1 scheme of work. In addition, the instrument was presented to professional colleagues in the area of Educational Research and Test and Measurement. Their useful contributions were incorporated into the relevant parts of the instrument to help measure accurately the students' achievement in mathematics.

The reliability of the instrument used to measure the influence of students' primary school background on mathematics achievement was achieved through pilot survey using fifty JSS1 students which were not part of the actual study. A reliability coefficient of 0.78 was obtained using split-half reliability test. This reliability coefficient was considered satisfactory to achieve the aim of the study.

VI. Results

The general description of the results shows that, 270 students were from urban schools, while 230 students were from rural schools (Table 1). It is observed that, 245 students used for the study had their primary education in private schools, while 255 students had their primary education in public schools. Table 1 revealed that, 230 of the respondents had their primary education in the rural community, whereas 270 had theirs in the urban settlement. This is interpreted to mean that the students' primary school backgrounds were adequately taken into consideration. Therefore, the result from the study can be generalized across the whole State.

Table 1: General presentation of results based on students' primary school background

Description			Primary School Type		Total
			Private (1)	Public (2)	
Primary	School	Rural (1)	98	132	230
Location		Urban (2)	147	123	270
		Total	245	255	500

The result for the study were presented based on stated hypotheses

H₁: There is no significant influence of students' primary school location on their achievement in secondary school mathematics.

The result of the independent t-test (Table 2) shows that, the mean score for students' achievement in mathematics is statistically different based on the school location. Students from rural primary school had a mean score of 39.6 which is significantly lower than 48.9 obtained by students' whose primary school where in urban. The result further indicates $t = 6.698$; $df = 498$; and $p < 0.05$. This informed the rejection of the null hypothesis. That means that there is significant influence of primary school location (rural and urban) on secondary school mathematics achievement. It is obvious from the result that, students from urban primary schools had higher mean score than those from rural primary schools. Figure 1 is a bar chart showing the relationship between school location and students' mathematics achievement. The bars show that, students of private primary school background achieved higher in mathematics than those of public primary school background irrespective of the location of the schools.

Table 2: Result of independent t-test for primary school location and students' mathematics achievement

School location	N	X	SD	DF	T- Cal	p-Value
Rural	230	39.6130	13.56314	498	6.698	0.00
Urban	270	48.8815	16.84375			

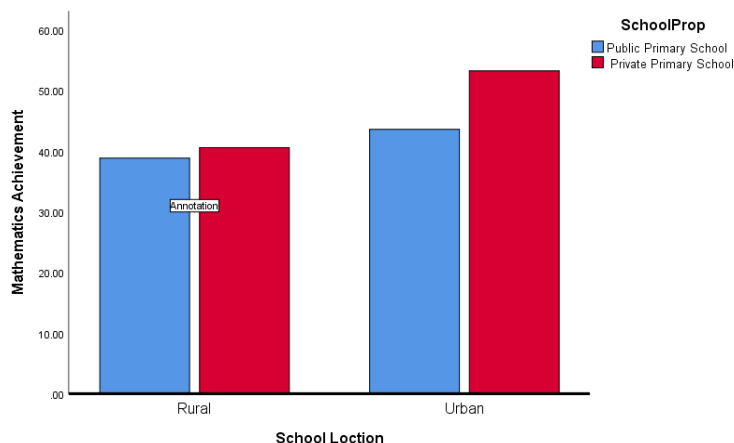


Figure 1: A bar plot of school location and students' mathematics achievement

H₂ There is no significant difference in students' achievement in secondary school mathematics and primary school type (public or private).

The result of the independent t-test analysis of primary school type (propriety) and students' achievement in secondary mathematics is contained in Table 3. The result reveals mean achievement score of 41.17 for students of public primary school and 48.21 for students of private primary school. In addition the values, $t = 5.009$; $df = 498$ and $p < 0.05$ were obtained. This is an indication of significant statistically difference, therefore the null hypothesis was rejected. Hence, there is a significant difference in mathematics achievement between students of private primary school and students from

public primary school. The students from private primary school achieving higher mean score than those from public primary school.

Table3: Result of independent t-test for primary school type (public or private) and students' mathematics achievement

School Type	N	X	SD	DF	T- Cal	F-Value
Public	255	41.1686	14.37514	498	5.009	0.00
Private	245	48.2082	16.99016			

H₃ : Students' mathematics achievement in secondary school is not significantly influenced by the interaction of primary school location and their primary school type (public and private).

Table 4: Two-way analysis of variance (ANOVA) of the effects of primary school background(primary school location and school proprietorship) on students' mathematics achievement

School location	School Type	N	Mean	StdDeviation
Rural	Public	132	38.8788	12.39861
	Private	98	40.6020	14.99879
	Total	230	39.6130	13.56314
Urban	Public	123	43.6260	15.91854
	Private	147	53.2789	16.37814
	Total	270	48.8815	16.84372
Total	Public	255	41.1686	14.37517
	Private	245	48.2080	16.99016

Source of variation	SS	DF	MS	F	Sig
School location	9230.792	1	9280.792	41.087	0.000
School type (proprietorship)	3956.169	1	3956.169	17.514	0.000
School location * school type(proprietorship)	1922.169	1	1922.169	8.510	0.004
Error	112037.902	496	225.883		
Total	1124497.00	500			

P < 0.05, df = 1 and 496

The independent variables in the hypothesis are school location and school proprietorship, while the dependent variable is the students' total score in the multiple choice test. The statistical analysis technique employed to test the hypothesis was two-way analysis of variance (ANOVA). The group mean and standard deviation of the students' achievement in mathematics test are presented in Table 4. The table shows the result of influence of primary school location and primary school proprietorship on students' achievement in mathematics. From the Table, it is seen that the F- ratio for school location (41.087), proprietorship (17.514) are statistically significant at p < 0.05 level of significance with 1 degree of freedom. It is based on this result that the null hypothesis was rejected for primary school location, primary school proprietorship when considered individually. This means that students' primary school location and student primary school proprietorship when considered individually have significant effect on student mathematics achievement. The interaction of school proprietorship by students location is a two-way interaction, which yield and F-ratio of 8.510. This ratio is considered statistically higher than the critical F-vale of 3.86 at P < 0.05 level with 1 degree of freedom. Following this result, the null hypothesis was rejected while the alternative hypothesis is upheld. This implies that interactive effect of primary school location and primary school proprietorship significantly influences students' achievement in secondary school mathematics.

VII. Discussion of Findings

Students' primary school background has been imported to determine its influence on their achievement in JSS mathematics. Primary school background was considered under school location and school type. The result shows significance influence in primary school location on students' achievement in secondary school mathematics. The result clearly indicated that, students with urban primary school background had higher mean score (48.88) than their counterpart (39.61) with rural primary school background, which was considered statistically significant at p < 0.005. The mean values are reflection of the stability of students of urban primary background in problem solving over students from rural background. This finding is in support of Kleinfield (1985); Lambdin (2009); Davies and Hersh (2012). They held the assertion that, school location determines the quality of students' education, experience and achievement in further studies. Also, Oworye, (2011) observed is a significant difference in academic achievement between students of rural secondary schools and those of urban secondary schools using senior school certificate examination results as index. The geographical location of schools has a significant influence on students' academic achievement. This difference would be a pointer to the uneven distribution of resources, poor school mapping, facilities, experience teachers refusing posting to rural

areas. In addition, lack of good roads which deterred school inspectors' visit to rural schools could contribute to the academic gap between rural and urban.

Result also indicates significance difference in mathematics achievement between students of private primary school background and those of public primary school background. Students of private primary school background achieved higher than those in public primary school background. The significant difference observed could be attributed to infrastructural difference between the ownership of the schools. The private primary schools have the advantages of coordinated supervision by the proprietors, discipline and minimal issue of corruption. On the other side, public primary schools over time had suffered indiscipline by staff and pupils, ineffective and uncoordinated monitoring by supervising bodies and high level of corruption. This could be the reason that students of public primary school background are of academic disadvantage in their junior secondary education.

The statistically significant interactive effect of primary school location and school type (proprietorship) on students' mathematics achievement in secondary school, points to the fact that, primary school location and primary school type collectively determine the speed at which a child could achieve her academic ceiling set by nature. Urban schools may be exposed to modern learning facilities. They, however, tend to be challenged with widely dense students' population and overcrowding classes, in addition to the problems of aged and worn out facilities as well as high level environmental pollution. The rural schools may not be exposed to modern learning techniques, but operate in a near natural environment which tends to encourage leaning.

VIII. Conclusion

The inference of primary school background on mathematics achievement of Junior Secondary School Students has been studied. The study deployed JSS1 students from public and private schools in urban and rural areas of Akwa Ibom State. The first term JSS1 mathematics scheme of work was used to prepare fifty test items and was administered to the students. The results show that, primary school background significantly influences students' mathematics achievement at the secondary school, with students from public primary schools in rural environment most affected. In order to optimize academic achievement, the study recommends proper funding, intensive supervision, discipline and down throne of corruption in public primary schools.

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