THE DIFFERENTIAL EFFECT OF SECONDARY SCHOOL LOCATION ON ACADEMIC PERFORMANCE OF STUDENTS' IN MATHEMATICS

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Abstract

This study examined the differential effect of secondary school location on academic performance of students' in mathematics in Edo State. The study was guided by two research question and one corresponding null hypothesis. The design used was correlational research design. The sample for the study was 300 SSII students. The instrument used for data collection was Mathematics achievement test. The instrument was validated by five experts and the reliability of the instrument was determined by the use of Pearson product moment correlation with a reliability index of 0.70. The data were collected by administering the instrument to respondents with the help of five research assistants. The data collected were analyzed using Mean and Standard Deviation for the research question and the null hypotheses was tested using analysis of variance. The result showed that students in the urban areas had higher mean performance in Mathematics than the students in the rural areas and therefore, school location have interaction effect on the Mathematics mean performance of the students at the secondary schools in Edo State. It was recommended, among others, that Edo State government should endeavour to provide rural schools with school resources, adequate qualified Mathematics teachers and instructional materials in Mathematics in order to improve the performance of students in Mathematics in the rural areas.

Keywords: Edo State, Mathematics, School Location, School II, Senior Secondary School, Students' Academic Performance.

Introduction

The development of any country through technology depends largely on the teaching and learning of Science and Mathematics subjects (Adepoju, 2004). To live as a useful and effective member of the modern society, every individual requires some knowledge of Mathematics (Adetunji, 2003). For the purpose of commercial and industrial activities, every individual in business transaction, domestic activities, farming, politics and decision-making, requires a certain amount of competence in basic Mathematics. For instance, a little knowledge of Mathematics helps a builder to design, take accurate measurements and identify shapes and solids. Some level of Mathematics is required by the cooks, the butcher, the tailor, the carpenter, the nurses, the bankers and accountants as well as the doctors and an ordinary man or woman in the street.

The Federal Republic of Nigeria (2013) in its education policy document stated that Secondary School Education is an instrument for national development that fosters the worth and development of

an individual for further education and general development of the society. The role of Secondary School Education is to lay a foundation for further education and if a good foundation is laid at this level, there are likely to be fewer academic problems at higher institutions of learning. At the Secondary School Education level, the academic performance of the student is paramount. The academic achievements of the students may depend on many factors such as the students' location of the school quality teachers, instructional materials and good Mathematics laboratory. Chukwuemeka (2013) asserted that students in a school that is sited in a noisy area like airport or at the heart of a city may have issues with academic performance. The term location in the context of this study is used in describing the area where the school is located either in the urban or rural area. The academic performance of students in Mathematics is a function of several factors which are inter-related. These factors are either internal or external. That is, it is either within the control of the individual or outside his or her control. These factors are capable of influencing the academic achievement of students in Mathematics, which include school location (Udoh, 2013), and need to be examined empirically.

School location is a factor that may likely affect the academic performance of students in the learning of Mathematics. Rural students tend to manifest more-simple social relationship due to greater interpersonal ties in rural settings. Bassey, Joshua and Asim (2008) found that urban students showed complex social relationships. Hence, the location of a school may be a factor that can affect students' academic performance. For instance, schools that are located in the rural areas may not have good number of qualified teachers for the fact that teachers find it difficult to work in the rural that lack the basic amenities. A rural area is an area with little or no basic infrastructures such as electricity, pipe borne water, good road network, good markets, hospitals, poor offices as well as banks and recreational centres. According to Chukwuemeka (2013), one of the factors that may influence academic performance is a school location. The location of a school plays a salient role in evaluating the learning outcomes. That is, it has a tendency of influencing the academic achievement of students especially in Mathematics. Some schools are located in urban areas. It is sometimes perceived that school located in urban areas have more access to educational resources compared to those in rural areas; and these have a way of influencing the teaching and learning process. At times schools in urban settlements may be having challenges due to the over populated nature of most urban areas. The noise and other forms of distraction may not be favourable to the school and as such, the learning outcome of such a school may be questionable.

Mathematics is an indispensable subject in building an educated mind, his reasoning and his personality. Aguele and Usman (2007) opined that Mathematics is the central intellectual discipline of any technological society. These authors added that the state of science and technology in any society depends on the development and application of Mathematics. Therefore, any nation that want to achieve rapid technological growth and development, academic performance in Mathematics is central. Mathematics is the foundation science subject for other science subjects like Physics, Chemistry, Biology and Additional Mathematics. This assuption is supported by the West African Examination Council (WAEC) Chief Examiners' Report of 2000 – 2018 on Senior Certificate Examination Results (2018) which recorded very low percentage passes in Mathematics at credit level in those years. However, with the premium placed on the study of Mathematics at the secondary school levels, there has been a growing decline in the performance of students in Mathematics based on location of school. This has resulted in a decline in the number of students that gain admission into the higher institutions. This is because, credit in Mathematics is a pre-requisite for admission into higher institutions irrespective of the course of study.

The poor performance in Mathematics by students at the secondary school has numerous consequences, prominent among these is lack of individual who have good knowledge of Mathematics, which in term leads to lack of scientific oriented individuals, shortage of engineers and general set back in the development of science and technology in the area of the study and Nigeria at large. Poor performance in Mathematics by secondary school students may also lead to few candidates being

admitted into the higher institutions, since a credit in Mathematics is one of the requirements for admission into the tertiary institutions in Nigeria, irrespective of location of the school. It is on this background that this work is designed to determine school location as a correlate of the academic performance of the students. Poor performance in Mathematics by students in Edo State secondary schools has been one of the problems discussed in seminars, conferences and workshops for many years. Tales of woes about poor academic performance in Mathematics by the students has become a public concern. Many educationists have identified teaching strategies, gender, lack of fund, teachers' qualifications, teaching experience and school location, as factors militating against good academic performance in Mathematics at the secondary schools. Also it has been observed that students shy away from Mathematics even though it is the bedrock of science and technology (Aguele, 2007). The poor academic performance in Mathematics by the students has become a great source of worry as well as discomfort to both parents, school managers, policy makers and various governments responsible for the education of students in secondary schools. In Edo State, the authors observed that there is difference in the academic performance in Mathematics based on location of the students, gender (boys and girls) and the location of the school. School location have been identified as one of the factor that can influence students' academic achievement in Mathematics in Edo State.

For instance, Titus, Dada and Adu (2016) found that school located near border towns and places of economic interest distract students' attention. Babatunde (2015) also found that there is a significant relationship between school in urban and rural areas and academic achievement in Kaduna State. Obi and Amba (2013) also found that there is a significant relationship between school location and students' academic achievement in Mathematics in Cross River State. Bulala, Ramatlala and Nenty (2014) also found that there was a direct significant relationship between school location and students' academic achievement in agriculture junior school certificate examinations in Botswana. Alokan and Arijesuyo (2013) further found that there was strong relationship between school location and students' academic achievement in Ondo State. These previous studies on the influence of school location on academic performance appear to be inconclusive. They also make the authors of this present study to believe that there exist little findings from empirical studies that there is a significant relationship between school location and student's academic performance. Thus, there is a need to empirically investigate the relationship between school location and academic performance in Mathematics. The question brothering the authors of this study at this juncture is that: Does an interplay exist between school location and academic performance of students in Mathematics?

Research Question

The research following questions were raised to guide this present study:

Research Question: What is the level of student's academic performance in Mathematics in senior secondary schools in Edo State based on school location?

Research Hypothesis

The null hypotheses were tested at a 0.05 level of significance:

Research Hypothesis: There is no significant difference between secondary schools in urban and rural areas on students' academic performance in Mathematics in Edo State.

Methods

Research Design

The descriptive survey research design was adopted to test the hypothetical assumption of the present study. It is primarily a nonexperimental research approach, which allow the authors to administers some questionnaire to a sample of respondents in order to describe their attitudes, opinions, behaviours and experiences (Creswell, 2005). As a result, a descriptive survey research design is appropriate for the present study because it would help the authors to collect data from business

educators in order to determine their perceptions on the differential effect of secondary school location on academic performance of students' in mathematics in Edo State.

Participants and Sampling Procedures

The population of this study were all the Senior Secondary School (SSS) II students in the twenty-four Public Senior Secondary Schools in the three education zones of Edo State, which consisted of 2670 SSS II students in Edo State. The source of this data is Post Primary Education Board, Benin City in 2015. The simple random and multistage sampling techniques were used to select the sample for the study. The first stage was to stratify Edo State into three education zones. Edo South, Edo North and Edo central education zones. The second stage was to purposely select two schools from each education zone the number of schools to be six (6) the third stage was to categorize the schools into urban and rural schools, thereby having three urban schools and three rural schools.

Measuring Instrument

A structured questionnaire was used for data collection in the present study. The questionnaire is titled: "Secondary School Location and Academic Performance of Students' in Mathematics. The students Mathematics Performance Test (SMPT) consisted of 40 multiple choice item questions, which was drawn using the Edo State Government Ministry of Education Unified Scheme of Work for senior secondary schools 1 & 2. The SMPT multiple choice item questions were constructed following a Table of specification. The test items were scored one mark for correct answer and a maximum of 40 marks was obtained. The SMPT was used to collect data on the achievement of students in Mathematics.

Validation and Reliability of Instrument

The validity of the SMPT was determined by subjecting the instrument to face validation by five (5) experts, three experts in Educational Foundations and two in Measurement and Evaluation. These experts individually subjected the items to rigorous scrutiny. The purpose was to ascertain the representativeness of the content of the instrument and the extent to which they cover the scope, of the syllabus or the scheme of work. All the experts were given free hand to either delete any item they considered irrelevant or add any other item they considered important but not reflected in the instrument. Their observations and corrections were inputted in the final production of the instrument.

The reliability of the instrument was determined by administering the test to 40 SSS II from Public SSS in Delta State, twice. The instrument was first administered to the students and retrieved, after an interval of two (2) weeks. The instrument was administered to the same group again. The scores obtained from the first and second administrations were thereafter correlated using Pearson's product moment correlation to determine the coefficient (r) of reliability, which yielded a reliability coefficient value of 0.70. The reliability coefficient value of 0.70 indicated that the coefficient value was satisfactorily high; implying that the instrument was adjudged to be reliable for data collection in the study.

Data Collection and Analysis

The instrument was administered to the respondents with the help of five research assistants who were briefed on how to administer and retrieve the questionnaire. The research assistants were teachers of Mathematics in SSS. The instrument was administered and collected the same day. The duration for the test was fifty minutes. Thus, students were expected to answer the questions in 50 minutes. The statistical tool that was used to analyze the data was Mean, Standard Deviation, and t-test.

Results

Research Question: What is the level of student's academic performance in Mathematics in senior secondary schools in Edo State based on school location?

Table 1: Mean and Standard Deviation of Students' Academic Performance in Mathematics Based on School Location

Location	N	Mean	SD	MD
Urban	150	24.06	6.392	
				2.80
Rural	150	21.80	8.385	
	300	22.81	7.640	

Note. N = Total Population, SD = Standard Deviation, MD = Mean Difference.

Table 1 showed the mean scores of academic performance of students in urban schools was 24.06, while the mean scores of academic performance of students in rural was 21.80. Hence, the result suggested that student's academic performance in Mathematics in senior secondary schools in Edo State differs based on their location. This is because, the urban students mean scores was higher than the rural students mean scores.

Research Hypothesis: There is no significant difference between secondary schools in urban and rural areas on students' academic performance in Mathematics in Edo State.

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Table 1: t-test of Academic Performance in senior secondary schools Mathematics in Edo State with respect to school location

Variables	Location	N	$\bar{X}$	SD	df	MD	T	P	Decision
Mathematics Achievement	Urban	150	24.06	6.392	98	2.80	3.752	.002	Sig.
	Rural	150	21.84	8.385					

Note. N = Total Population, X= Mean, SD = Standard Deviation, df = degree of freedom, MD = Mean Difference.

Table 2 showed that the calculated t-value of 3.752 is statistically significant ($p<0.05$). Therefore, the null hypothesis was rejected while the alternate was retained. This implies that there is a significant difference between urban and rural students' academic performance in Mathematics in senior secondary schools in Edo State and school location.

Discussion

The findings of the study showed that there is a significant difference between urban and rural students' academic achievement in Mathematics in senior secondary schools in Edo State. The findings concur with the study of Titus, Dada and Adu (2016) who found that schools located near border towns and places of economic interest distract students' attention in Ogun State. The results also agree with the study of Babatunde (2015) who found that there is a significant interplay between school location (urban and rural) and academic achievement of students in Kaduna State. Similarly, the result is in line with the study of Obi and Amba (2013) who found that there was a significant difference between school location and students' academic achievement in Mathematics in Ikom Local Government Areas in Cross River State. In addition, the findings agree with the study of Bulala, Ramatlala and Nenty (2014) who found a significant difference between school location and students' academic

achievement in junior school certificate examinations in agriculture in Botswana. Furthermore, findings agree with the study of Alokan and Arijesuyo (2013) who found that there was a strong difference between school location and students' academic achievement in Ondo State.

Conclusion

Based on result, it is concluded that a disparity exists in the academic performance of students in mathematics in relation to their school location as students in the urban areas had higher mean scores in Mathematics than the students in the rural areas in the secondary schools in Edo State.

Recommendations

Based on the findings, the following recommendations were made:

1. Mathematics Teachers in rural school should endeavour to improvise on the quality of their class instruction in other to improve on their learning and make them compete favourably with other students in urban schools.
2. The Edo State government should endeavour to provide rural schools with school resources, adequate qualified Mathematics teachers in Mathematics in order to improve the performance of students in Mathematics in the rural areas.

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