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Learning Environment and Academic Performance of Mathematics Students in Public Senior Secondary Schools in Rivers State

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ABSTRACT
The study investigated learning environment and academic performance of mathematics students in public senior secondary schools in Rivers State. The study adopted the correlational research design. The population of this study is 66,164 students which is the total population of senior secondary school students in Rivers State, while a sample size of 399 (152 male and 247 female) students was selected proportionately using the Taro Yamene formula. The simple random sampling technique was adopted for the study. The research instruments used in this study to elicit information from the respondents were Learning Environment Rating Scale (LERS) and 50-item Mathematics Objective Skill Test (MOST) developed by the researchers. Learning Environment Rating Scale (LERS) is a four –point rating scale with response options of Strongly Agree (SA) – 4 points, Agree (A) – 3 points, Disagree (D) – 2 points and Strongly Disagree (SD) - 1 point. Test Blueprint was used to develop the Mathematics Objective Skill Test (MOST) with response options of A. B. C and D. The respondents were required to choose the correct answer. The correct answer was cored 2 marks while the wrong answer was scored zero. Content and face validation of the research instruments were carried out by two (2) Measurement and Evaluation and one (1) Mathematics experts. The reliability of the Learning Environment Rating Scale (LERS) was established using test re-test method and Pearson's Product Moment Correlation Coefficient analysis was used to obtain a reliability coefficient of 0.85. Cronbach Alpha formula was to determine the internal consistency of the Mathematics Objective Skill Test (MOST) which yielded the result of 0.82. These show that the research instruments used in this study are reliable. The instruments were administered to the respondents with the assistance of Mathematics teachers of the secondary schools investigated. The research questions were answered and hypotheses tested at 0.05 alpha level using the Pearson's Product Moment Correlation Coefficient Analysis. Thereafter, t-transformation was used to determine the strength of the calculated r. It was found that instructional facilities, teachers and classroom structure significantly relate with academic performance of mathematics students in selected senior secondary schools in Rivers State. Hence, the study recommends the provision of instructional facilities such as modern laboratories, functional libraries, comfortable classroom structure and effective and competent teachers to improve academic performance of mathematics students.
Keywords: Learning Environment, Academic Performance

INTRODUCTION

No doubt the bedrock of development in Nigeria is education even though there seems to be generous agreement concerning the fall in Nigeria educational standards (Akinsolu, 2010). The consistent reduction in the quality of resources and the negative consequences of the falling standards of education in Nigeria on its posterity is making the school learning environment and students' academic performance a serious concern for the populace. Dike and Umeobika (2013) revealed that recently, the poor performance of some secondary school

students in different subjects as observed in the annual results of Senior School Certificate Examination conducted by WAEC and NECO in Rivers State justifies the assumption of dwindling academic performance of some secondary school students in both internal and external examinations.

It is pertinent to out-stage here that secondary education is an instrument for national development because it molds and forms the individuals who afterwards advance the society (Dike and Umeobika, 2013). More so, secondary schools are said to be important because it is where tertiary institutions draw their students from. Thus, it is obvious to assert that the essence of secondary education is to lay the foundation for further study at a higher level. In their study, Dike and Umeobika found that about 93% of secondary school leavers in any given year do not qualify to gain admissions into higher institution of learning. According to Sam (2011) this is because on yearly basis, poor performance of thousands of students in examinations conducted by NECO and WAEC were recorded, where only 20% of the candidates pass at acceptable credit level. Apart from the rate of failure, report has also u n covered that secondary schools are not meeting the expected end of producing quality students.

Learning environment is referred to as the physical characteristics of a school. Learning and teaching environment ought to inform, communicate, collaborate, produce, scaffold and manage. Also, learning environment encompasses a wide range of components and activities within which learning occurs. However, the overall effects of learning environment on academic performance of secondary school students can be positive or negative. While some researchers show that there is no relationship between the variables, other researches show that there is a relationship between learning environment and the performance of students. Adeyemo (2012) and Ajayi, Haastrup & Osalusi (2010) opined that availability of teachers, classroom structure, instructional facilities and quality of educational facilities such as school buildings, classrooms, chairs, tables, laboratories etc have positive impacts of the academic performance of students. This entails that the school environment is a determinant of the extent to which learning and teaching will be provided. However, Sabitu, Babatunde & Oluwole (2012) confirmed that the availability of these must be merged with a skillful/tactical usage of them in other to ensure effective teaching and learning.

Moore (2008) further asserts that the need for good environment is not in isolation from other factors. Good learning environment must be merged with good standard, qualified teachers, and good management to achieve good academic performances of students in examinations. However, he stated further explain that for effective learning to take place there should be a synergic relationship between high moral, commitment and enthusiasm and high learning. Although, a different argument was put forward by Adepoju (2002) and Owoeye (2000) that in spite of the efforts to ensure the availability of educational training facilities and making students have equal educational opportunities so as to improve their performance in the various examinations, there are series of evidence reviewing poor performance of students in public examinations like senior school certificate examinations (SSCE) and NECO. This implies that despite this claim provision of infrastructural facilities, there is still high negative impact of these facilities on academic performance.

Statement of the Problem

Many secondary schools in Rivers State today are been established at various location by government, private organizations or individuals hence teaching and learning taking place under different environment (Tella, 2008). Each learning environment has its own location, facilities and also operates under different classroom structure, but all the students are expected to write the same standard examination (i.e. Senior Secondary Certificate Examination) at the completion of secondary education. It is obvious to expect a uniform performance from all the candidates since they were taught using the same designed curriculum and syllabus but in most cases some schools seem to do better than others. The problem of this study is that there are various factors that are responsible for the constant failure or success students from various schools. It is this gap that the study seeks to fill hence the need to investigate learning environment and academic performance of mathematics students in public senior secondary schools in Rivers State.

Research Questions

The following research questions guided the study:

1. What is the relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State?
2. What is the relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State?
3. What is the relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State?

Hypotheses

The following hypotheses were formulated and tested at 0.05 alpha level.

1. There is no significant relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State.
2. There is no significant relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State.
3. There is no significant relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State.

METHODS

The study adopted the correlational research design. The population of this study consisted of 66,164 students from senior secondary school in Rivers State. The sample size of 399 students was selected proportionately was used in this study. Taro Yamene formula was employed to compute in order to arrive at the sample size. The simple random sampling technique was adopted for the study. The research instruments used in this study to elicit information from the respondents were Learning Environment Rating Scale (LERS) and 50-item Mathematics Objective Skill Test (MOST) developed by the researchers. Learning Environment Rating Scale (LERS) is a four –point rating scale with response options of Strongly Agree (SA) – 4 points, Agree (A) – 3 points, Disagree (D) – 2 points and Strongly Disagree (SD) - 1 point. Test Blueprint was used to develop the Mathematics Objective Skill Test (MOST) with response options of A. B. C and D. The respondents were required to choose the correct answer. The correct answer was cored 2 marks while the wrong answer was scored zero. Content and face validation of the research instruments were carried out by two (2) Measurement and Evaluation and one (1) Mathematics experts. The reliability of the Learning Environment Rating Scale (LERS) was established using test re-test method and Pearson's Product Moment Correlation Coefficient analysis was used to obtain a reliability coefficient of 0.85. Cronbach Alpha formula was to determine the internal consistency of the Mathematics Objective Skill Test (MOST) which yielded the result of 0.82. These show that the research instruments used in this study are reliable. The instruments were administered to the respondents with the assistance of Mathematics teachers of the secondary schools investigated. The research questions were answered and hypotheses tested at 0.05 alpha level using the Pearson's Product Moment Correlation Coefficient Analysis. Thereafter, t-transformation was used to determine the strength of the calculated r.

RESULTS

Research Question 1

What is the relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State?

Table 1: Relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State

Variables	N	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-value	Decision
Instructional Facilities (X)	399	8259	34687	752051	0.41	Positive (Strong)
Academic Performance (Y)	399	9445	30780			

Table 1 shows the relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State. The calculated r = 0.41 shows a strong positive relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State. This implies that good instructional facilities improves academic performance of mathematics students in public senior secondary schools in Rivers State.

Research Question 2

What is the relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State?

Table 2: Relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State.

Variables	N	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-value	Decision
Trained Teachers (X)	399	4162	24601	692290	0.59	Positive (Strong)
Academic Performance (Y)	399	3074	20540			

Table 2 shows the relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State. The calculated r = 0.59 shows a strong positive relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State. This implies that good trained teachers improves academic performance of mathematics students in public senior secondary schools in Rivers State.

Research Question 3

What is the relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State?

Table 3: Relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State.

Variables	N	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-value	Decision
Classroom Structure (X)	399	5044	16802	99428	0.73	Positive (Strong)
Academic Performance (Y)	399	6845	17301			

Table 2 shows the relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State. The calculated r = 0.73 shows a strong positive relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State. This implies that good classroom structure improves academic performance of mathematics students in public senior secondary schools in Rivers State.

Hypothesis 1

There is no significant relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State.

Table 4: Relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State

Variables	N	∑X ∑Y	∑X² ∑Y²	∑XY	Df	r-cal	t-trans.	t-crit	Decision
Instructional Facilities (X)	399	8259	34687	752051	397	0.41	8.96	1.96	H_o
Academic Performance (Y)	399	9445	30780						Rejected

* Significance at 0.05 level.

Table 4 revealed that the t-transformation value of 8.96 is greater than the t-critical value of 1.96 at 0.05 level of significance and a degree of freedom of 397, the null hypothesis of no significant relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State is hereby rejected while the alternate is thus accepted. The implication is that there is a positive relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State, in other words, instructional facilities improves academic performance of mathematics students.

Hypothesis 2

There is no significant relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State.

Table 5: Relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State

Variables	N	∑X ∑Y	∑X² ∑Y²	∑XY	Df	r-cal	t-cal	t-crit	Decision
Trained Teachers (X)	399	4162	24601	69229	397	0.59	14.56	1.96	H_o
Academic Performance (Y)	399	3074	20540						Rejected

* Significance at 0.05 level.

Table 5 reveals that the t-transformation value is 14.56, which is is greater than the t-critical value of 1.96 at 0.05 level of significance and a degree of freedom of 397, the null hypothesis of no significant relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State is hereby rejected while the alternate is thus accepted. The implication is that there is a positive relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State, in other words, trained teachers improves academic performance of mathematics students.

Hypothesis 3

There is no significant relationship between classroom structure and academic performance of mathematics students in senior secondary schools in Rivers State.

Table 6: Relationship between classroom structure and academic performance of mathematics students in senior secondary schools in Rivers State

Variables	N	∑X ∑Y	∑X² ∑Y²	∑XY	Df	r-cal	t-cal	t-crit	Decision
Classroom Structure (X)	399	5044	16802	99428	397	0.73	21.28	1.96	H_o
Academic Performance (Y)	399	6845	17301						Rejected

* Significance at 0.05 level.

Table 6 indicates that the t-transformation value is 21.28, which is greater than the t-critical value of 1.96 at 0.05 level of significance and a degree of freedom of 397, the null hypothesis of no significant relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State is hereby rejected while the alternate is thus accepted. The implication is that there is a positive relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State, in other words, classroom structure improves academic performance of mathematics students.

DISCUSSION

One of the major findings of this study was that there is a positive significant relationship between instructional facilities and academic performance of mathematics students in public senior secondary schools in Rivers State. In line with this finding, Adeyemo (2012), Ajayi, et' al, (2010) confirmed that instructional facilities and quality of educational facilities such as school buildings, classrooms, chairs, tables, laboratories etc have positive impacts of the academic performance of students. This entails that the school environment is a determinant of the extent to which learning and teaching will be provided. However, Sabitu, Babatunde and Oluwole (2012) confirmed that the availability of these must be merged with a skillful/tactical usage of them in other to ensure effective teaching and learning.

Also it was found that there is a positive significant relationship between trained teachers and academic performance of mathematics students in public senior secondary schools in Rivers State. This finding is supported by Ajayi (1998), Adepoju (2002) and Owoeye (2000) who asserted that inspite of the efforts to ensure the availability of educational training facilities and making students have equal educational opportunities so as to improve their performance in the various examinations, there are series of evidence reviewing poor performance of students in public examinations like senior school certificate examinations (SSCE) and NECO. This implies that despite this claim about teachers and provision of infrastructural facilities, there is still high negative impact of these facilities on academic performance.

Finally, it was found that there is a positive significant relationship between classroom structure and academic performance of mathematics students in public senior secondary schools in Rivers State. To have effective teaching and learning, it lead to the combination of many factors which among others include: the classroom painting and lighting, seats and sitting arrangement, the classroom climate, air quality or ventilation, facilities. Thus, students' academic achievements are tried to these components of learning environment. In the course of this research, the results make clear that students can perform better if classrooms have enough lighting. This further implies that the quality of lighting and painting influence students' academic performance. The research also reveals that poor ventilation must be catered for and equally be discouraged so that the classroom temperature should be kept moderate in order not to hinder quality academic activities. Overcrowd does harm to learning mathematics as indicated by the research.

CONCLUSION

Based on the findings of this study, it was concluded that the learning has significantly improved academic performance of public senior secondary school students. In other words, instructional facilities, trained teachers and classroom structure positively improve academic performance of public senior secondary school students in Rivers State.

RECOMMENDATIONS

Based on the results of this study, the following recommendations were made:

1. The provision of facilities such as modern laboratories, functional libraries, and comfortable classrooms to improve academic performance of mathematics students is necessary
2. Parents and the stakeholders through P.T.A. should work to see that the learning environment conform to UNESCO standard.

3. Government of Rivers State should draw their attention to education by providing the necessary funds to the principals and school administrators by not only providing necessary learning facilities but maintain existing structures.
4. A Board at the level of the state government can be established to regulate private schools to ensure that standards are maintained as to improve the condition of classroom by providing electric fittings besides renovations of schools.

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