

IMPACT OF TEACHERS' QUALITY AND SCHOOL VARIABLES ON THE ACADEMIC PERFORMANCE OF SENIOR SECONDARY SCHOOL STUDENTS' IN MATHEMATICS IN ONDO STATE

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Abstract

The study investigated the impact of teachers' quality and school variables on the academic performance of senior secondary school students in Mathematics in Ose Local Government Area of Ondo state. The study adopted descriptive research design of the survey type. The sample was 200 senior secondary school II students, selected purposefully from four schools. The instrument for data collection was a structured Mathematics questionnaire developed by the researchers. Analysis of Variance (ANOVA) was used for hypothesis one while Multiple Regression Analysis was used for hypothesis two generated for the study. The hypotheses were tested at 0.05 level of significance. Findings from the study revealed that, there is no significant difference in the quality of teachers across the selected schools. The result also showed that, there was a significant positive multiple correlation between the predictor variables (class size, student's behavior, school environment and laboratory adequacy) and academic performance of students in Mathematics in Ondo State. Based on the findings, it was recommended that teachers should endeavour to help the students improve their attitude towards Mathematics so as to enhance their better performance in the subject while the government needs to provide quality education for its people by building more schools and provide the basic infrastructure needed by the schools.

Keywords: Teachers' quality, School variables, Performance, Students, Mathematics.

Introduction

Mathematics education is a vital tool for the understanding and application of science and technology, the discipline plays the vital role of a precursor and harbinger to the much needed technological and of course national development, which has become imperative in the developing nations of the world. Mathematics is generally recognized as the bedrock of several subjects in school curriculum and it is indispensable to the national goal and objectives. Kolawole and Popoola (2009) opined that, Mathematics is an instrument that facilitates the learning of all subjects. Due to the uniqueness of Mathematics, it is classified as a compulsory subject right from the primary school to secondary

school and a subject examination that must be passed in the senior school certificate examination.

Mathematics is an essential subject for consideration for successful outing in certificate examinations like the Secondary School Certificate Examination (SSCE) conducted by West Africa Examination Council (WAEC) and the National Examination Council (NECO) as well as placement examinations like unified tertiary Matriculation (UTME). Stressing the usefulness of Mathematics, Kolawole (2004) described Mathematics as a backbone of a nation. Different teaching techniques have been adopted by pedagogues in order to shore up students'

performance in Mathematics ranging from teacher centre-techniques to other learner-centre methods.

Mathematics teaching can only be result oriented when students are willing and the teachers are favourably disposed, using the appropriate methods and resources in teaching the students. With the current increase in scientific knowledge all over the world, much demand is placed and emphasis is laid on the teacher, the learner, the curriculum and the environment in the whole process of teaching and learning of Mathematics because of its importance. Despite the importance of Mathematics to mankind and the efforts of research to improve on its teaching and learning, the performance of students in the subject remains low in Nigeria. It is on this premise that the present study is based to examine the students' perception on the impact of school variables on their academic performance in senior secondary school Mathematics. The researchers consider some variables of the school as those instruments that could tailor the level of students' academic performance. The school variables include the school size, student behaviour, teacher's quality, school laboratory and school environment.

Environment refers to everything (physical and social factors) external to the systems (students that have the potential to affect all parts of the organization). The environment provided the input as well as make use of the output from the system. Students and teachers comfort is indicated as the most important aspect of any school environment (Zins, Weissberg, Wang and Walberg 2004), if students are comfortable, then learning becomes much easier. Being comfortable is a combination of different factors, adequate usable space, noise control and climate control. The classroom is the most important area of the school because it is where students and teachers spend most of their time and where learning process takes place. Classroom must be designed with effective communication and interaction in mind. Students should be able to see easily and hear the instructor (teacher) and other students' noise must be controlled.

Class Size in Mathematics is an important factor in relation to academic performance of students, large classes may likely have an adverse effect on students' performance in Mathematics class. A

class with highly populated students may result in the teachers not been able to monitor the performance of the students and thus reducing the students' academic performance. Adeyemi (2008) opined that, students in smaller classes, tends to receive adequate attention from the teachers and have better access to the facilities and equipment and therefore able to learn and perform better than the students in larger classes. Teacher/pupil ratio is one of the important factors determining good academic performance of students. The implication of this is that, ratio should be the basis for determining the qualities of teachers required in a school to ensure good quality.

Teaching of Mathematics involves some practical works which can only be effectively taught in the laboratory for easy access to geometrical instruments or instructional materials; however, most schools do not have Mathematics laboratory while the schools that have lack essential facilities. The teaching and learning experience centre on the extent of adequacy of laboratory facilities in the schools and the teachers' effectiveness in the use of materials in the laboratory with the aim of facilitating and providing meaningful learning experiences in the learners. It is generally believed that, constant practice leads to proficiency in what the learner learns during classroom instruction. According to Mamlock-Naaman (2011), he stated in his paper that, laboratory contributed in no small measure to the academic achievement of students. This has given rise to the expectation that laboratory facilities should be adequately provided to secondary schools for effective teaching and learning of Mathematics.

Quality of teachers is another factor considered to have influenced the performance of students' in Mathematics. The importance of teachers is acknowledged all over the world, as they play unique role in educational development of any nation. The quality of teachers in a school will determine the quality of the school system, and the students' performance in public examinations. In any school administration, attitude of a teacher can be likened to the moral conduct, behaviour and acceptance of an administration. Those exhibiting the above are regarded as good teachers. Besides the students' description, bad teachers also share many traits in common such as seeming to become angry when students ask

questions. Dalgety, Coll and Jones (2003) opined that good attitude of a teacher cannot be over emphasized, it can be seen in the ability of a teacher to allocate enough time for students to accomplish a task and communicate clear goal for what is expected. The fact that students' performance in Mathematics at the secondary school level is low is no longer news. Several factors have been reported to be responsible for this decline in students' performance in Mathematics. However, we cannot lose sight of the fact that, in any teaching learning situation, the students, the teachers, the curriculum and the learning environment are the four pivots of teaching learning process. It is on this basis that this study is designed to examine the impact of teachers' quality and school variables on their academic performance in senior secondary school Mathematics.

Statement of Problem

Mathematics is one of the compulsory subjects every child must attempt and pass to acquire education. It seems poor performance of students in Mathematics at the senior secondary school level can be attributed to teachers' quality and some school variables such as; school environment, class size, students behaviour, teachers quality and laboratory adequacy. It seems little prominence has been given to these in connection with academic performance of senior secondary school students' in Mathematics. Therefore, the study investigated the impact of these variables on the academic performance of senior secondary school students' in Mathematics in Ose Local Government Area of Ondo state.

Research Hypotheses

The following hypotheses were formulated to guide the study:

1. School variables (class size, students' behaviour, school environment and laboratory adequacy) will not significantly contribute to academic performance of students' in Mathematics.
2. Teacher's quality will not significantly influence academic performance of students' in Mathematics.

Methodology

This study adopted the descriptive research design of the survey type. The population for this study comprised all senior secondary school two students in Ose Local Government area of Ondo State. A total of two hundred (200) senior secondary school two Mathematics Students, purposively selected from the four randomly selected secondary schools constituted the sample for this study. Fifty (50) students were selected from each School.

The instrument for data collection was a structured Mathematics questionnaire developed by the researchers tagged 'Questionnaire on impact of school variables on performance of students' in Mathematics' (QISVSM). The questionnaire was divided into two parts. Part A was used to obtain the bio-data of the respondents and part B was used to obtain information used for testing the hypotheses raised in this study. To ensure the validity of the instrument, it was subjected to face and content validity. The corrected version was used for data collection.

To establish the reliability of the instrument, the instrument was tested with twenty (20) students, who were outside the main study, and a test-retest reliability coefficient of 0.75 was obtained using Pearson's Product Moment Correlation Analysis. The questionnaire was administered to the students by the researchers and some research assistants. Data collected from the students were analyzed using inferential statistics of Regression Analysis and Analysis of variance (ANOVA) and all hypotheses were tested at 0.05 level of significance.

Results

Hypothesis 1: School variables (class size, students' behavior, school environment and laboratory adequacy) will not significantly contribute to academic performance of students' in Mathematics.

Table 1: Multiple Regression Analysis showing school variables (class size, students behavior, school environment and laboratory adequacy) on academic performance of students' in Mathematics.

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
(Constant)	31.241	8.024			1.321	.074
Class size	2.232	.632	.362		1.213	.011
Students behaviour	.604	1.084	.072		.517	.528
School environment	4.122	1.213	.112		1.214	.010
Laboratory adequacy	2.163	.232	.212		1.126	.028
Multiple R= 0.587, Multiple R ² = 0.329, Adjusted R ² = 0.315, F _{4, 195} =10.312						

P<0.05(significant result), dependent variable: students' academic performance

The following regression can be derived from above table 1.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4$$

Where X_1 = class size, X_2 = students behaviour, X_3 = school environment, X_4 = laboratory adequacy,

b_i = (i = 1- 4) regression weight coefficients, a = constant

The multiple regression relationship between the dependent and independent variables can therefore be given as follow;

$$Y = 31.241 + 2.232X_1 + 0.604X_2 + 4.122X_3 + 2.163X_4$$

From the above, the school variables (class size, students behaviour, school environment and laboratory adequacy) significantly contributed to academic performance of students in Mathematics ($F_{4, 195}=10.312$, $P<0.05$). The null hypothesis is rejected. The table above reveals that there is a significant positive multiple correlation between the predictor variables ($R=0.587$, $P<0.05$). This implies that, all the predictor variables are factors that can influence the academic performance of students in Mathematics. The value of number accounted for coefficient of determinant ($R^2 = 0.315$) indicates that, all the predictor variables jointly accounted for 31.5% of the total variance in academic performance of students in Mathematics while the remaining 68.5% unexplained variation due to other variables that can account for academic performance in Mathematics .

The regression result in the table above reveals that, the most important predictor variable that contributed to the academic performance of students in Mathematics is class size ($\beta = 0.362$) this was closely followed by laboratory adequacy ($\beta = 0.212$), and school environment ($\beta = 0.112$) while the least contribution is students' behaviour ($\beta = 0.072$). The calculated F-ratio (10.312) was significant at 0.05 level of significance. This means that, the predictor variables jointly provide a significant explanation for the variation in academic performance of students in Mathematics in Ondo State.

Hypothesis 2: Teachers quality will not significantly influence academic performance of students' in Mathematics.

Table 2: ANOVA showing influence of teachers' quality and performance of students' in Mathematics.

Source	SS	df	MS	F	P
Between group	12.280	4	3.070	6.850	0.054
Within group	87.400	195	0.484		
Total	99.680	199			

$p>0.05$

Table 2 shows that ($F_{4, 195}$, $p>0.05$). The null hypothesis is not rejected. This implies that, teachers' quality will not significantly influence academic performance of students' in Mathematics across the selected schools.

Discussion

The results also showed that, there was a significant positive multiple correlations between school variables (class size, students' behavior, school environment and laboratory adequacy) and academic performance of students' in Mathematics. This implies that, the variables

jointly provide a significant explanation for the variation in students' academic performance in Mathematics. In terms of magnitude of the weight of regression coefficient, class size had the highest contribution to students' academic performance in Mathematics. This implies that, the less the class size, the better the academic performance of students. This findings was in agreement with the findings of Adeyemi (2008) who asserted that, students in smaller classes tend to receive adequate attention from the teacher and have better access to the facilities and equipment and therefore able to learn and perform better than the students in larger classes. It is also in line with the findings of Egede (2005) who pointed out that, an alarming class size of 100 or more students in the secondary school leave the teacher overworked and therefore unable to exercise patience and positive attitude.

The finding revealed that, laboratory adequacy also affects the performances of students in Mathematics. This corroborates the findings of Adeyegbe (2005) that laboratory adequacy affect the performance in Chemistry. It also supports the findings of Mamlock-Naaman (2011) that laboratory contributed in no small measure to the academic achievement of students. School environment also has effect on the performance of students in Mathematics. This conforms to the findings of Onukwo (2004) who concluded that, a conducive environment enhances a child's growth and development. Students feel happy in a peaceful and friendly environment, where schools located in a noisy urban street are associated with deficits in students' mental concentration, leading to their poor academic performance in Mathematics.

The study revealed that, students' behaviour has effect on their performance in Mathematics; the findings revealed that, some of the students see Mathematics as very difficult, abstract and complex subject and these influence their performance towards the subject and eventually affects their performance in the subject. This corroborates the findings of Eshun (2004) who found that, emotional dispositions have an impact on an individual's behaviour, as one is likely to achieve better in a subject that one enjoys. The finding, however, contradicts that of Nasser and Birenbaum (2004) that students' behaviour had

minor and insignificant effects on Mathematics achievement.

The finding of the study revealed that, teachers' quality has no significant influence on academic performance of students in Mathematics across the selected schools. The result negates the study of Obemeata (1995) who argued that, the quality of teachers is an important input in effective learning and that such high quality outputs expected from students require the input of high quality from the curriculum implementation.

Conclusion

From the findings of this study, it is concluded that four out of five variables could predict the dependent variable. For student's academic performance, school environment, class size, laboratory adequacy and students attitude were predictors as they have significant effects on the academic performance of Mathematics students especially at secondary school level. Quality of teachers was found to have no significant effect on students' performance in Mathematics. This finding was a true reflection of student's perception on the effects of the identified variables on the performance in Mathematics.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Teachers should make use of available resources in the school for effective teaching and learning of Mathematics.
2. Teachers should endeavour to help the students improve their behaviour towards Mathematics so as to enhance better performance in the subject.
3. Government should attempt to encourage and improve the attitude of students to academic work by providing laboratories so that the learning experiences of the students can become more meaningful and the same time interesting.
4. Government should build more classrooms and make sure adequate provisions for seats especially in urban schools to ease the problems of overcrowded classrooms and poor sitting arrangement that presently make learning difficult in public schools.

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