



Correlation of Classroom Characteristics, Parental Socio-Economic Background and Students Mathematics Achievement in Abia State

Nna Izuchukwu & A. O. Ovute

Department of Science Education, Michael Okpara University of Agriculture, Umudike

Corresponding Author: nnaizu@yahoo.com

Abstract

This study investigated the correlation of classroom characteristics, parental socio-economic background and students' achievement in mathematics in Abia State. Two research questions were posed and answered while two hypotheses were formulated and tested at 0.05 level of significance. The study was carried out in Abia State. 12000 SSII students in public secondary school in Abia State formed the population with sample of 300 students drawn from the population through multistage random sampling technique. The study adopted a correlational research design while the instrument used for the study was a questionnaire titled Classroom Characteristics Questionnaire (CCQ) and mathematics achievement test. Data obtained for the study were analyzed using Pearson Product Moment Correlation Coefficient (PPMCC) for research questions to establish the relationship between the variables, while linear regression was used to test the null hypotheses at 0.05 level of significance. The findings revealed the following:- that there is a moderate relationship between classroom characteristics and students' academic achievement, a high relationship between teacher-student relationship and academic achievement. Based on the findings, the following recommendations were made: there is need to put classroom characteristics in order by having a good and conducive environment for learning, provision of facilities to enhance teaching, by both the government and parents

Keywords: Classroom Characteristics, Parental Socio-Economic Background and Students Mathematics Achievement

Introduction

Education is basic and obvious process by which skills, knowledge and attitudes are acquired for improving personal competencies and seeking better opportunities (Obunadike, 2015). Education can be seen professionally as mainly a function of making available the wisdom of the past and present, so that the youth (student) may be mentally, physically and socially equipped to solve the problems of the society; hence emergency of formal education. Education is a fundamental right, the key to sustainable development, a crucial tool for effective participation in society and enhances peace and stability among countries (Ninomiya, 2003). Judith (2001) opined that education is designed for the purpose of providing knowledge, skills or character to students. Education does not only provide knowledge and skill but also inculcates values, training of instincts, fostering right attitude and habits (Ifelumi, 2015). Education equally, is an asset preparation for a life change agent and a means to a useful end (Okebukola, 2009). Education is viewed as the actions through which human beings attempt to produce lasting improvements in the structure of the

psychic disposition of others to retain components they consider positive or to prevent the formation of disposition they consider negative (Dimba, 2014).

This form of education as viewed by (Okereke, 2014), usually has several levels amongst which are secondary education. In Nigeria and other place in the world, secondary education is next stage of education after primary education. Secondary education is therefore a form of education given to children beyond the elementary grades; provided by a high school or college preparatory school. It is aimed at preparing the individual for useful living within the society and for higher education (Federal Republic of Nigeria, (FRN), 2013). Secondary education cycle lasts for a period of six years. It is organized into stages. Junior secondary school which is three years where pre-vocational training is aimed at developing in the students and the senior secondary school. At the end of the junior secondary this, the students will be examined based on the Junior Secondary School Certificate Examination (JSSCE) (FRN, 2013). Therefore, senior secondary education, being the next stage after the junior

secondary education is usually the period every student tend to departmentalize or select subjects based on area of interest or inclination, after which students take the Senior Secondary Certificate Examination (SSCE).

National budget presentation (2010) added that students as well as teachers spend majority of their time in the classrooms and in the school. A teacher is someone whose job is to teach especially in a school, or one who teaches. Teachers are group of individuals trained especially to increase the intellectual abilities and have peaceful living of other people. Essentially teachers are important human resource in the secondary education circles as they are the pivot on which the educational processes hinge. Teachers can influence the outcome of teaching and learning positively or negatively because they manipulate and influence the quality of education in the classroom.

Classroom characteristics such as class arrangement, teaching experience, teaching qualification, teachers and students relationship, classroom values and classroom beliefs all influence student academic development (Montaque & Rinaldi, 2001). Gary, (2009) opined that, how smoothly a classroom runs can make or break a school year for both students and teachers. Classroom activities are therefore structured in ways allowing students to explore, explain, extend and evaluate their progress. The quantity of interactions that students have with their teachers in classroom predicts the students' academic achievement (Gary, 2009). Classroom climate is built up by the pattern of interaction between teacher and students' verbal exchange, asking questions, responding and reacting. It is therefore essential to have a well-managed classroom to improve classroom efficiency and create an environment conducive for learning (Budget Presentation, 2016). Some characteristics that may define a well-managed and efficient classroom include: self-engagement, clear expectations, effective time management, positive work environment, firm discipline.

Effective classroom characteristics put up by the teacher via control of the classroom provide orderliness and safety needed for teaching and learning. Classroom characteristic is one of the neglected areas in our secondary schools, despite the fact that the success or failure of any teaching and learning process depends on the way classroom are managed. Failure to effectively handle the classroom cab have an overall negative influence on the entire school, especially in terms of sound academic performance of the school. When this happens, other negative consequences follow

such as the depletion of the student population of the school because parents/guardians prefer to enroll their children and ward in schools that are performing well academically.

Another worrisome issue in the public secondary schools is that of teacher's quality. Non-professional teachers are being recruited into the system. A professional teacher is one that has passed the Teachers Registration Council of Nigeria (TRCN) professional qualifying examination. A qualified and professional teacher is more likely to change the life of the students by planting the seed of aspiration, noble goals and dreams in the heart of students and be a role model and show the way to greatness to students. A qualified and professional teacher is more likely to resolve and prevent conflict in the classroom, thus bring about a better classroom environment conducive for teaching and learning for better academic performance. In a situation where there are qualified teachers but inexperience, classroom conflict may arise because the teacher is not experience on management issues in classroom therefore teachers experience plays a role in having better classroom environment for learning to take place. Teachers are facilitators that make things happen in the classroom and outside. Teaching experience demonstrates an effective way to motivate students and minimize disruption. Teaching experience involves; teaching method and teaching skills.

Mathematics is one of the core and compulsory subjects taught in secondary schools. It is an important subject in school curriculum and more related to one's daily life (Kurumah & Imoko, 2008). Big (2017) opined that mathematics literacy is crucial for an individual to grow up and be able to understand statistical, economics and daily living skills among other things. This implies that no nation can develop scientifically and technologically without proper foundation of mathematics in the school. A conducive classroom is very important for learning because without the feeling of safety, students will develop anxiety and become uneasy in the classroom. Despite the important qualities of mathematics, there is still poor performance of students' in mathematics at secondary school level. The performance may be related to students' parental socio-economic background and students classroom characteristics. The problem of study is to determine if students' academic achievement could be correlated with classroom characteristics and the parental socio-economic background. The purpose of this study is to correlate classroom characteristics, parental socioeconomic background with academic achievement

of mathematics students in Abia State. The following research questions were posited for the study;

1. What is the relationship between classroom characteristics and students' academic achievement in mathematics?
2. What is the relationship between teacher-student relationship and academic achievement of students in mathematics?

Methodology

Design of the Study

The study is a correlational research design. A correlational research design is the type of research design that measures two or more factors to determine or estimate the extent to which the value for the factors are related or change in an identifiable pattern Rumsey (2016). The correlational research design allows for the computation of statistical measures called the correlation coefficient used to identify the extent to which the values of the two variables or factors are related. The correlation coefficient is a statistics used to measure the strength and direction of the linear relationship, or correlation between two factors and the value of the correlation coefficient range from -1.0 to $+1.0$ (Nnamerenwa, 2018). Since this study seeks to correlate classroom characteristics and parents socioeconomic background with students' academic achievement in mathematics, correlation research design is therefore the most appropriate design for the study.

Participants

The population of the study consisted of 12000 senior secondary two (SS2) students in public secondary schools in the 2020/2021 academic session in Abia State. There are 147 public senior secondary schools in Abia State offering mathematics as indicated in the statistics provided by the Abia State Secondary Education Management Board (2021). Senior secondary two (SS2) students were chosen for the study because they are not new in the secondary education system and must have covered the content area of the study. They can as well understand what classroom characteristics and parental socio-economic background are all about. The sample of the study was 300 students drawn from 25 secondary schools in 7 Local Government Areas and from 3 Educational Zones. The sample size of 26 schools forms 11% of the population while 7 Local Government Areas represents 41% of the population of 7 Local Government Areas in Abia State. This is because Nwanna (2007)

recommended the use of at least 10% sample size for a population of a few thousand. The multistage sampling technique was used to sample the sizes of the education zones, Local Government Areas, schools and students. The multistage was considered appropriate since the sampling of the education zones, Local Government Areas, schools, students were chosen based on different sampling technique.

Data Collection

Two instruments will be used for data collection (questionnaire and mathematics achievement test). The questionnaire titled "Classroom Characteristics and Parental Socio-Economics Background" (CCAPSEB) was developed by the researcher. The questionnaire is grouped into two sections; section A and section B. Section 'A' seeks information on students' demographic data and parental socio-economics background such as: identification number, Students' class, Gender, parents' highest qualification, parental level of education and parents' occupation while section 'B' seeks information on classroom characteristics. The questionnaire has a total of 20 items modeled on a four (4) point rating scale. The response options for items were – Strongly Agree (SA); Agree (A); Disagree (D) and strongly disagree (SD) with numerical values of 4, 3, 2, and 1 points assigned to each of the responses respectively. The mathematics achievement test is 40 multiple choice questions adapted from WAEC past questions and answer booklet from 2017-2020. The multiple questions had four options A, B, C and D with one correct option which is the key. The content covered in the items using SS11 mathematics Curriculum are circle geometry, trigonometry, linear and quadratic equations and algebraic expression and ratios.

Validity Procedures

The two instruments for the study were validated by three (3) different persons to ensure its content and face validity one from the department of measurement and evaluation, another from the department of mathematics education, both from the College of education, Michael Okpara University of Agriculture, Umudike (MOUAE), and one from Mathematics teachers from Ibeku High School. The reliability of the instrument was ascertained through trial-testing of the instrument developed. Thirty (30) SS2 mathematics students outside the sampled schools in Abia State were used. The reason for trial-testing was to determine the internal consistency of the items.

Cronbach alpha was used in determining the reliability of the questionnaire and the reliability coefficient of 0.90 was obtained while kuder Richardson 20 was used to determine the reliability of the achievement test and reliability coefficient of 0.88 was obtained

Data Analysis

Pearson Product Moment Correlation Coefficient as well as coefficient of determination were used to answer research questions while Simple linear regression analysis was used to test hypotheses. F-value of simple linear regressions statistics was used to

determine the significant of the extent of the relationship between the variables at 0.05 alpha levels.

Results

Results in table 1 shows that there is a moderate relationship between classroom characteristics and students' academic achievement in Mathematics. The correlation coefficient $r(.633)$ is a linear correlation between the observed variables which indicated moderate positive relationship. The coefficient of determination (R^2) 0.40 indicated that 40% of the variance observed in students' achievement was accounted for by classroom characteristics.

Table 1: Pearson product moment correlation of relationship between classroom characteristics and students academic achievement in mathematics

Variables	R	R ²	% of Contribution	Decisions
Students achievement	.633			Moderate Relationship
Classroom characteristics		0.40	40	

N = 300

Table 2 shows F-calculated value of .634 at 0.05 level of significance with P value of .040^b which is less than 0.05 level of significant. Therefore the null hypothesis of no significant relationship is rejected.

There is a significant relationship between the classroom characteristics and students' academic achievement.

Table 2: Linear regression analysis for the relationship between classroom characteristics and students academic achievement

Variables	Term	Sum of Square	Df	Mean Square	F.cal	Sig.	Decision
Classroom characteristics	Regression	.238	1	.238	.634	.040 ^b	Significant relationship
	Residual	212.192	298		.040 ^b		
	Total	212.430	299				

The result in table 3 reveals that there was a high relationship between teacher-student relations and students' achievement in Mathematics as indicated by the correlation coefficient $r(0.846)$. The correlation coefficient $r(0.846)$ is a linear correlation between the

observed variable which indicated a high positive relationship. The coefficient of determination indicates 72% of the variance observed on students' achievement in Mathematics.

Table 3: Pearson product moment correlation of relationship between teacher-student relations and academic achievement of students in Mathematics

Variables	R	R ²	% of Contribution	Decisions
Teacher-student relationship	.846**	.715	72	High relationship
Students Achievement		0.40	40	

N = 300

The result on table 4 shows F-calculated value of 750.01 and p-value of 0.003 which is less than 0.05 level of significant. This indicates that the null hypothesis of no significant relationship is rejected.

This implies that there is a significant relationship between teacher-student relationship and academic achievement of students in Mathematics.

Table 4. Linear regression analysis for the relationship between teacher-student relationship and student academic achievement

Variables	Term	Sum of Square	Df	Mean Square	F.cal	Sig.	Decision
Teacher-student relationship	Regression	138.894	1	138.894	750.012	.003 ^b	Significant Relationship
	Residual	55.186	298	.185			
	Total	194.081	299				

Discussion

Relationship between classroom characteristics and students' academic achievement in mathematics. The correlation coefficient $r(.633)$ is a linear correlation between the observed variables which indicated a moderate relationship between classroom characteristics and students achievement in mathematics. The coefficient of determination (R^2)0.400 indicates 40% of the variance observed in students' achievement as accounted for by classroom characteristics.

This findings is in agreement with the work of Iroke (2014) who conducted a research on classroom interaction and students learning outcome in physics and found out a significantly positive relationship between classroom interaction and students learning outcome in physics.

The correlation coefficient $r(.846)$ is a linear correlation between the observed variables which indicated a high relationship between teacher-students relations on academic achievement.

The coefficient of determination (R^2)0.716 indicates 72% of the variance observed in students' achievement as accounted for by teacher-student relationship. The corresponding hypothesis affirmed that there is a significant relationship between teacher-student relationship and academic achievements of students in mathematics. The work is in agreement with Zhuzhu & Chunxia (2019) whose study on the relationship between teacher-student relationship and academic achievement found out a significantly positive relationship between teacher-student relationship and academic achievement.

Conclusion

This study on correlation of classroom characteristics, parental socio-economic background and students' achievement in mathematics in Abia State was carried out in Abia State. Based on the findings of the study the researcher made some conclusions:- that there is a moderate positive relationship between classroom characteristics and academic achievement, high positive relationship between teacher-students relationship. Based on the findings and their educational implications, the following recommendations were made.

1. There is need to put classroom characteristics in order by having a good and conducive environment for learning, provision of facilities to enhance teaching, by both the government and parents.
2. Teacher-student relationship is important for smooth educational pursuit and better achievement. As a result of this, the teachers as well as the student should have a cordial relationship to facilitate teaching and learning.

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