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SCHOOL PLANTS AS PREDICTORS OF STUDENTS' ACADEMIC PERFORMANCE IN PUBLIC SECONDARY SCHOOLS IN ANAMBRA STATE

Onyejekwe, Onyinye Regina
Prof. Zita Obi, & Dr. Ifunanya Ohamobi
Department of Educational Foundations
Faculty of Education
Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus

ABSTRACT

The study examined school plants as predictors of students' academic performance in public secondary schools in Anambra State. Two research questions and two null hypotheses guided the study. The study adopted correlational research design. The population of the study consists 21,272 SS2 students in 267 public secondary schools in the six education zones in Anambra State. The sample of 1,064 SS2 students was used for the study. Multistage sampling procedure comprising proportionate stratified and simple random sampling techniques were used for the study. The instrument 'School Plant Questionnaire (SPQ)' was used for data collection while Students' Academic Performance Scores (SAPS) was used to measure students' academic performance for this study. The instruments were subjected to face and construct validation. The face validation was done using three experts while construct validation was carried out by Principal Component Analysis (PCA) with the help SPSS v.26. The reliability of the instrument was done using Cronbach Alpha technique and the average coefficient values of 0.80 for SPQ was obtained and considered highly reliable and suitable for the study. Simple linear regression statistical tool was used to answer the research questions and test the null hypotheses at 0.05 level of significance. The findings of the study revealed that instructional materials and ICT facilities positively and significantly predict students' academic performance in public secondary schools in Anambra State. The study concluded that school plants are positive and significant predictors of students' academic performance in public secondary schools in Anambra State because it motivates students to learn, increases study engagement, promotes collaborative learning and improves teaching strategies for students to understand. Based on the findings, the study recommended that teachers should put it at the back of their mind that a sound learning is always attributed to the utilization of effective instructional materials and resources in teaching and learning social studies, they should therefore keep on improvising the appropriate instructional materials needed for effective teaching

Keywords: School Plants, Students' Academic Performance.

Introduction

Education has been responsible for the upliftment of the human conditions. The primary concern of education is the elevation of human conditions. Through education, people are enabled to develop their knowledge and skills, adopt new behaviour and be able to survive in the society. All over the world, education is the key to development which clearly demonstrated that education

play vital roles in the development of the individual, society and the nation as a whole. Although, education goes on in all aspects of human endeavour, most societies have set up specific institutions that use variety of means to promote efficient and desirable learning. Thus, in school system, academic success manifests through academic performance.

Academic performance is commonly measured by examinations or continuous assessment. The specified standard is usually called pass mark, and the pass mark is a score above average in which students are considered having passed and below which students are considered having failed. Ezeaku and Obunike (2024) opined that academic performance represents outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university. It is the knowledge attained or skills developed in school. Academic performance signifies the knowledge gained and skills developed in school subjects, often assessed through test scores or grades assigned by teachers. Onyekwelu and Onuorah (2024) noted that academic performance can be measured using various types of tests, either verbal or written. Onyekwelu (2025a) credited that academic performance is students' level of success in their educational pursuits. It reflects their mastery of subject content, application of acquired knowledge and overall commitment to learning.

Positive academic performance is one of the most important goals of the educational process but most often than not this expected positive performance is not achieved as a result of mass failure of students in both internal and external examinations. This situation seems to be a recurring decimal that Uzokife and Mbonu (2023) opined that high failure in academic performance of students in Nigeria is no longer news in recent years. This problem according to Okaforcha (2024) has grown widely that it has led to the fallen standard of education in Nigeria at large of which Anambra state is not exempted. Ohamobi et al. (2025) insisted that there is low academic performance among secondary school students in Anambra State with about 59.5% having grades that could not qualify them for higher class or education. Academic performance at this level determines whether students can successfully transition to higher education or contribute meaningfully to society (Onyekwelu, 2024). This implies that students' academic performance is dropping day by day. There is also a reflection of the recurring poor performance of students in the Senior and Junior School Certificate Examination, which has become a national problem. Consistent lower academic performance at the senior secondary school is a threat to every country's educational system. The academic performance of students is determined by both the human (teacher) and material factor (school plant).

In Anambra State though it is an educationally advantaged state, yet some schools are not living up to expectations as some students perform poorly academically in Mathematics which they may lose confidence in themselves, become discouraged, feel isolated and disconnected from school, scores low in tests, and put in less effort in their studies and increase the risk of antisocial behaviours in the school which continues to worsen the situation. This can lead to a cycle of failure in Mathematics. In support, Adinna and Anokwute (2023) submitted that students who are frequently absent from school may feel anxious about falling behind or fitting in when they return to school. This anxiety can make it difficult for them to engage in Mathematics lesson. Students' academic performance in Mathematics was used because it is one of the compulsory subjects in school. Adinna and Anene (2024) noted that students who have difficulties with basic concepts

may not function effectively, not only in Mathematics as a subject but in all their academic endeavours leading to poor academic performance among students.

Contextually, students' academic performance is a student's success in meeting academic expectations, such as getting good grades, participating in class and understanding the material. It is a measure of a student's ability to apply knowledge, engage with their studies and master subject matter. The responsibility of imparting knowledge revolves around the teacher who plans, organizes and implements the teaching learning process. Thus, for teachers to hold learners together, they require good school plants for effective classroom teaching and learning.

Good teaching promotes good academic performance. Onyekwelu and Adinna (2022) noted that the primary aim of the teaching and learning process is to bring about in the leaner desirable change in behaviour through critical thinking which further leads to better academic performance. The process does not take place in a vacuum but rather in the environment structured to facilitate learning through adequate school plant. The school plant comprises the site, buildings, play grounds, health clinics and all forms of school equipment and all other facilities (Ohaka & Ohaka, 2022). The school plant is also known as the controlled environment which facilitates teaching and learning process as well as well-being of the occupants. Ebimuna (2022) stated that the school plant availability is to satisfy educational goals which have been predetermined by educational planners. A good school plant enhances better school programmes and the community needs by providing a place for psychological and physical safety for students and teachers and enhance the quality and quantity of instructions. Onyekwelu (2025b) noted that well-managed school plants contribute to improved working conditions, thereby motivating teachers. School plant availability include; instructional space, administrative space, classroom facilities, recreational facilities which are relevant in the teaching and learning process in the educational system. The rate at which these spaces may enhance proper teaching and learning depends on the location of structure and facilities within the school environment. A proper school plant in terms of location, structure and facilities would encourage effective teaching and learning and enhance better learning environment.

School plant is the physical expression of the school programmes and activities. It is consciously designed and controlled environment with the aim of achieving teaching and learning activities within the school. It comprises the school site and all the structures that have been put in place to aid effective teaching and learning in the school system. Salami (2022) listed school plants to include blocks of classroom, laboratories, workshops, libraries, equipment, consumables, electricity, water, visual and audiovisual aids, tables, desks, chair, playground, storage space and toilets. School plants will enhance better school programmes and the community needs by providing a place for psychological and physical safety for students and teachers and enhancing the good quality and quantity of instruction. Ebimum (2022) listed school plant as school buildings, libraries and laboratories, ICT facilities, classrooms, etc. in the words of Elujekwute et al. (2023) school plants included school buildings, physical environment, instructional materials, libraries, equipment, chair, playground, storage space and toilets among others. Mbanugo et al. (2024) noted school plants to include ICT facilities, school buildings, instructional materials, libraries, physical environment, and classroom equipment among others.

Contextually, school plants refer to all the physical facilities that support teaching and learning activities, including the school buildings, classrooms, laboratories, libraries, furniture, playgrounds and other equipment. It is also the sum total of building, equipment, textbook including the surrounding where teaching and learning takes place in the area of a school that are used by students or used to directly support the school. In this study, school plant was delimited to instructional materials and ICT facilities.

The use of instructional materials is indispensable in the teaching and learning process. They are essential tools which enhance the assimilation, comprehension, application and retention of concepts in any subject. Instructional materials are used to make teaching and learning more meaningful and comprehensible to learners. Itanka (2023) defined instructional materials as those resources used to facilitate teaching and learning. Instructional resources are people, events, places or materials that are used to enhance learning, usually by simplifying a difficult situation or making uninteresting learning attractive. It is simply resources used for effective implementation of any educational programme. In the same vein Mbanugo *et al*. (2024) described instructional resources as human or non-human materials which a teacher uses to pass information to learners in the classroom. What qualifies resources to be tagged as instructional or educational is when they are used for communication and dissemination of information in the teaching and learning environment (Ogundeji *et al*., 2024). The demand for instructional materials' utilization in the teaching and learning is very important as it could enhance students' academic performance, retention and application of skills. Teachers' use of instructional materials in the classroom can be enhanced through good ICT facilities in the school.

Information and Communication Technologies (ICT) facilities are technological equipment that allows access to information through telecommunications. ICT includes a variety of technologies, such as: the internet, wireless networks, social media, and cell phones. ICT facilities can be used in a variety of settings, including libraries, schools, and academic institutions. Ebimuna (2022) opined that ICT facilities refers to technologies or devices that provides access to information through telecommunications such as the internet, wireless networks, social media, cell phones and other communications mediums. ICT facilities also include computer labs, electronic whiteboards, laptops, and tablet computing devices. The use of ICT is a valuable tool to enhance the learning experience and accessing resources. Nwosu (2023) posited that ICT is increasingly playing an important role in organizations and in society's ability to produce, access, adopt and apply information. It is however being heralded as the tool for the post-industrial age and the foundations for a knowledge economy due to its ability to facilitate the transfer and acquisition of knowledge. ICT facilities as part of school plants are yet to be fully explored by schools as a way of boosting the academic performance of students.

The ever-increasing fluctuations in academic performance of students in Mathematics in public secondary schools in Anambra State are a serious concern and unpalatable signal to the development of the state economy and even the nation as a whole. This continues to militate against the objectives of education to provide students with basic knowledge in various concepts and principles through efficient selection of content and sequencing. These laudable objectives are not being achieved as the performance of students in Mathematics has been fluctuating consistently. The fluctuating rate of academic performance of students in Mathematics in public

secondary schools in Anambra State is becoming more worrisome than envisaged that one begins to wonder if teachers possess the quality and apply proper management practices in managing students in classroom. Evidence from the report of WAEC chief examiner's report (2023) showed that students' academic performance in Mathematics in WAEC reduced by 8 per cent between 2021 and 2023 while students' academic performance in Mathematics in NECO was reduced by 12 per cent between 2021 and 2023. This however necessitated the researcher to carry out an analytic examination of school plants as predictors of students' academic performance in public secondary schools in Anambra State.

Purpose of the Study

The main purpose of the study was to examine school plants as predictors of students' academic performance in public secondary schools in Anambra State. Specifically, the study sought to:

1. examine the predictive value of instructional material on students' academic performance in public secondary schools in Anambra State.
2. determine the predictive value of ICT facilities on students' academic performance in public secondary schools in Anambra State.

Research Questions

The following research questions guided the study:

1. What is the predictive value of instructional materials on students' academic performance in public secondary schools in Anambra State?
2. What is the predictive value of ICT facilities on students' academic performance in public secondary schools in Anambra State?

Hypotheses

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

1. Instructional materials do not significantly predict students' academic performance in public secondary schools in Anambra State?
2. ICT facilities do not significantly predict students' academic performance in public secondary schools in Anambra State?

Research Method

The study was carried out in Anambra State. The study adopted correlational research design. The population of the study consists 21,272 SS2 students in 267 public secondary schools in the six education zones in Anambra State. The sample of 1,064 SS2 students was used for the study. Multistage sampling procedure comprising proportionate stratified and simple random sampling techniques were used for the study. The instrument 'School Plant Questionnaire (SPQ)' was used for data collection while Students' Academic Performance Scores (SAPS) was used to measure students' academic performance for this study. The instruments were subjected to face and construct validation. The face validation was done using three experts while construct validation was carried out by Principal Component Analysis (PCA) with the help SPSS v.26. The

reliability of the instrument was done using Cronbach Alpha technique and the average coefficient values of 0.80 for SPQ was obtained and considered highly reliable and suitable for the study. Direct method of data administration was utilized by the researcher together with six research assistants. Out of 1,064 copies of the instrument administered, 836(79%) of the instrument were correctly completed and returned. Simple linear regression statistical tool was used to answer the research questions and test the null hypotheses at 0.05 level of significance.

Data Analysis

Research Question One: What is the predictive value of instructional materials on students' academic performance in public secondary schools in Anambra State?

Table 1: Summary of simple regression analysis on the predictive value of instructional materials on students' academic performance in public secondary schools in Anambra State

		Unstandardized *β*	Std. Dev. *β*	Standardized *β*
Constant		34.124	3.852	
Instructional Materials		0.773	0.265	0.752
R	0.752			
R^2	0.679			
Adj. R^2	0.648			

The summary of the simple regression analysis as shown in Table 1 indicated that the regression line has a positive intercept as presented by the constant value of 34.124. This means that if all the variables are held constant or fixed (zero) at the expense of instructional materials, students' academic performance will be valued at 34%. The analysis showed that instructional materials positively predict students' academic performance in public secondary schools in Anambra State as shown by the regression coefficient (R = 0.752). However, the standardized beta is also values at β = 0.752 which revealed that instructional materials is a positive predictor of students' academic performance in public secondary schools in Anambra State. This implies that a unit advancement in instructional materials led to 0.752(75%) advancement in students' academic performance in public secondary schools in Anambra State. Thus, the positive prediction of instructional materials on students' academic performance means that students' academic performance moderately depends on instructional materials in public secondary schools in Anambra State. The coefficient of determination (R^2) value of 0.679 indicated that the explanatory power of the variable was high. This implies that 68% of the variations in students' academic performance in public secondary schools in Anambra State were accounted for by the variations in instructional materials. The adjusted R^2 supported the claim of the R^2 with a value of 0.648 indicating that 65% of the total variation in students' academic performance was explained by instructional materials. Thus, adjusted R^2 supports the statement that the explanatory power of instructional materials is moderately depends on students' academic performance in public secondary schools in Anambra State.

Research Question Two: What is the predictive value of ICT facilities on students' academic performance in public secondary schools in Anambra State?

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Table 2: Summary of simple regression analysis on the predictive value of ICT facilities on students' academic performance in public secondary schools in Anambra State

		Unstandardized *β*	Std. Dev. *β*	Standardized *β*
Constant		28.184	5.239	
ICT Facilities		0.593	0.364	0.575
R	0.575			
R^2	0.516			
Adj. R^2	0.481			

The summary of the simple regression analysis as shown in Table 2 indicated that the regression line has a positive intercept as presented by the constant value of 28.184. This means that if all the variables are held constant or fixed (zero) at the expense of ICT facilities, students' academic performance will be valued at 28%. The analysis showed that ICT facilities positively predict students' academic performance in public secondary schools in Anambra State as shown by the regression coefficient (R = 0.575). In addition, the standardized beta is also values at β = 0.575 which revealed that ICT facilities is a positive predictor of students' academic performance in public secondary schools in Anambra State. This implies that a unit improvement in ICT facilities led to 0.575(58%) improvement in students' academic performance in public secondary schools in Anambra State. Thus, the positive prediction of ICT facilities on students' academic performance means that students' academic performance moderately depends on ICT facilities in public secondary schools in Anambra State. The coefficient of determination (R^2) value of 0.516 indicated that the explanatory power of the variable was moderately strong. This implies that 52% of the variations in students' academic performance in public secondary schools in Anambra State were accounted for by the variations in ICT facilities. The adjusted R^2 supported the claim of the R^2 with a value of 0.481 indicating that 48% of the total variation in students' academic performance was explained by ICT facilities. Thus, adjusted R^2 supports the statement that the explanatory power of ICT facilities is moderately depends on students' academic performance in public secondary schools in Anambra State.

Test of Hypotheses

Hypothesis One: Instructional materials do not significantly predict students' academic performance in public secondary schools in Anambra State.

Table 3: Test of significance on the simple regression analysis on significant predication of instructional materials on students' academic performance in public secondary schools in Anambra State

		Unstandardized *β*	Std. Dev. *β*	Standardized *β*	t-value	p-value
Constant		34.124	3.852		28.209	0.000
Instructional Materials		0.773	0.265	0.752	25.435	0.000
R	0.752					
R^2	0.679					
Adj. R^2	0.648					
F	45.625					0.000

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The summary of the test of significance of simple regression analysis as shown in Table 3 showed that the simple regression coefficient (R) is 0.752 while the R^2 is 0.679 and Adjust R^2 is 0.648. The F-ratio associated with regression is 45.625, the t-test is 25.435 and the P-value = 0.000. Since p-value (0.000) is less than the specified level of significance 0.05, the study therefore rejected the null hypothesis that instructional materials do not significantly predict students' academic performance in public secondary schools in Anambra State and accepted the alternative hypothesis that instructional materials significantly predict students' academic performance in public secondary schools in Anambra State.

Hypothesis Two: ICT facilities do not significantly predict students' academic performance in public secondary schools in Anambra State.

Table 4: Test of significance on the simple regression analysis on significant predication of ICT facilities on students' academic performance in public secondary schools in Anambra State

		Unstandardized *β*	Std. Dev. *β*	Standardized *β*	t-value	p-value
Constant		28.184	5.239		24.736	0.000
ICT Facilities		0.593	0.364	0.575	21.264	0.000
R	0.575					
R^2	0.516					
Adj. R^2	0.481					
F	39.512					0.000

The summary of the test of significance of simple regression analysis as shown in Table 4 showed that the simple regression coefficient (R) is 0.575 while the R^2 is 0.516 and Adjust R^2 is 0.481. The F-ratio associated with regression is 39.512, the t-test is 21.264 and the P-value = 0.000. Since p-value (0.000) is less than the specified level of significance 0.05, the study therefore rejected the null hypothesis that ICT facilities do not significantly predict students' academic performance in public secondary schools in Anambra State and accepted the alternative hypothesis that ICT facilities significantly predict students' academic performance in public secondary schools in Anambra State.

Discussion of the Findings

Findings on the predictive value of instructional materials on students' academic performance in public secondary schools in Anambra State revealed that instructional materials have a positive predictive value of 0.752(75%) on students' academic performance in public secondary schools in Anambra State. This means that increase in instructional materials will bring about 75% increases in students' academic performance in public secondary schools in Anambra State. The study also showed that instructional materials significantly predict students' academic performance in public secondary schools in Anambra State. The findings align with the findings of Odo and Ezeudu (2022) that teaching is more effective when instructional materials are utilized. Similarly, Itankan (2023) confirmed a significant correlation between the use of library materials by students and teachers and improved academic performance. Uzokife and Mbonu (2023) found a direct link between students' engagement and enhanced academic performance through instructional materials in classroom. Ogundeji et al. (2024) analysis indicated that the availability

and use of resources such as chalkboards, math kits, teaching guides, science guides, audio-visual aids, and science kits positively impact the academic performance of students. Nwana and Okeke (2024) submitted in their findings that instructional materials not only stimulate learners but also enhance learning outcomes by engaging relevant senses and making instruction clear and meaningful. Mbanugo et al. (2024) asserted that the evolution of teaching equipment and materials facilitates the teaching-learning process and addresses instructional needs. Similarly, Nwikpo et al. (2024) underscore the crucial role of instructional materials in facilitating the teaching-learning process, thereby improving learning outcomes. Technological advancements have made instructional tools, such as projected and electronic materials, essential for contemporary education, as emphasized by Okechukwu et al. (2024). They argued that these tools are pivotal for knowledge transfer and academic excellence.

Findings on the predictive value of ICT facilities on students' academic performance in public secondary schools in Anambra State revealed that ICT facilities has a positive predictive value of 0.575(58%) on students' academic performance in public secondary schools in Anambra State. This means that increase in ICT facilities will bring about 58% increases in students' academic performance in public secondary schools in Anambra State. The study also showed that ICT facilities significantly predict students' academic performance in public secondary schools in Anambra State. The findings are in line with the findings of Ubulom and Ogwunte (2022) that ICT impacts students' academic performance because it motivates students to learn. Elujekwute et al. (2023) affirmed that the use of ICT facilities in the classroom of learning helps to create interactive classes and make the lessons more fun and enjoyable. Nwosu (2023) in his findings, noted that ICT positively impact students' academic performance by providing access to educational resources and tools that enhance learning. The findings of Ekaette-Nkok (2024), ICT ensures the information needed will be faster and easier to access for the benefit of education, innovation in learning is increasingly developing with e-learning innovations that further facilitate the educational process. Similarly, Mbanugo et al. (2024) findings revealed that students become motivated in learning with the use of ICT, improves study engagement, encourages collaborative learning, and enhances teachers' teaching methods for students to understand, and enhance their learning in the classroom, which at the long run, improve the academic performance of students.

Conclusion

From the results of this study, school plants are driving forces that determine the academic performance of students. Hence, the study concluded that school plants are positive and significant predictors of students' academic performance in public secondary schools in Anambra State because it motivates students to learn, increases study engagement, promotes collaborative learning and improves teaching strategies for students to understand.

Recommendations

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

1. Teachers should put it at the back of their mind that a sound learning is always attributed to the utilization of effective instructional materials and resources in teaching and learning

social studies, they should therefore keep on improvising the appropriate instructional materials needed for effective teaching.

2. Teachers should encourage the students to stick to their academic pursuits using the ICT facilities to improve their academic achievement and character development.

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