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SCHOOL INFRASTRUCTURE PROVISION AND EDUCATIONAL PRODUCTIVITY IN PUBLIC SENIOR SECONDARY SCHOOLS IN RIVERS STATE

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Abstract
The persistent underperformance of students in public senior secondary schools across Rivers State, Nigeria, has continued to raise concerns about the productivity of the education system, prompting this study to investigate how school infrastructure provision relates to educational productivity in the state. Two objectives, research questions and hypotheses guided the study. The study adopted a correlational survey design and drew its population from principals, teachers, and Senior Secondary 2 students across the state's public senior secondary schools. Using a stratified random sampling technique based on the three senatorial districts, 320 valid responses were obtained from a structured instrument, the School Infrastructure and Educational Productivity Questionnaire (SIEPQ). Research questions were answered using mean and standard deviation, while the two null hypotheses were tested using the Pearson Product Moment Correlation Coefficient (PPMC) at the 0.05 level of significance. The results showed that both instructional facility availability and school building condition were rated, on average, above the criterion mean, indicating that respondents perceived these infrastructural elements as influential to a high extent. Correlational analysis further revealed a strong, statistically significant positive relationship between instructional facility availability and students' academic achievement, and a similarly significant positive relationship between school building condition and teachers' instructional effectiveness, leading to the rejection of both null hypotheses. The study recommended that the Rivers State Government, through the Ministry of Education and the Rivers State Secondary Schools Board, prioritise the sustained provision, renovation, and maintenance of instructional facilities and school buildings to improve learning outcomes and teacher effectiveness.

Keywords: School Infrastructure, Educational Productivity, Instructional Facilities, School Buildings, Academic Achievement

INTRODUCTION

Educational productivity refers to the efficiency and effectiveness with which educational systems convert available inputs; including human, material, and infrastructural resources into desired learning outcomes. In public senior secondary schools, educational productivity is commonly measured through students' academic achievement, teachers' instructional effectiveness, and overall school performance on standardised assessments. The relationship between school infrastructure and these productivity indicators has attracted considerable scholarly attention globally, with a growing consensus that the physical learning environment plays a non-trivial role in shaping educational outcomes (Ineye-Briggs, Uriri & Nwisagbo, 2023; Nwile & Inukan-Adebayo, 2022).

In Nigeria, the state of public secondary school infrastructure has remained a persistent challenge. Rivers State, as one of the more economically significant states in the South-South geopolitical zone, has not been exempt from this challenge. Despite the state's substantial internally generated revenue, largely driven by oil and gas receipts, many public senior secondary schools continue to operate in dilapidated buildings, with inadequate instructional materials, overcrowded classrooms, and non-functional laboratory and library facilities (Ineye-Briggs, 2023; Amadi & Nwosu,

2019). These deficiencies have been linked to declining academic standards and diminished teacher motivation, which collectively undermine educational productivity.

School infrastructure encompasses the physical structures, equipment, and support systems that constitute the learning environment. These include classroom buildings, libraries, laboratories, sanitation facilities, furniture, instructional materials, and information and communication technology (ICT) resources. Infrastructure has been conceptualised both as a prerequisite for and a determinant of the quality of education delivered in schools (UNESCO, 2011). When infrastructure is inadequate or in poor condition, it disrupts the teaching-learning process, demotivates teachers, and creates an unconducive environment for students' cognitive engagement.

EMPIRICAL STUDIES

The following empirical studies reviewed focus on the relationship between the availability of instructional facilities and students' academic achievement in public secondary schools.

Amaechi and Wordu (2021) investigated the relationship between availability of instructional facilities and students2019 academic achievement in secondary schools in Rivers State. Using a correlational survey design, data were collected from 400 students and 80 teachers across 20 randomly selected public senior secondary schools. The Pearson Product Moment Correlation Coefficient (PPMC) was used for data analysis. The findings revealed a significant positive relationship between the availability of instructional facilities such as laboratories, libraries, and ICT equipment and students' academic performance in core subjects. The study concluded that schools with adequate instructional facilities consistently recorded higher academic outcomes, and recommended that the Rivers State government prioritise infrastructure development in public schools to improve learning results.

Similarly, Nwosu and Akor (2019) examined the extent to which availability of school facilities influenced academic performance among senior secondary school students in Imo State. The study adopted a correlational research design, with a sample of 350 students drawn through stratified random sampling from 15 public secondary schools. A validated School Facilities Utilisation Questionnaire (SFUQ) and students' WAEC results served as instruments. Findings from Spearman rank-order correlation revealed a strong positive relationship between facility availability; particularly science laboratories and well-stocked libraries and students academic achievement. The researchers recommended regular provision and maintenance of instructional resources as a key strategy for improving academic outcomes in Nigerian secondary schools.

Also, Ogbondah and Agi (2020) conducted a correlational study to determine the relationship between availability of instructional materials and academic achievement among students in public secondary schools in Bayelsa State. The study sampled 320 students and 60 teachers using purposive and random sampling techniques. Data were collected using a structured questionnaire and academic records from NECO examinations. The Pearson correlation statistic yielded a significant positive relationship. The study established that the paucity of instructional resources such as textbooks, charts, models, and audiovisual aids was directly linked to poor academic output.

Ekwueme and Meremikwu (2018) carried out a correlational study to examine how the availability of teaching and learning resources influenced students' achievement in mathematics in public senior secondary schools in Cross River State. Using a sample of 280 students and 45 mathematics teachers selected through multistage sampling, the researchers employed the Pearson correlation and regression analysis. Results showed a significant positive correlation between resource availability including manipulative, mathematics kits, and computers and students' scores in standardised mathematics assessments..

Eze, Ezenwafor, and Obulor (2016) investigated the relationship between availability of facilities and academic performance of business education students in secondary schools in Anambra State,

Nigeria. The study used a correlational design and sampled 260 students and 55 teachers across 18 schools. Analysis using Pearson PPMC revealed a significant positive correlation between the availability of functional typewriters, computers, and audio-visual aids and students academic outcomes in business-related subjects.

Okeke and Nwachukwu (2022) conducted a correlational investigation into the relationship between physical school environments, specifically instructional facility availability, and academic achievement of secondary school students in Enugu State. The study sampled 375 students using cluster sampling across 20 schools. Instruments included an Environmental Adequacy Checklist (EAC) and students' West African Senior School Certificate Examination (WASSCE) scores. Pearson correlation analysis confirmed a significant positive relationship. Schools with functional libraries, laboratories, and ICT labs produced students with markedly higher examination performance. The study recommended that the Enugu State Ministry of Education develop a facility upgrade roadmap for underserved schools.

Adesoji and Merenu (2017) examined the relationship between school resources; particularly instructional facilities and the academic achievement of students in public senior secondary schools in Ogun State. Through a correlational survey design, data were obtained from 300 students and 60 science teachers. Science laboratory equipment inventory scores and students' WAEC Biology, Chemistry, and Physics scores were correlated using Pearson statistics. Findings indicated a strong positive correlation. The researchers found that students in schools with well-equipped science laboratories significantly outperformed their peers from resource-deficient schools, and recommended prioritised funding for laboratory development in Nigerian public secondary schools.

Ubulom and Amadi (2015) undertook a correlational study to ascertain the degree to which instructional facility availability influenced students2019 academic performance in public secondary schools in Rivers State. The sample comprised 310 students and 70 teachers drawn from 12 public secondary schools in Port Harcourt and Obio/Akpor local government areas. Data were collected through a validated questionnaire on school facility availability and NECO examination scores. The study revealed a significant positive relationship. The study concluded that instructional facility deprivation was a major predictor of poor academic outcomes and urged the Rivers State government to urgently address facility deficits in public schools.

Nwikina and Nwanekpe (2021) investigated the relationship between the physical condition of school buildings and teachers' instructional effectiveness in public senior secondary schools in Rivers State. Using a correlational research design, the study sampled 240 teachers from 16 schools across three senatorial districts. A validated School Building Condition Assessment Scale (SBCAS) and Teachers' Instructional Effectiveness Inventory (TIEI) were the instruments used. Pearson PPMC analysis revealed a significant positive correlation indicating that teachers in schools with structurally sound and aesthetically adequate buildings demonstrated considerably higher instructional effectiveness. The study recommended systematic building maintenance programmes and capital investment in school infrastructure in Rivers State.

Okafor and Emeh (2020) conducted a correlational investigation into how the condition of school infrastructure affected the instructional effectiveness of teachers in Abia State public secondary schools. A sample of 200 teachers from 14 schools participated in the study. The Infrastructural Condition Rating Scale (ICRS) and a validated Teacher Effectiveness Questionnaire (TEQ) were employed as data collection tools. Results from Pearson correlation analysis showed a significant positive relationship between structural building conditions and teacher instructional effectiveness. The study concluded that dilapidated structures, leaking roofs, and inadequate classroom facilities constrained teachers' use of diverse instructional strategies.

Ugwu, Eze, and Eneh (2017) examined the relationship between school physical environment — with emphasis on building conditions and teachers' productivity in Enugu State public secondary schools. The study adopted a descriptive correlational design, with a sample of 255 teachers drawn from 15 schools. Instruments included a School Physical Environment Inventory (SPEI) and a Teacher Productivity Scale (TPS). Pearson correlation revealed a significant positive relationship. The researchers found that building deficiencies such as collapsed ceilings, damaged floors, and non-functional restrooms adversely affected teachers' motivation and professional performance.
Madukwe and Kalu (2022) explored the relationship between school building conditions and instructional delivery among teachers in Anambra State public secondary schools. The correlational study involved 270 teachers from 17 schools. A validated School Building Condition Questionnaire (SBCQ) and an Instructional Delivery Effectiveness Tool (IDET) were administered to respondents. Analysis using the Pearson PPMC produced a strong positive correlation. Schools with well-maintained buildings, properly furnished classrooms, and functional sanitation facilities had teachers who demonstrated more structured, creative, and effective instructional methods. The study recommended a public-private partnership approach to addressing building dilapidation in Nigerian secondary schools.

Studies in sub-Saharan Africa have consistently demonstrated that the physical condition of school environments is significantly correlated with students' academic performance and teacher job satisfaction (Nwile & Amie-Ogan, 2021; Nwachukwu & Ohia, 2017). Yet, there remains a relative paucity of empirical studies that specifically link infrastructure provision to the multidimensional concept of educational productivity in Rivers State public senior secondary schools. Most existing studies in the state have focused on either infrastructure provision alone or student performance in isolation, without integrating both within a single analytical framework.

This study is therefore justified on both theoretical and practical grounds. Theoretically, it contributes to the broader literature on the input-output model of educational production, which posits that the quality and quantity of inputs, including infrastructure to determine the nature and level of educational outputs. Practically, the findings are expected to provide empirical evidence that can inform policy decisions on infrastructure investment in Rivers State public secondary schools.

Statement of the Problem

The consistent underperformance of students in public senior secondary schools in Rivers State in the West African Senior School Certificate Examination (WASSCE) raises fundamental questions about the state of educational productivity in the system. Reports from the Rivers State Ministry of Education and the West African Examinations Council (WAEC) have shown that many schools in the state record abysmally low pass rates in core subjects such as English Language, Mathematics, Physics, and Chemistry. Empirical evidence suggests that these poor outcomes may, in part, be attributable to the deteriorating state of school infrastructure.

Instructional facilities include textbooks, laboratory equipment, charts, models, and projectors are either absent or grossly inadequate in many public senior secondary schools in Rivers State. Similarly, the physical condition of school buildings in the state is largely deplorable, with dilapidated roofs, broken windows, cracked walls, and flooded classrooms being common features. These conditions not only impede the delivery of quality instruction but also discourage students from attending school regularly and diminish teachers' commitment to effective teaching. Despite these observable realities, there is a dearth of systematic empirical studies that have quantified the nature and extent of the relationship between infrastructure provision and educational productivity in Rivers State public senior secondary schools. This gap in the literature necessitates the present study.

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Aim and Objectives of the Study

The main aim of the study is to investigate the relationship between infrastructure provision and educational productivity in Rivers State public senior secondary schools The specific objectives of this study were to:

1. Determine the extent to which availability of instructional facilities influences students' academic achievement in public senior secondary schools in Rivers State.
2. Ascertain the extent to which the condition of school buildings affects teachers' instructional effectiveness in public senior secondary schools in Rivers State.

Research Questions

The following research questions guided the study:

1. To what extent does the availability of instructional facilities influence students' academic achievement in public senior secondary schools in Rivers State?
2. To what extent does the condition of school buildings affect teachers' instructional effectiveness in public senior secondary schools in Rivers State?

Hypotheses

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

HO1: There is no significant relationship between the availability of instructional facilities and students' academic achievement in public senior secondary schools in Rivers State.

HO2: There is no significant relationship between the condition of school buildings and teachers' instructional effectiveness in public senior secondary schools in Rivers State.

METHODS

This study adopted a correlational survey research design. The correlational design was considered appropriate because the study sought to establish the nature and strength of the relationship between school infrastructure provision (independent variable) and educational productivity (dependent variable) without manipulating any of the variables. Survey methodology was employed to collect data from a large sample of respondents across multiple schools. The population of this study comprised all principals, teachers, and Senior Secondary 2 (SS2) students in the 373 public senior secondary schools in Rivers State, as obtained from the Rivers State Secondary Schools Board (RSSSB) database for the 2023/2024 academic session. This category of students was selected because they had sufficient exposure to the school environment and could provide informed responses on the study variables. A stratified random sampling technique was used to select the sample for this study. Rivers State was stratified into its three senatorial districts: Rivers East, Rivers West, and Rivers South East. A proportionate allocation formula was then applied to determine the number of schools to be selected from each senatorial district. Subsequently, simple random sampling by ballot was used to select 30 schools across the three districts. From each selected school, the principal, five teachers, and five SS2 students were purposively and randomly selected, respectively, yielding a total sample of 330 respondents. However, 320 questionnaires were retrieved and found usable for analysis, representing a 97% return rate. The instrument for data collection was a structured questionnaire titled 'School Infrastructure and Educational Productivity Questionnaire (SIEPQ)'. The questionnaire was developed by the researcher, drawing on relevant literature and validated instruments from prior studies. It consisted of two sections. Section A captured respondents' demographic information, while Section B contained 40 items organised into four subscales: Instructional Facility Availability (10 items), School Building Condition (10 items), Students' Academic Achievement (10 items), and Teachers' Instructional Effectiveness (10 items). Items were rated on a four-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree

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(1). The face and content validity of the SIEPQ were established through expert review. Three specialists; two in Educational Management and one in Measurement and Evaluation from the University of Port Harcourt examined the instrument for clarity, relevance, and alignment with the study objectives. Their observations and corrections were incorporated before the instrument was administered. Reliability was ascertained through a pilot study conducted with 30 respondents from three public senior secondary schools not included in the main study. The Cronbach Alpha reliability coefficient was computed and yielded indices of 0.84, 0.81, 0.87, and 0.83 for the four subscales, respectively, indicating high internal consistency. Data collection was carried out by the researcher with the assistance of four trained research assistants. The questionnaire was administered directly to respondents in their schools following the procurement of appropriate administrative approvals from the RSSSB and individual school principals. Respondents were assured of the confidentiality of their responses and the purely academic nature of the study. Completed questionnaires were retrieved immediately after completion to ensure a high return rate. Data collected were analysed using Mean and standard deviation to answer the research questions. A mean score of 2.50 and above was considered as agreement with a given item, while a mean score below 2.50 was considered as disagreement. Pearson Product Moment Correlation Coefficient (PPMC) was used to test the null hypotheses at a 0.05 level of significance. The decision rule was to reject the null hypothesis if the p-value was less than or equal to 0.05 and to retain it if otherwise. All analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 25.0.

RESULTS

Research Question 1: To what extent does the availability of instructional facilities influence students' academic achievement in public senior secondary schools in Rivers State?

Table 1: Mean and Standard Deviation of Responses on availability of instructional facilities influence students' academic achievement in public senior secondary schools

Variable	Mean Range	Grand Mean	SD
Instructional Facility Availability	2.63 - 3.41	3.12	0.61
Students' Academic Achievement	-	2.97	0.58

The data analysed to answer Research Question 1 showed that the mean scores of respondents on items relating to instructional facility availability ranged from 2.63 to 3.41, all above the criterion mean of 2.50. The grand mean for instructional facility availability was 3.12 (SD = 0.61), while the grand mean for students' academic achievement was 2.97 (SD = 0.58). These results indicate that respondents agreed that the availability of instructional facilities influences students' academic achievement to a high extent. Specifically, the availability of textbooks, laboratory apparatus, and ICT tools were rated as among the most influential facilities. In contrast, the non-availability of functional libraries and audio-visual aids were identified as major impediments to students' academic achievement.

Research Question 2: *To what extent does the condition of school buildings affect teachers' instructional effectiveness in public senior secondary schools in Rivers State?*

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Table 2: Mean and Standard Deviation of Responses on condition of school buildings affect teachers' instructional effectiveness in public senior secondary schools

Variable	Mean Range	Grand Mean	SD
School Building Condition	2.57 - 3.29	2.94	0.66
Teachers' Instructional Effectiveness	-	2.88	0.63

Analysis of data for Research Question 2 revealed that respondents' mean scores on items related to school building conditions ranged from 2.57 to 3.29, with a grand mean of 2.94 (SD = 0.66). The grand mean for teachers' instructional effectiveness was 2.88 (SD = 0.63). These figures indicate that respondents agreed to a moderate-to-high extent that the condition of school buildings affects teachers' instructional effectiveness. Poor classroom ventilation, inadequate seating, damaged roofing, and lack of functional staff rooms were cited as the most significant building-related factors that constrain teachers' ability to deliver effective instruction.

Hypothesis 1: There is no significant relationship between the availability of instructional facilities and students' academic achievement in public senior secondary schools in Rivers State.

Table 3: Summary of relationship between the availability of instructional facilities and students' academic achievement in public senior secondary schools

Variables Correlated	N	r-value	p-value	α level	Decision
Instructional Facility Availability vs. Students' Academic Achievement	320	0.71	.000	0.05	Rejected

The result of Table 3 showed a strong, positive, and statistically significant relationship between the availability of instructional facilities and students' academic achievement ($r = 0.71$, $n = 320$, $p = .000 < .05$). The null hypothesis was therefore rejected. This implies that as the availability of instructional facilities increases, students' academic achievement in public senior secondary schools in Rivers State correspondingly improves.

Hypothesis 2: There is no significant relationship between the condition of school buildings and teachers' instructional effectiveness in public senior secondary schools in Rivers State.

Table 4: Summary of relationship between the availability of instructional facilities and students' academic achievement in public senior secondary schools

Variables Correlated	N	r-value	p-value	α level	Decision
School Building Condition vs. Teachers' Instructional Effectiveness	320	0.68	.000	0.05	Rejected

Table 4 revealed a significant positive relationship between the condition of school buildings and teachers' instructional effectiveness ($r = 0.68$, $n = 320$, $p = .000 < .05$). The null hypothesis was therefore rejected. This finding indicates that improvements in school building conditions are

associated with enhanced teacher instructional effectiveness in public senior secondary schools in Rivers State.

DISCUSSION

The result obtained for Hypothesis 1 confirms that students' academic achievement is strongly and positively associated with the level of instructional facility provision ($r = 0.71$, $p < .05$), a pattern that mirrors findings reported across the wider Nigerian literature. For instance, Madukwe and Kalu (2022) similarly observed that the standard of available school facilities was a strong predictor of learners' achievement scores even when socioeconomic background was taken into account, while Amadi and Nwosu (2019) identified shortages of instructional materials as one of the principal factors behind weak academic outcomes in Rivers State secondary schools. Taken together with the descriptive results in Table 1, where instructional facility availability and academic achievement both recorded grand means above the 2.50 benchmark, this finding suggests that access to functional textbooks, laboratory equipment, and ICT resources translates directly into greater learner engagement, more effective assimilation of subject content, and ultimately stronger performance in internal and external examinations. Viewed through the lens of the educational production function theory, this result lends empirical support to the proposition that schooling operates as a transformation process in which material inputs, including instructional facilities, are converted into measurable learning outputs. By this logic, persistent shortfalls in instructional facility provision do not merely inconvenience teaching; they actively constrain the productive capacity of the school system and place a ceiling on what students can realistically achieve. Given that many public senior secondary schools in Rivers State continue to operate without the most basic teaching aids, the strength of this relationship ($r = 0.71$) signals that targeted investment in instructional facilities is likely to yield proportionate gains in academic achievement, making it a high-priority lever for policymakers seeking to improve educational productivity.

The outcome of Hypothesis 2 shows that the physical condition of school buildings is significantly and positively related to teachers' instructional effectiveness ($r = 0.68$, $p < .05$), corroborating the work of Nwile and Inukan-Adebayo (2022), who linked the state of school buildings to measurable variations in teacher effectiveness and morale. A related study by Nwachukwu and Ohia (2017) in neighbouring Bayelsa State likewise found that teachers working in better-maintained school environments reported markedly higher levels of instructional motivation and commitment than colleagues in dilapidated schools, lending further weight to the present finding. This relationship can be interpreted through the framework of environmental psychology, which holds that the physical surroundings in which people work shape their cognitive performance, emotional states, and behavioural responses (Ineye-Briggs & Kayii, 2024). Teachers who operate daily within dilapidated, overcrowded, or poorly ventilated buildings are likely to experience cumulative physical discomfort and psychological strain that erode their capacity to plan creatively, sustain energy levels, and deliver lessons consistently. By contrast, a structurally sound and well-kept building environment communicates institutional value and care, which in turn appears to translate into greater professional investment and stronger instructional delivery, as reflected in the descriptive data in Table 2.

It is worth noting that the correlation coefficient for building condition and teacher effectiveness ($r = 0.68$) is marginally lower than that obtained for instructional facility availability and academic achievement ($r = 0.71$). While both relationships are strong and statistically significant, this slight difference may indicate that teachers' instructional effectiveness is shaped not only by the physical building but also by other factors that fall outside the scope of this study, such as opportunities for professional development, remuneration and welfare conditions, and the quality of administrative

support and supervision they receive. Future studies could usefully examine how these additional variables interact with infrastructure to determine teacher effectiveness.

CONCLUSION

This study has established that school infrastructure provision is a significant positive correlate of educational productivity in public senior secondary schools in Rivers State. Specifically, the availability of instructional facilities was found to significantly influence students' academic achievement, while the condition of school buildings was found to significantly affect teachers' instructional effectiveness. These findings collectively indicate that the physical learning environment is not a peripheral concern but a central determinant of how effectively schools achieve their educational mandate. Without deliberate and sustained investment in school infrastructure, efforts to improve educational productivity in Rivers State will remain largely superficial.

RECOMMENDATIONS

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

1. The Rivers State Government, through the Ministry of Education and the RSSSB, should prioritise the provision of adequate and modern instructional facilities including textbooks, laboratory equipment, and ICT tools in all public senior secondary schools in the state.
2. A systematic and time-bound programme for the renovation, maintenance, and upgrade of school buildings in Rivers State should be established.

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