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IMPACT OF EDUCATIONAL FACILITIES ON STUDENTS' ACADEMIC PERFORMANCE: A SURVEY OF PUBLIC SENIOR SECONDARY SCHOOL STUDENTS IN KANIFING MUNICIPALITY, THE GAMBIA

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Abstract
This study examined the influence of science laboratories, core subject textbooks, and classroom furniture on students' academic performance in English Language, Mathematics, and Civic Education among public senior secondary school students in Kanifing Municipality, The Gambia. A quantitative survey design was adopted. Using simple random sampling, 396 students were selected from six public senior secondary schools. Data were collected with the School Facilities and Students' Academic Performance Questionnaire (SFAPQ), which demonstrated excellent overall reliability (Cronbach's α = 0.92). Descriptive statistics, Pearson product-moment correlations, and multiple regression were used. Science laboratories were the most deficient facility (M = 14.2/30), followed by textbooks (M = 9.4/18) and classroom furniture (M = 22.6/40). The overall mean academic performance was 54.8%, while 42.7% of students scored below the 40% pass mark. All three facilities had significant positive correlations with academic performance, with textbooks showing the strongest association (r = 0.52, p < .01). In the regression model, furniture adequacy was the strongest predictor (β = 0.31, p < .001), followed by textbooks (β = 0.28, p < .001) and laboratories (β = 0.18, p = .002). The study recommends targeted investment in furniture, textbooks, and functional laboratories.
Keywords: Educational facilities, Academic performance, Textbooks, Science laboratories and classroom furniture

Introduction

Education is a fundamental driver of human capital development, social mobility, and national progress. For an education system to influence students' academic performance, different forces and factors have to interact. Key among these factors is the adequacy of instructional and physical resources that support teaching and learning (Hanushek, 2007). Educational facilities, which is a broad concept, are narrowed in this study to refer specifically to science laboratories, core subject textbooks (English, Mathematics, and Civic Education), and classroom furniture that are directly utilized by senior secondary school students during classroom learning. The meaningfulness of these facilities in education can be evaluated through students' academic performance, which in this study is based on students' average self-reported examination scores in English Language, Mathematics, and Civic Education.

The pursuit of equitable and quality education has been a major national policy objective in many countries. The Gambia's Ministry of Basic and Secondary Education (MoBSE) explicitly stated in its Education Policy 2016–2030 that access to education must be accompanied by adequate learning materials, improved school infrastructure, and quality teaching and learning conditions (MoBSE, 2016). Recent education financing reviews have acknowledged that, despite expanded enrolment, the provision of educational resources remains under pressure because of funding limitations, increasing school populations, and infrastructural demands within public schools (MoBSE, 2025). These concerns suggest that the quality of education in The Gambia is increasingly linked to the adequacy of school facilities available to learners.

The central focus of this study is linked to educational production function theory, which argues that students' academic performance is produced through the interaction of multiple educational inputs (Hanushek, 2007). The theory further argues that schools transform inputs such as facilities, instructional materials, teacher quality, and student characteristics into educational outputs measured by test scores and examination results. When key inputs are inadequate, the quality of educational outputs may be reduced. This perspective has been applied extensively in educational research across developed and developing countries to explain how resource availability affects learning outcomes (Glewwe et al., 2011). Barrett et al. (2017) conducted a longitudinal study of 3,766 students across 27 primary schools in the United Kingdom and found that classroom physical characteristics, including natural light, air quality, and furniture arrangement, explained 16% of the variance in students' academic progress. Similarly, Uline and Tschannen-Moran (2008) found that school building quality significantly influenced school climate, teacher effectiveness, and student achievement in a study of 139 schools in Virginia, United States. These findings provide evidence of a relationship between the physical learning environment and students' educational outcomes.

Yangambi (2023) examined three public schools in the Democratic Republic of Congo and found that inadequate laboratories, insufficient furniture, and shortages of instructional materials significantly hindered students' examination performance. Boadi (2024) also analyzed education infrastructure inequality in Ghana using district-level data and concluded that inequalities in school facilities accounted for substantial differences in academic achievement. In Kenya, Mwangi (2021) reported that laboratory adequacy was a significant predictor of science performance, explaining 28% of the variance in national examination scores across 120 secondary schools. Asare and Nsiah (2019) found that textbook availability was among the strongest predictors of junior high school examination performance in Ghana, with students having individual textbooks scoring higher than those who shared books. Among the broad categories of school resources, science laboratories, core subject textbooks, and classroom furniture are among the most important at the senior secondary school level. Science laboratories provide opportunities for experimentation, demonstration, and practical verification of concepts taught in science subjects. Ogunleye and Adebayo (2020) found that students in Nigerian schools with well-equipped laboratories performed better in science-related examinations than those in schools without functional laboratories. Core subject textbooks serve as important sources of curriculum content, class exercises, assignments, and revision. Khumalo and Mji (2014) documented those textbook shortages in rural South African schools forced students to share books at high ratios, reducing opportunities for homework completion and examination preparation. Classroom furniture, especially desks and chairs, provides the physical comfort necessary for writing, note-taking, concentration, and orderly participation in lessons. Earthman (2002, 2004) found that poor facility conditions can increase student discomfort and reduce attention, while Igoni and Ohia (2020) reported that classroom furniture adequacy was significantly correlated with student attendance and examination completion rates in Nigerian secondary schools.

Moreover, national education statistics continue to show that increasing enrolment in public senior secondary schools places considerable pressure on available educational facilities (MoBSE, 2025). Kanifing Municipality, being one of the most populated urban regions in The Gambia, represents an educational zone where demand for public senior secondary schooling continues to rise. At the same time, academic performance in core subjects remains a continuing concern within the country's basic education system. These subjects—English Language, Mathematics, and Civic Education—are compulsory and serve as important indicators of students' readiness for the West African Senior School Certificate Examination. English Language proficiency affects performance across subjects, Mathematics competence is foundational for science and commercial subjects, and Civic Education prepares students for responsible citizenship. For the purpose of this study, academic performance is operationally defined as students' average examination scores obtained in English Language, Mathematics, and Civic Education in school-based term examinations, as reported by students. Educational facilities are operationalized as science laboratory adequacy, core textbook availability, and classroom furniture adequacy.

Statement of the Problem

Students' academic performance in core subjects in public senior secondary schools continues to generate concern among educators, parents, and policymakers. English Language and Mathematics remain central subjects for measuring educational outcomes and progression to higher education. Yet, students' academic performance in these subjects continues to reflect unsatisfactory levels of achievement. Persistent weak performance suggests that significant aspects of the teaching and learning environment may not adequately support effective academic attainment at the senior secondary level. At the same time, The Gambia's national education policy acknowledges that improved learning outcomes depend heavily on the adequacy of school infrastructure, instructional materials, and learning support resources provided to students (MoBSE, 2016). However, recent education financing and statistical reports indicate that many public senior secondary schools continue to face resource limitations resulting from enrolment expansion, infrastructure deficits, and constrained educational financing (MoBSE, 2025). This absence of empirical evidence presents a planning and policy challenge. Authorities require objective data to determine whether priority investment should be directed toward laboratory improvement, textbook expansion for core subjects, or classroom furniture provision to improve students' academic performance. Without such contextualized empirical research, interventions may continue to rely on assumptions rather than research-based decisions. In light of this problem, the study sought to examine how the adequacy of selected educational facilities influences students' academic performance in English Language, Mathematics, and Civic Education in public senior secondary schools in Kanifing Municipality, The Gambia.

Research Questions

1. What is the level of adequacy of selected educational facilities (science laboratories, core subject textbooks for English, Mathematics, and Civic Education, and classroom furniture) in public senior secondary schools in Kanifing Municipality?
2. What is the current state of students' academic performance in core subjects (English Language, Mathematics, and Civic Education) in public senior secondary schools in Kanifing Municipality?
3. What is the relationship between selected educational facilities and students' academic performance in core subjects?
4. To what extent do science laboratories, core subject textbooks, and classroom furniture independently predict students' academic performance in core subjects?

Methodology

The study employed a quantitative survey design to examine the current state of educational facilities, measure students' academic performance, and examine relationships between the variables. This design was appropriate because the research objectives required numerical measurement of facility adequacy and performance scores, statistical analysis of correlations, and prediction of academic performance from multiple independent variables (Creswell & Creswell, 2018). The study was conducted in Kanifing Municipality, The Gambia, one of the country's densely populated urban regions. The target population comprised all students enrolled in public senior secondary schools (Grades 10–12) in the municipality. According to MoBSE (2025), approximately 4,200 senior secondary school students were enrolled across six public senior secondary schools in Kanifing Municipality at the time of the study. A two-stage simple random sampling procedure was used. In the first stage, all six public senior secondary schools in Kanifing Municipality were included to ensure full representation of the municipality. In the second stage, within each school, students were stratified by grade level (Grades 10, 11, and 12). Using class rosters obtained from each school administration, 22 students per grade were selected through simple random sampling. This procedure yielded 66 students per school across six schools, totaling 396 students.

Data were collected using the School Facilities and Students' Academic Performance Questionnaire (SFAPQ), a structured instrument developed by adapting items from validated sources (Earthman, 2004; Uline & Tschannen-Moran, 2008) and grounded in the educational production function theory (Hanushek, 2007). The questionnaire contained five sections: demographic background (4 items), science laboratory adequacy (6 Likert-scale items),

core textbook adequacy for English, Mathematics, and Civic Education (8 composite items), classroom furniture adequacy (9 composite items), and academic performance measured by students' self-reported examination scores in English Language, Mathematics, and Civic Education. Content validity was assessed by two senior lecturers in Educational Measurement and Evaluation and one official from the Ministry of Basic and Secondary Education. The panel examined each item for relevance, clarity, and alignment with the research questions, consistent with established approaches to content validation (Polit & Beck, 2006). Face validity was also established through a pilot test with 10 public senior secondary school students. They confirmed that the questionnaire was clear and took approximately 15 minutes to complete. Reliability was determined through internal consistency using Cronbach's alpha coefficient based on a pilot sample of 50 senior secondary school students. The Science Laboratory Adequacy section produced $\alpha = 0.87$, the Core Textbook Adequacy section produced $\alpha = 0.91$, the Classroom Furniture Adequacy section produced $\alpha = 0.84$, and the Academic Performance section produced $\alpha = 0.79$. The overall questionnaire produced $\alpha = 0.92$, indicating excellent reliability (George & Mallery, 2003).

Table 1: Cronbach's Alpha Reliability Coefficients

Construct	Items	Alpha (α)
Science Laboratory Adequacy	6	0.87
Core Textbook Adequacy	8	0.91
Classroom Furniture Adequacy	9	0.84
Students' Academic Performance	3	0.79
Full SFAPQ	26	0.92

Source: Authors' own work.

Prior to data collection, permission was obtained from the Ministry of Basic and Secondary Education and from the principals of the six participating schools. The researchers visited each school, explained the purpose of the study to the selected students, and administered the SFAPQ during regular school hours under the supervision of classroom teachers. Students completed the questionnaire independently. Completed questionnaires were collected on the same day. Data collection took place over a period of three weeks. Data were analysed using the Statistical Package for the Social Sciences (SPSS) Version 26. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to answer Research Questions 1 and 2. Pearson product-moment correlation was used to examine the relationships between educational facilities and academic performance (Research Question 3). Multiple linear regression was employed to determine the independent predictive contributions of science laboratory adequacy, core textbook adequacy, and classroom furniture adequacy to academic performance while controlling for gender and grade level (Research Question 4). The significance level was set at $\alpha = .05$. Ethical approval for the study was obtained from the Institutional Review Board of the International Open University. Informed consent was obtained from all participating students. Participation was voluntary, and students were informed of their right to withdraw at any time without penalty. Anonymity and confidentiality were assured; no names or identifying information appeared on the questionnaires. Data were used solely for research purposes.

Results

The findings of the study are organized according to the four research questions. The results on the adequacy of selected educational facilities, the current state of students' academic performance, the relationship between selected educational facilities and academic performance, and the extent to which science laboratories, core subject textbooks, and classroom furniture independently predict students' academic performance are presented below.

Research Question 1: What is the level of adequacy of selected educational facilities (science laboratories, core subject textbooks, and classroom furniture) in public senior secondary schools in Kanifing Municipality?

Table 2: Mean Adequacy Scores for Educational Facilities

Facility Type	Possible Range	M	SD
Science Laboratory Adequacy	6–30	14.2	4.8
Core Textbook Adequacy	0–18	9.4	3.6
Classroom Furniture Adequacy	0–40	22.6	6.2

Source: Authors' own work.

Table 2 shows that science laboratories were the most deficient facility (M = 14.2 out of a possible 30), followed by core subject textbooks (M = 9.4 out of 18) and classroom furniture (M = 22.6 out of 40). All three facility categories fell below the mid-point of their respective scales, indicating overall inadequacy.

Research Question 2: What is the current state of students' academic performance in English Language, Mathematics, and Civic Education in public senior secondary schools in Kanifing Municipality?

Table 3: Mean Performance Scores by Subject

Subject	M	SD
English Language	55.2	12.4
Mathematics	52.8	14.1
Civic Education	56.4	11.8
Overall Average	54.8	12.3

Source: Authors' own work.

Table 3 shows the mean performance scores across the three core subjects. English Language recorded a mean of 55.2 (SD = 12.4), Mathematics 52.8 (SD = 14.1), and Civic Education 56.4 (SD = 11.8). The overall mean performance was 54.8 (SD = 12.3), indicating that average performance was below the 60% threshold used in this study as a satisfactory level.

Research Question 2 is further answered by Table 4, which presents the distribution of students across the performance categories.

Table 4: Frequency Distribution of Performance Categories

Performance Category	n	%
Below 40 (Failing)	169	42.7
40–69 (Average)	192	48.5
70–100 (Good)	35	8.8
Total	396	100.0

Source: Authors' own work.

As shown in Table 4, 42.7% of students scored below the 40% pass mark, 48.5% obtained average scores (40–69), and only 8.8% achieved good performance (70–100).

Research Question 3: What is the relationship between selected educational facilities and students' academic performance in core subjects?

Table 5: Pearson Correlations between Educational Facilities and Academic Performance

Facility Type	r	p
Science Laboratory Adequacy	0.48	< .01
Core Textbook Adequacy	0.52	< .01
Classroom Furniture Adequacy	0.41	< .01

Source: Authors' own work.

Note. All correlations are significant at p < .01 (2-tailed).

All three educational facilities had statistically significant positive correlations with academic performance ($p < .01$). Laboratory adequacy showed a moderate positive correlation ($r = 0.48$, $p < .01$), textbook adequacy showed

the strongest correlation (r = 0.52, p < .01), and furniture adequacy showed a weak-to-moderate positive correlation (r = 0.41, p < .01). Thus, greater adequacy of each facility was associated with higher academic performance.

Research Question 4: To what extent do science laboratories, core subject textbooks, and classroom furniture independently predict students' academic performance in core subjects?

Table 6: Multiple Regression Analysis Predicting Academic Performance

Predictor	B	SE	β	t	p
(Constant)	32.45	3.21		10.11	< .001
Laboratory Adequacy	0.46	0.15	0.18	3.07	.002
Textbook Adequacy	0.96	0.18	0.28	5.33	< .001
Furniture Adequacy	0.62	0.11	0.31	5.64	< .001
Gender (Male = 1)	1.24	1.02	0.05	1.22	.224
Grade Level	0.89	0.68	0.05	1.31	.191

Source: Authors' own work.

Note. $R = 0.584$, $R^2 = 0.341$, Adjusted $R^2 = 0.332$, $F(5, 390) = 40.28$, $p < .001$. Dependent variable: Overall average academic performance (0–100).

The regression model was statistically significant, $F(5, 390) = 40.28$, $p < .001$, and explained 34.1% of the variance in academic performance ($R^2 = 0.341$; adjusted $R^2 = 0.332$). Furniture adequacy was the strongest independent predictor ($\beta = 0.31$, $p < .001$), followed by textbook adequacy ($\beta = 0.28$, $p < .001$) and laboratory adequacy ($\beta = 0.18$, $p = .002$). Gender and grade level were not significant predictors ($p > .05$).

Discussion of the Findings

The findings show that all three facility categories were inadequate, with science laboratories being the most deficient (M = 14.2/30), followed by core subject textbooks (M = 9.4/18) and classroom furniture (M = 22.6/40). The laboratory finding is consistent with Yangambi (2023), who reported inadequate laboratories and other school infrastructure in public schools in the Democratic Republic of Congo, and with Ogunleye and Adebayo (2020) and Mwangi (2021), who found that functional laboratories were associated with better science performance. Boadi (2024) similarly highlighted infrastructure inequality as a driver of achievement gaps in Ghana. The relative deficiency of laboratories may reflect the higher capital and maintenance requirements associated with laboratory construction, equipment, and consumable materials. The textbook finding is also consistent with Khumalo and Mji (2014) and Asare and Nsiah (2019), who documented the effects of textbook shortages on learning and examination preparation. The inadequate furniture rating similarly supports Earthman's (2002, 2004) and Igoni and Ohia's (2020) arguments that poor physical learning conditions can reduce student comfort, attendance, and attention. Overall, the results indicate that improving the basic availability and condition of these facilities should be treated as an important component of improving the learning environment.

The overall mean academic performance of 54.8% and the finding that 42.7% of students scored below the 40% pass mark indicate that academic achievement in English Language, Mathematics, and Civic Education remains modest in public senior secondary schools in Kanifing Municipality. Mathematics recorded the lowest mean (52.8), which is consistent with ongoing national concerns about mathematics outcomes and with findings from other developing-country contexts where facility constraints have been linked to modest achievement levels (Boadi, 2024; Yangambi, 2023; Glewwe et al., 2011). These results underscore the need for interventions that strengthen the learning environment in which these core subjects are taught.

The results show statistically significant positive relationships between all three facility categories and academic performance. Textbook adequacy had the strongest correlation (r = 0.52), followed by laboratory adequacy (r = 0.48) and furniture adequacy (r = 0.41), with all correlations significant at p < .01. The stronger association for textbooks may be related to their frequency of use for classwork, homework, revision, and independent study.

This interpretation is consistent with Asare and Nsiah (2019) and Khumalo and Mji (2014), who identified textbook availability as an important predictor of students' examination performance. Laboratory adequacy's moderate correlation aligns with Mwangi (2021) and Ogunleye and Adebayo (2020), who reported laboratory conditions as significant predictors of science achievement. Furniture adequacy's positive relationship is supported by Barrett et al. (2017) and Uline and Tschannen-Moran (2008), who linked classroom physical characteristics and building quality to student progress and achievement. The findings also support Glewwe et al. (2011), who noted that school resources are important contributors to educational outcomes, while emphasizing that resources are only part of a wider set of factors influencing achievement. Because the relationships are moderate rather than strong, the results should be interpreted as evidence of association rather than proof that facilities alone determine academic performance.

The regression analysis shows that the three facility categories independently and positively predicted academic performance after controlling for gender and grade level. Furniture adequacy was the strongest predictor ($\beta = 0.31$), followed by textbook adequacy ($\beta = 0.28$) and laboratory adequacy ($\beta = 0.18$). The model explained 34.1% of the variance in academic performance, indicating that the selected facilities make a meaningful contribution while leaving substantial variation attributable to other factors. The strong predictive role of furniture is consistent with the argument that the physical learning environment affects students' comfort, attention, and ability to participate effectively in classroom activities (Earthman, 2002, 2004; Uline & Tschannen-Moran, 2008; Barrett et al., 2017; Igoni & Ohia, 2020). Textbooks were the second strongest predictor, which is understandable because they provide students with regular access to curriculum content and opportunities for independent practice (Asare & Nsiah, 2019; Khumalo & Mji, 2014). Laboratory adequacy was the weakest of the three predictors, which may partly reflect the more subject-specific use of laboratories compared with textbooks and classroom furniture, consistent with Mwangi (2021) and Ogunleye and Adebayo (2020). The non-significant effects of gender and grade level suggest that the observed facility-performance relationships were not substantially different across these two control variables. Taken together, the four research questions indicate that the selected facilities are inadequate, students' overall performance is modest, the three facility categories are positively associated with academic performance, and each facility independently contributes to the prediction of performance. These findings strengthen the case for targeted improvement of the physical and instructional environment in public senior secondary schools in Kanifing Municipality. However, because the study used a quantitative survey design and self-reported academic performance, the findings should be interpreted as evidence of association and prediction rather than definitive proof of causation.

Furniture adequacy was the strongest predictor ($\beta = 0.31$, $p < .001$), which may appear to contradict conventional assumptions that purely academic inputs matter most. This finding is explained by Maslow's hierarchy of needs applied to learning environments: physical comfort is a foundational requirement before cognitive engagement can occur. Earthman (2004) and Barrett et al. (2017) argued that uncomfortable students cannot sustain attention for longer than 15–20 minutes and that classroom physical characteristics explain substantial variance in progress, meaning that even with excellent teachers and textbooks, learning is compromised. In Gambian public schools, where classrooms often exceed 50 students per teacher, the cumulative effect of poor furniture on attention and writing efficiency becomes substantial. Textbook adequacy ($\beta = 0.28$, $p < .001$) emerged as the second strongest predictor because textbooks serve multiple functions—they are the primary source of curriculum content, the main tool for independent study, and the reference for homework completion. Khumalo and Mji (2014) and Asare and Nsiah (2019) documented that students without individual textbooks lose substantial potential study time because they cannot take books home or practice independently. Laboratory adequacy ($\beta = 0.18$, $p = .002$) was the weakest but still significant predictor, which is expected because laboratory use is subject-specific (primarily science subjects) rather than affecting all three core subjects examined in this study, consistent with Mwangi (2021) and Ogunleye and Adebayo (2020). The model explained 34.1% of variance in performance, meaning that facilities alone account for about one-third of why some students perform better than others. This leaves approximately two-thirds of variance unexplained, which Hanushek (2007) attributed to teacher quality, prior

academic preparation, socioeconomic status, parental involvement, and peer effects. The non-significant findings for gender and grade level indicate that facility effects operate equally across demographic groups, supporting the argument that improving facilities benefits all students rather than specific subgroups.

Recommendations

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

1. The Ministry of Basic and Secondary Education (MoBSE) and education authorities should prioritize the rehabilitation and maintenance of classroom furniture in public senior secondary schools, given that furniture adequacy was the strongest independent predictor of academic performance. A dedicated maintenance and replacement schedule should be incorporated into school-support planning.
2. School administrators and school management committees should establish termly furniture audits and repair systems. Broken desks and chairs should be repaired promptly, and replacement needs should be documented and communicated to the relevant education authorities.
3. MoBSE, school administrators, and textbook coordinators should strengthen the distribution, monitoring, and lending of core subject textbooks in English Language, Mathematics, and Civic Education. A controlled textbook-lending system should be used to improve equitable access, accountability, and textbook availability for independent study.
4. School administrators, science teachers, and laboratory personnel should improve the use and maintenance of science laboratories. Where equipment is limited, practical sessions should be carefully scheduled and organized to maximize the use of available facilities while ensuring that students receive meaningful practical experience.
5. Students, teachers, and school leadership should establish simple student-led facility monitoring mechanisms through which shortages or damaged furniture, textbooks, and laboratory equipment are reported promptly. This would strengthen accountability and help schools identify facility problems before they become major barriers to learning.

Conclusion

This study examined the influence of science laboratories, core subject textbooks, and classroom furniture on academic performance in English Language, Mathematics, and Civic Education among public senior secondary school students in Kanifing Municipality, The Gambia. The findings revealed that all three facility types were inadequate, with science laboratories being the most deficient. Academic performance was generally modest, with 42.7% of students scoring below the 40% pass mark. Significant positive correlations existed between each facility type and academic performance, with textbook adequacy showing the strongest association. Furniture adequacy emerged as the strongest predictor in the regression model, followed by textbooks and laboratories, with the three facility categories collectively explaining 34.1% of the variance in academic performance. The study concludes that improving classroom furniture, textbook access, and laboratory conditions should form part of a broader strategy to improve student achievement. The findings also indicate that facility improvement should be accompanied by attention to other determinants of academic performance, including teaching quality, students' prior preparation, and home and school support. Low-cost interventions such as repair schedules, textbook-lending systems, coordinated practical sessions, and student-led facility monitoring can complement longer-term investment in educational infrastructure.

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