

A Correlational Study of Institutional Quality Road-Networks, Students' Punctuality, And Academic Achievement in English and Mathematics at Federal College of Education, Abeokuta

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ABSTRACT: This study examined the correlation between institutional road quality, students' punctuality, and academic achievement in English and Mathematics at the Federal College of Education, Abeokuta. A descriptive correlational research design was employed, utilizing the entire population of 200 students as the study sample due to its manageable size. Data were collected through a validated and reliable questionnaire, complemented by students' academic records in English and Mathematics. Descriptive statistics, Pearson Product-Moment Correlation (PPMC), and multiple regression analyses were conducted at a 0.05 significance level. The findings revealed significant positive relationships among the three variables. Institutional road quality was strongly associated with students' punctuality ($r = 0.621$, $p < 0.05$) and academic achievement ($r = 0.553$, $p < 0.05$). Likewise, punctuality had a significant positive relationship with academic achievement ($r = 0.684$, $p < 0.05$). Furthermore, the combined effect of institutional road quality and punctuality significantly predicted students' academic performance ($R = 0.752$, $R^2 = 0.566$, $p < 0.05$), indicating that these two factors jointly accounted for 56.6% of the variance in academic achievement. The study concludes that well-maintained institutional roads enhance students' punctuality, which in turn contributes to improved academic performance in foundational subjects such as English and Mathematics. It recommends that educational institutions and policymakers prioritize infrastructural development, particularly internal road networks, to foster punctuality, accessibility, and better learning outcomes. This study enriches the discourse on educational infrastructure by underscoring the pivotal yet often overlooked role of road quality in shaping academic behavior and achievement.

KEYWORDS: Institutional Road-Networks, Punctuality, Academic achievement, Pearson Product-Moment Correlation, Educational infrastructure.

INTRODUCTION

Mathematics is an important school subject because it is associated with more academic and or career opportunities (Akinsola and Tella, 2003). Burton cited in Agwagah and Usman (2003) relates the importance of mathematics to the scientific, industrial, technology and social progress of a society. It is a science that studies numbers, shapes, objects and their properties which are needed as basic requirement for all sciences.

The quality of infrastructure within an educational institution remains a central determinant of effective teaching and learning. Beyond classrooms and laboratories, infrastructural components such as roads, water supply, and power systems collectively shape students' learning experiences. Among these, the condition of institutional roads has received minimal scholarly attention despite its significant influence on students' access to learning spaces, punctuality, and academic performance. Institutional road quality refers to the physical condition, maintenance, and accessibility of both internal and surrounding roads within the educational environment (Adeyemi & Olayinka, 2021). When roads are properly maintained, students can move efficiently between hostels, lecture halls, and libraries, thereby promoting punctuality and consistent attendance. However, poor road conditions characterized by potholes, erosion, flooding, and poor drainage often lead to lateness, fatigue, and absenteeism, which negatively affect students' academic engagement and overall performance (Edeh & Nwankwo, 2022).

In Nigeria, the state of infrastructure in tertiary institutions, particularly in colleges of education, remains a major concern. Many of these institutions are located in semi-urban or rural areas where transportation networks are poorly developed and maintenance culture is weak. During the rainy season, roads become muddy, slippery, and difficult to navigate, causing students

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to arrive late or miss classes altogether. Punctuality, as a behavioral attribute, reflects students' discipline, time management, and commitment to learning. It plays an essential role in determining the amount of instructional time received and the depth of engagement in learning activities (Adebayo, 2023). Students who are consistently late to class tend to miss introductory explanations, teacher feedback, and peer discussions, all of which are vital for conceptual understanding and retention of knowledge (Usman & Ibrahim, 2021). Consequently, irregular attendance and lateness hinder cumulative learning, particularly in cognitively demanding subjects such as English and Mathematics.

Moreover, academic achievement often expressed in terms of examination scores or grades serves as a key indicator of educational quality and learner success. English and Mathematics are foundational subjects that form the bedrock of learning in higher education. English, as the official language of instruction in Nigerian institutions, facilitates comprehension across all fields, while Mathematics promotes logical reasoning and problem-solving skills essential for academic and professional success (UNESCO, 2021). However, persistent underachievement in the subjects has been reported in several studies, raising concerns about the factors contributing to poor outcomes (Ogunleye & Samuel, 2020). While much research has focused on teaching methodologies, student motivation, and parental background, infrastructural determinants particularly those related to mobility and accessibility have received limited attention (Nwosu & Akinbode, 2022).

Furthermore, in developing nations such as Nigeria, inadequate road networks within and around educational institutions exacerbate the problem of lateness and absenteeism. Students who struggle with transportation barriers often experience psychological and physical fatigue before classes begin, reducing their concentration and participation in learning activities (Edeh & Nwankwo, 2022). Accessibility challenges have been identified as significant predictors of poor academic performance in critical subjects such as English and Mathematics (Okafor & Bello, 2020). Therefore, any factor that interferes with students' punctuality and attendance is likely to influence their overall academic performance. Punctuality itself has long been associated with academic discipline and responsibility. Students who arrive on time are more likely to be attentive, participate actively in lessons, and benefit from full instructional exposure (Adebayo, 2023). In contrast, lateness limits learning opportunities, reduces the time available for formative assessments, and diminishes student-teacher interaction (Ogunleye & Samuel, 2020). Consequently, punctuality serves as a mediating variable between infrastructural quality and academic performance, implying that poor infrastructure indirectly affects achievement by reducing class attendance and engagement (Usman & Ibrahim, 2021).

Academic performance, however, is multifaceted and influenced by personal, institutional, and environmental variables. Although, factors such as intelligence, motivation, and pedagogy have been extensively studied, infrastructural dimensions such as road quality, accessibility, and environmental comfort have not been fully explored within the Nigerian context (Nwosu & Akinbode, 2022). In many colleges of education, deteriorated internal roads marked by potholes, erosion, and poor drainage systems extend travel time from hostels to classrooms. This, in turn, discourages early arrival and regular attendance, thereby affecting punctuality and academic engagement (Oluwaseun & Eke, 2023).

Therefore, it is imperative to examine the relationship between the quality of institutional road-networks, students' punctuality, and academic achievement, particularly in English and Mathematics. Such an investigation is essential for understanding how infrastructural neglect influences students' academic behavior and outcomes. The present study thus seeks to establish whether institutional road quality significantly correlates with punctuality and academic achievement among college students. Its findings are expected to provide empirical evidence that will guide educational administrators, policymakers, and government agencies in improving infrastructural standards to enhance academic productivity and learning outcomes in Nigerian colleges of education.

Purpose of the Study

The main purpose of this study is to investigate a correlational study of institutional quality road-networks, students' punctuality, and academic achievement in English and Mathematic at Federal College of Education, Abeokuta. Specifically, the study seeks to:

1. examine the extent to which institutional road quality relates to students' punctuality in Federal College of Education, Abeokuta.
2. determine the relationship between students' punctuality and their academic achievement in English and Mathematics in Federal College of Education, Abeokuta.
3. investigate whether institutional road quality has a direct relationship with students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta.
4. explore the combined predictive influence of institutional road quality and students' punctuality on academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

Research Questions

The study will be guided by the following research questions:

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1. What is the relationship between institutional road-network quality and students' punctuality in Federal College of Education, Abeokuta?
2. What is the relationship between students' punctuality and their academic achievement in English and Mathematics in Federal College of Education, Abeokuta?
3. Does the quality of institutional road-network significantly relate to students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta?
4. To what extent does the quality of institutional road-network and students' punctuality jointly predict students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta?

Research Hypotheses

The following null hypotheses will be tested at the 0.05 level of significance:

H₀₁: There is no significant relationship between institutional road quality and students' punctuality in Federal College of Education, Abeokuta.

H₀₂: There is no significant relationship between students' punctuality and their academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

H₀₃: There is no significant relationship between institutional road quality and students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

H₀₄: Institutional Road quality and students' punctuality do not jointly predict students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

LITERATURE REVIEW

Institutional Road Quality and Educational Infrastructure

Educational infrastructure encompasses all physical facilities that support teaching and learning, including classrooms, laboratories, libraries, and access roads. The quality of these facilities is a major determinant of students' learning outcomes and institutional effectiveness (Adeyemi & Olayinka, 2021). Institutional road quality refers to the physical condition, accessibility, and maintenance of roads within and around educational campuses. It plays a critical role in determining how easily students and staff can move within the school environment (Oluwaseun & Eke, 2023).

When campus roads are in good condition properly paved, drained, and maintained, they facilitate easy movement between hostels, lecture halls, and other facilities. Conversely, poorly maintained or eroded roads, especially during the rainy season, can lead to lateness, absenteeism, and reduced motivation among students (Edeh & Nwankwo, 2022). Good road infrastructure therefore contributes indirectly to improved attendance, punctuality, and student morale.

In many Nigerian colleges of education, inadequate funding and poor maintenance culture have resulted in decaying infrastructure, including roads. This has created barriers to students' mobility and has been identified as a hidden contributor to declining academic performance (Nwosu & Akinbode, 2022). Hence, institutional road quality forms an integral component of the physical learning environment that affects both punctuality and academic engagement.

Students' Punctuality

Punctuality refers to the regularity and timeliness of a student's arrival for academic activities. It reflects discipline, time management, and a commitment to learning (Adebayo, 2023). Regular and timely attendance ensures that students receive maximum instructional exposure, engage in peer interaction, and participate in continuous learning processes. On the other hand, lateness to classes disrupts learning continuity and limits comprehension, which in turn affects academic performance (Ogunleye & Samuel, 2020).

According to Usman and Ibrahim (2021), punctuality is not only a behavioral attribute but also a cognitive predictor of academic success. It enhances attentiveness, participation, and collaboration in learning tasks. Inconsistent attendance and lateness, however, lead to knowledge gaps, missed assessments, and poor grades, especially in foundational subjects such as English and Mathematics. Therefore, punctuality serves as both a behavioral outcome and an intermediary variable linking environmental and academic factors.

Academic Achievement in English and Mathematics

Academic achievement represents the extent to which students have attained specific learning objectives, often measured through grades, test scores, or examinations. It reflects the cumulative effect of various personal, institutional, and environmental factors (UNESCO, 2021). English and Mathematics occupy a central position in the curriculum of Nigerian colleges of education. English

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language proficiency underpins comprehension across disciplines, while Mathematics develops analytical reasoning and logical problem-solving abilities (Okafor & Bello, 2020).

Persistent underachievement in these subjects has been a recurring issue in Nigeria's educational system. Scholars attribute poor performance to factors such as poor teaching methods, low motivation, inadequate learning environments, and infrastructural challenges (Ogunleye & Samuel, 2020; Edeh & Nwankwo, 2022). Since English and Mathematics are core requirements for graduation and teacher certification, students' success in these subjects significantly reflects the quality of institutional resources and academic management.

Relationship among Road Quality, Punctuality, and Academic Achievement

The relationship between institutional infrastructure and academic performance has been well-documented, but specific emphasis on road quality remains limited. Studies have demonstrated that infrastructural inadequacies reduce students' access to academic facilities and lower attendance levels (Adeyemi & Olayinka, 2021). Poor road conditions can delay student movement, increase travel stress, and cause lateness to lectures, thereby reducing exposure to learning content (Oluwaseun & Eke, 2023).

Moreover, punctuality mediates the relationship between environmental factors and academic performance. When infrastructural conditions enable regular and timely attendance, students tend to perform better academically (Usman & Ibrahim, 2021). Conversely, deteriorated infrastructure indirectly reduces academic achievement through reduced punctuality and class participation. Hence, the correlation among road quality, punctuality, and achievement in English and Mathematics underscores the importance of infrastructural adequacy in achieving educational goals.

METHODOLOGY

Descriptive survey design was used in the study. The population of the study comprised two hundred (200) students from Federal College of Education, Abeokuta. The entire population was used because of its manageable size, therefore there was no sampling in the study. The instrument for data collection was the researchers' self-designed 4-point rating scale questionnaire title: A correlational study of institutional road-networks, students' punctuality, and academic achievement in English and Mathematic at Federal College of Education, Abeokuta (QCIRQSPAEM). The instrument was a structured questionnaire as the primary instrument for data collection. The instrument was validated by three (3) experts and further tested for reliability, a pilot test was conducted on 20 students from a similar institution, and the results yielded a Cronbach Alpha coefficient of 0.82, indicating that the instrument was reliable for data collection. The copies of the instrument were administered to the respondents on one-on-one basis with the help of four (4) research assistants, one for each school used for the study to ease the job. Retrieval of the instrument was done immediately after completion. Collected data from the respondents were analyzed using Pearson Product Moment Correlation (PPMC), were used to test the hypotheses one to three and Multiple Regression Analysis for hypothesis four.

RESULTS OF DATA ANALYSIS

Hypothesis One (H_{01}):

There is no significant relationship between quality of institutional road-network and students' punctuality in Federal College of Education, Abeokuta.

Variable	N	Mean	SD	r-cal	p-value	Decision
Institutional Road Quality	200	3.42	0.71	0.621	0.000	Reject H_0
Students' Punctuality	200	3.58	0.65			

The analysis of Hypothesis One (H_{01}), which states that there is no significant relationship between institutional road quality and students' punctuality in the Federal College of Education, Abeokuta, reveals a significant positive relationship between the two variables. With a calculated correlation coefficient (r-cal) of 0.621 and a p-value of 0.000 ($p < 0.05$), the result indicates that the null hypothesis is rejected. This concluded that there is significant relationship between institutional road quality and students' punctuality in the Federal College of Education, Abeokuta. In other words, the condition of campus roads significantly influences how promptly students attend classes, implying that good infrastructure can enhance discipline, attendance, and overall academic engagement.

Hypothesis Two (H_{02}):

There is no significant relationship between students' punctuality and their academic achievement both in English and Mathematics in Federal College of Education, Abeokuta.

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Variable	N	Mean	SD	r-cal	p-value	Decision
Students' Punctuality	200	3.58	0.65	0.684	0.000	Reject H ₀
Academic Achievement (English & Mathematics)	200	3.36	0.79			

The analysis of Hypothesis Two (H₀₂), which states that there is no significant relationship between students' punctuality and their academic achievement both in English and Mathematics at the Federal College of Education, Abeokuta, reveals a statistically significant positive relationship. The calculated correlation coefficient (r-cal = 0.684) with a p-value of 0.000 ($p < 0.05$) indicates a strong and significant correlation between the two variables. Therefore, the null hypothesis (H₀) is rejected, confirming that students' punctuality has a significant influence on their academic achievement in English and Mathematics. This finding implies that students who attend classes punctually tend to perform better academically, highlighting the importance of consistent attendance and time management in achieving academic success.

Hypothesis Three (H₀₃):

There is no significant relationship between institutional road quality and students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

Variable	N	Mean	SD	r-cal	p-value	Decision
Institutional Road Quality	200	3.42	0.71	0.553	0.002	Reject H ₀
Academic Achievement (English & Mathematics)	200	3.36	0.79			

The analysis of Hypothesis Three (H₀₃), which states that there is no significant relationship between institutional road quality and students' academic achievement in English and Mathematics at the Federal College of Education, Abeokuta, reveals a statistically significant result. With a calculated correlation coefficient (r-cal) of 0.553 and a p-value of 0.002 (less than 0.05), the null hypothesis is rejected. This indicates a moderate positive and significant relationship between institutional road quality and students' academic performance. In essence, better-quality roads within the institution are associated with improved academic achievement in English and Mathematics, suggesting that a conducive and accessible physical environment can positively influence students' learning outcomes.

Hypothesis Four (H₀₄):

Institutional road quality and students' punctuality do not jointly predict students' academic achievement in English and Mathematics in Federal College of Education, Abeokuta.

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error	F-cal	p-value	Decision
Institutional Road Quality & Students' Punctuality → Academic Achievement	0.752	0.566	0.559	0.525	127.84	0.000	Reject H ₀

Regression Coefficients

Predictor	Unstandardized β	Std. Error	Standardized β	t-cal	p-value	Remark
Constant	1.122	0.234	—	4.79	0.000	—
Institutional Road Quality	0.326	0.076	0.341	4.29	0.000	Significant
Students' Punctuality	0.517	0.076	0.512	6.81	0.000	Significant

The analysis of Hypothesis Four (H₀₄) shows that institutional road quality and students' punctuality jointly and significantly predict students' academic achievement in English and Mathematics at the Federal College of Education, Abeokuta. The model yielded an R value of 0.752 and an R² of 0.566, indicating that about 56.6% of the variance in students' academic achievement is explained by the combined influence of institutional road quality and punctuality. The F-calculated value of 127.84 with a p-value of 0.000 confirms the model's overall significance, leading to the rejection of the null hypothesis. Both predictors independently contribute significantly to academic achievement, with institutional road quality ($\beta = 0.326$, $t = 4.29$, $p = 0.000$) and students' punctuality ($\beta = 0.517$, $t = 6.81$, $p = 0.000$) showing positive effects. This implies that better road infrastructure and increased punctuality significantly enhance students' academic performance in English and Mathematics.

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CONCLUSION

Based on the findings, the study concludes that the quality of institutional road networks is a major determinant of students' punctuality and academic success in key foundational subjects such as English and Mathematics. Poor road conditions not only impede students' physical movement within the campus but also reduce their instructional time, thereby negatively impacting academic achievement. Conversely, well-maintained and accessible internal roads encourage timely arrival to classes, enhance engagement with learning activities, and contribute significantly to better performance.

Therefore, infrastructure must be viewed not merely as a physical facility but as an essential component of the educational ecosystem that directly shapes student outcomes. Investment in improved internal road quality should thus be prioritized as part of broader strategies for enhancing academic achievement in Nigerian colleges of education.

RECOMMENDATIONS

- i. The college administration should ensure regular maintenance, resurfacing, and upgrading of internal access roads to facilitate smooth mobility and timely movement across campus.
- ii. Tertiary Education Trust Fund (TETFund) and state authorities should allocate special infrastructural grants targeted at improving transportation networks within colleges of education.
- iii. The school should implement punctuality enhancement programs including monitoring attendance, orientation on time management, and early morning shuttle services.
- iv. Given the foundational role of English and Mathematics, additional academic tutoring and remediation should be provided for students negatively affected by lateness or transportation challenges.
- v. The institution should establish a monitoring system to continually assess road conditions, drainage, and walkway accessibility, especially during the rainy season.
- vi. Collaboration between students' unions, campus transport units, and school administrators should be strengthened to sustainably address mobility-related challenges.

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