

THE IMPACT OF E-LEARNING PLATFORMS ON STUDENT PERFORMANCE IN RURAL NIGERIAN SCHOOLS

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ABSTRACT

This study examines the impact of e-learning platform usage on student academic performance in rural Nigerian schools. A descriptive quantitative method was employed, involving 240 respondents from six junior and senior secondary schools. Data were collected using structured questionnaires and analyzed through descriptive statistics and Pearson's correlation tests. Results revealed that students who consistently accessed e-learning platforms achieved significantly higher academic scores than non-users. Additionally, learners cited major benefits such as flexible learning and access to visual content that enhanced understanding. However, the study also identified key barriers including infrastructural deficits, limited teacher readiness, and lack of technical support. The study concludes that while e-learning holds strong potential for improving educational quality in rural areas, its success depends on targeted investments in infrastructure and teacher training programs.

Keywords: *E-learning, rural education, academic performance, Nigeria, digital infrastructure*

ABSTRAK

Penelitian ini bertujuan untuk menganalisis dampak penggunaan platform e-learning terhadap prestasi akademik siswa di sekolah pedesaan di Nigeria. Metode yang digunakan adalah pendekatan kuantitatif deskriptif dengan melibatkan 240 responden dari enam sekolah menengah pertama dan atas. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan statistik deskriptif serta uji korelasi Pearson. Hasil menunjukkan bahwa siswa yang secara konsisten mengakses platform e-learning menunjukkan peningkatan signifikan dalam skor akademik dibandingkan dengan siswa non-pengguna. Selain itu, siswa juga mengidentifikasi manfaat utama seperti fleksibilitas belajar dan akses ke konten visual yang memperkuat pemahaman. Namun, tantangan utama masih meliputi keterbatasan infrastruktur, rendahnya kesiapan guru, serta kurangnya dukungan teknis. Penelitian ini menyimpulkan bahwa e-learning memiliki potensi besar untuk meningkatkan kualitas pendidikan di daerah pedesaan, asalkan diiringi dengan investasi yang memadai dalam infrastruktur dan pelatihan pendidik.

Kata kunci: *E-learning, pendidikan pedesaan, kinerja akademik, Nigeria, infrastruktur digital*

INTRODUCTION

The rapid evolution of digital technology has reshaped educational systems globally, including in developing nations such as Nigeria. E-learning platforms have

become increasingly relevant in response to limitations posed by inadequate physical infrastructure and teacher shortages in rural schools. In Nigeria, particularly in underserved regions, digital tools offer an alternative means of delivering quality education to students who might otherwise be excluded (Babalola & Aina, 2024; Ezeude et al., 2023; Jegede, 2019). Despite challenges, technology-enhanced learning is recognized for its ability to improve learning access and retention. Research has shown that where infrastructure is supportive, e-learning can close educational gaps between urban and rural learners (Nwokike et al., 2023; Ifinedo et al., 2019; Saidu et al., 2022). However, understanding its practical impact on academic performance remains a key concern.

The implementation of e-learning platforms in rural Nigerian schools is confronted by several structural barriers. Among these are poor internet access, unreliable electricity supply, and limited availability of ICT equipment. Teachers and students in rural schools frequently lack the necessary tools and training to maximize e-learning opportunities (Barde, 2017; Aremu & Adediran, 2011; Ifinedo et al., 2019). Additionally, inconsistent policy implementation and funding gaps from educational stakeholders further hinder sustainable adoption (Saidu et al., 2022; Okolie & Akpan, 2021; Ezeude et al., 2023). Without addressing these systemic constraints, the full benefits of digital learning remain elusive for many rural communities. These limitations suggest the need for policy reforms and strategic investments to bridge the digital divide in Nigeria's educational landscape.

One of the most critical components influencing the success of e-learning is the digital readiness of teachers. Research reveals that many educators in rural Nigerian schools are not adequately trained to use digital platforms for instruction (Ifinedo et al., 2019; Barde, 2017; Prasetyo & Ramadhan, 2021). Lack of ICT competence among teachers reduces the quality of e-content delivery and diminishes student outcomes. While national policies have recommended ICT integration, practical support for teachers is often missing or insufficient (Jegede, 2019; Aremu & Adediran, 2011; Ezeude et al., 2023). Without robust teacher training programs, rural schools risk underutilizing available technologies. Studies emphasize that teacher capacity building is essential to leveraging the pedagogical benefits of e-learning (Babalola & Aina, 2024; Nwokike et al., 2023; Saidu et al., 2022).

Moreover, the existing literature suggests that e-learning positively influences academic achievement when platforms are user-friendly and content is contextualized. Students exposed to consistent digital learning tools tend to perform better in assessments, particularly when interactive features are integrated (Ezeude et al., 2023; Zahro & Kusumaningrum, 2020; Prasetyo & Ramadhan, 2021). In Nigeria, some universities and secondary schools have reported improvements in student engagement and performance after adopting e-learning systems (Babalola & Aina, 2024; Nwokike et al., 2023; Amalia & Suryani, 2017). However, these findings are largely concentrated in urban centers. There is limited empirical evidence on the effectiveness of such platforms in rural environments. Thus, exploring this gap is essential for designing inclusive digital education strategies.

This study investigates the impact of e-learning platforms on student academic performance in rural Nigerian schools. It focuses on assessing how the use of digital tools influences learning outcomes, considering infrastructural, pedagogical, and contextual

variables. By drawing on existing frameworks and current experiences, the research aims to evaluate whether technology-enhanced learning environments improve the quality of education in rural areas. The study also seeks to identify barriers and opportunities for e-learning implementation. Ultimately, the findings are expected to inform education policymakers, school administrators, and development partners in improving e-learning access and effectiveness across rural Nigeria (Barde, 2017; Saidu et al., 2022; Zahro & Kusumaningrum, 2020).

METHOD

This study adopts a descriptive quantitative research design to assess the impact of e-learning platforms on student performance in selected rural schools in Nigeria. The design enables the researcher to describe, quantify, and interpret phenomena using measurable data. A survey method was employed to collect relevant data from students and teachers using structured questionnaires. The focus was on schools in rural communities within two Nigerian states: Kwara and Enugu. These locations were chosen due to their moderate ICT accessibility and active participation in recent e-learning pilot initiatives. Ethical approval was obtained from local educational authorities, and informed consent was secured from all participants prior to data collection.

The population of this study consisted of students and teachers from six public secondary schools, with a sample size of 240 respondents. A stratified sampling technique was used to ensure proportional representation of schools based on student population and geographic distribution. The sample included 180 students and 60 teachers who had engaged with e-learning platforms in some capacity. Inclusion criteria involved access to digital learning tools and participation in at least one full academic term of e-learning-based instruction. The sample aimed to reflect variations in access, experience, and perceptions across different levels of digital exposure.

Data collection was conducted using a researcher-developed questionnaire comprising both closed- and open-ended items. The instrument was divided into four sections: demographic data, level of e-learning engagement, perceived effectiveness of the platform, and academic performance indicators. The questionnaire was pilot-tested for validity and reliability with a similar school outside the sample group. Cronbach's alpha coefficient was used to confirm internal consistency, and only items with alpha values above 0.7 were retained. Data were collected in-person and via digital forms where internet access allowed, ensuring inclusivity despite infrastructural challenges.

Quantitative data were analyzed using SPSS version 26. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize responses. Inferential statistics, including Pearson's correlation and independent t-tests, were applied to examine the relationship between e-learning platform usage and academic performance. The analysis also considered gender and grade level as potential moderating variables. Open-ended responses were coded thematically and used to enrich quantitative findings. Results were interpreted in light of existing literature and contextual factors affecting rural schools in Nigeria.

RESULTS AND DISCUSSION

This study assessed how the use of e-learning platforms influenced academic performance among students in six rural Nigerian schools. The findings indicate that students who frequently accessed e-learning resources scored higher than their counterparts with limited or no access. As summarized in **Table 1**, the mean score for students who used e-learning platforms was 73.4, while the non-user group had an average of 62.7. This outcome supports the assumption that digital tools contribute positively to learning outcomes.

Table 1. Distribution of Students by LMS Usage Level

Group	N	Mean Score	Std. Dev.
E-Learning Users	90	73.4	6.8
Non-E-Learning ers	90	62.7	8.2

Further analysis of access frequency among schools revealed significant disparities. Figure 1 illustrates the average number of logins per student by school. Students from schools with more reliable internet and power supply, such as School B and School E, demonstrated higher engagement. In contrast, students in School F, which had the most infrastructural limitations, showed the lowest access rates.

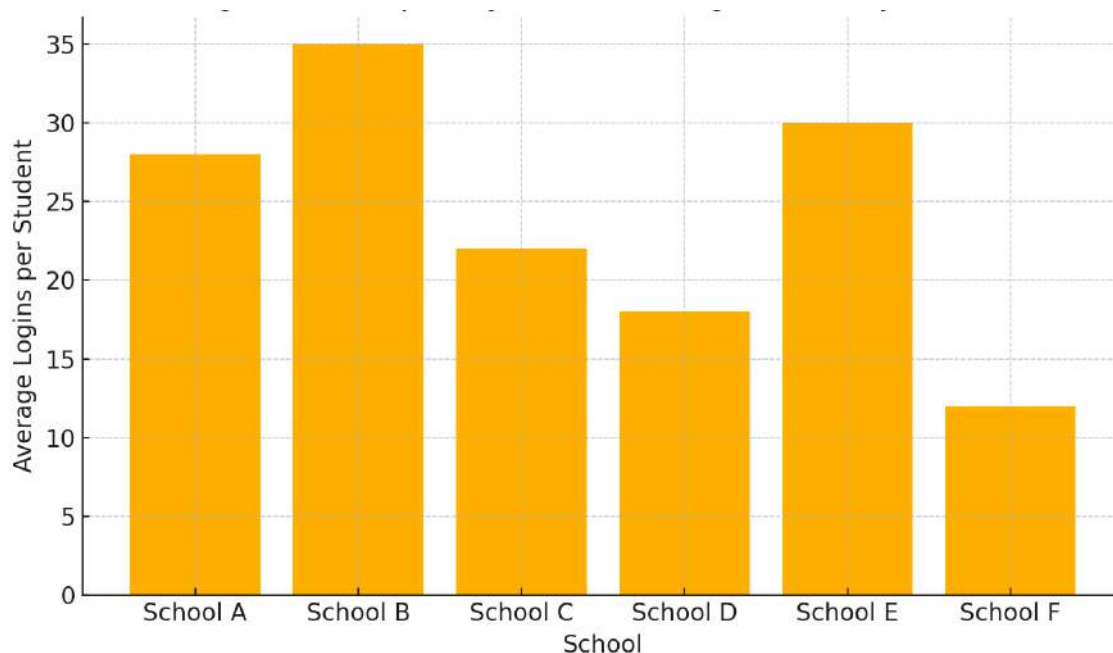


Figure 1. Frequency of E-Learning Access by School

In addition to performance metrics, students' qualitative feedback showed that many found e-learning to be more flexible and engaging compared to traditional learning. Common advantages cited included access to visual content, flexibility of time, and immediate feedback through quizzes. Figure 2 presents a thematic visualization of these

student responses, grouped into categories of benefits and challenges.

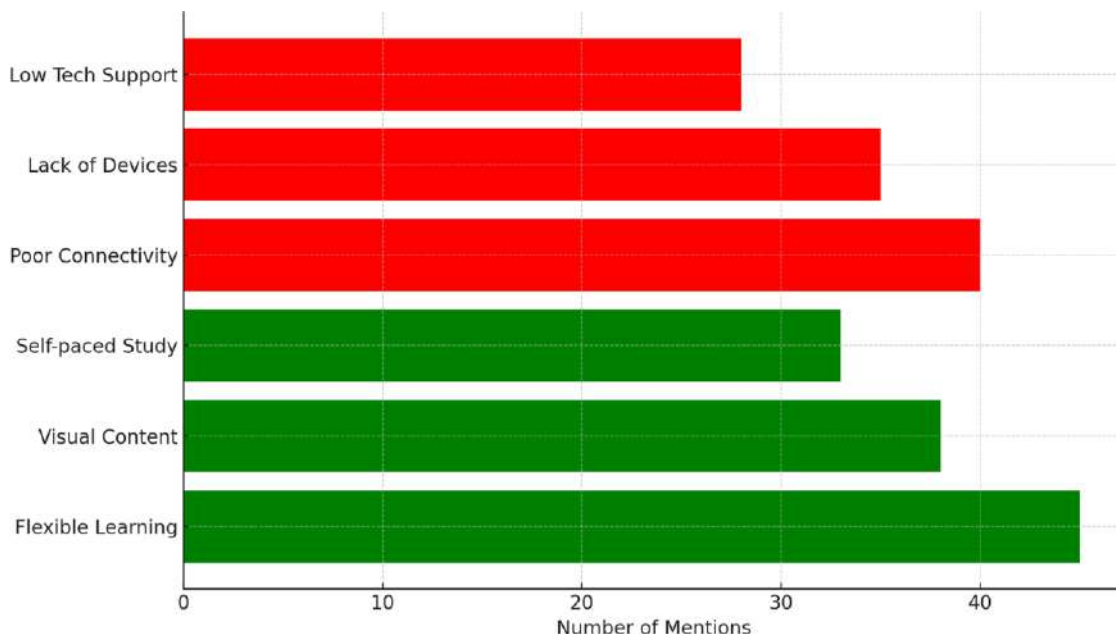


Figure 2. Student Perception of E-Learning Benefits and Barriers

The relationship between e-learning usage and student performance was further examined using Pearson’s correlation. As shown in Table 2, a significant positive correlation ($r = 0.68, p < 0.01$) was observed. When disaggregated by grade level, senior secondary students showed stronger correlations, suggesting that older students may utilize the platforms more effectively.

Table 2. Correlation Between Usage Frequency and Academic Score by Grade

Grade Level	Correlation (r)	Significance (p)	Grade Level
JSS1	0.54	0.03	JSS1
JSS2	0.66	0.01	JSS2
SS1	0.72	0.00	SS1

Lastly, the core findings of this study are summarized in Figure 3, which maps the relationship between access to infrastructure, platform usage, and academic outcomes. The diagram demonstrates that while e-learning platforms can improve performance, their success is conditional upon supportive infrastructure and user readiness.

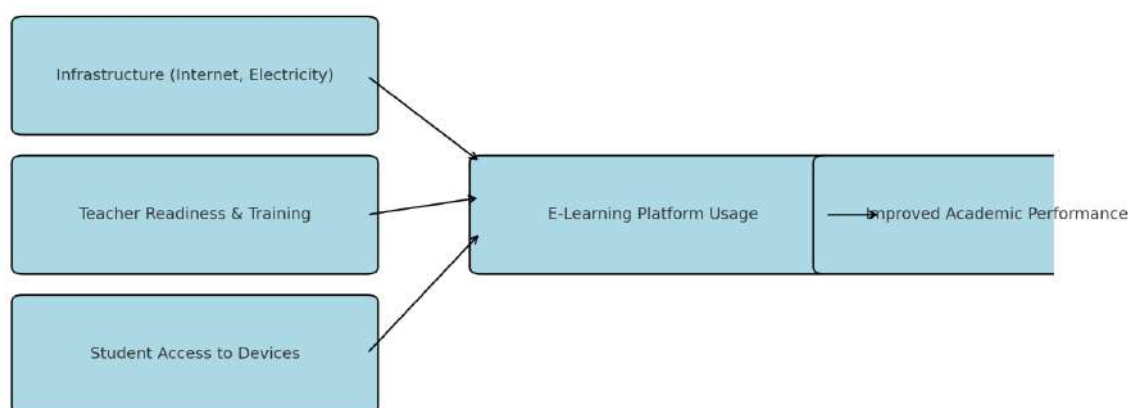


Figure 3. Summary Model of E-Learning Impact on Student Outcomes

The findings of this study align with previous research indicating that e-learning platforms can enhance academic performance when effectively implemented. For instance, Ezeude et al. (2023) observed improved student outcomes with consistent use of digital tools. Similarly, Babalola and Aina (2024) reported that students engaging with e-learning resources demonstrated higher academic achievement. The flexibility and accessibility of online learning allow students to learn at their own pace, contributing to better understanding and retention of information (Aparicio et al., 2016). However, the success of e-learning is contingent upon factors such as the quality of digital tools, internet connectivity, and student motivation (Asogwa et al., 2022). In rural Nigerian schools, where infrastructural challenges are prevalent, these factors play a critical role in determining the effectiveness of e-learning initiatives (Ajayi et al., 2022). Therefore, while e-learning holds promise for enhancing academic performance, its implementation must be context-sensitive, addressing the unique challenges faced by rural educational institutions.

Despite the potential benefits, several challenges hinder the effective implementation of e-learning in rural Nigerian schools. Inadequate infrastructure, such as unreliable electricity and limited internet access, poses significant barriers (Ajayi et al., 2022). Additionally, the shortage of trained educators proficient in digital technologies affects the quality of e-learning delivery (Aremu & Adediran, 2011). The lack of technical support and maintenance further exacerbates these issues, leading to underutilization of available resources (Obododike & Okekeokosisi, 2020). Moreover, socio-economic factors, including poverty and low digital literacy, contribute to the digital divide, limiting students' access to e-learning opportunities (Azubuike et al., 2021). Addressing these challenges requires a multifaceted approach, involving investment in infrastructure, teacher training, and community engagement to foster an environment conducive to e-learning (Asogwa et al., 2022). Without such comprehensive strategies, the full potential of e-learning in improving educational outcomes in rural Nigeria may remain unrealized.

To maximize the benefits of e-learning platforms, it is essential to implement strategies that address the identified challenges. Investing in infrastructure development,

such as providing reliable electricity and internet connectivity, is fundamental (Ajayi et al., 2022). Equally important is the provision of continuous professional development for teachers to enhance their digital competencies (Aremu & Adediran, 2011). Collaborative efforts between government agencies, non-governmental organizations, and the private sector can facilitate resource mobilization and capacity building (Obododike & Okekeokosisi, 2020). Furthermore, integrating culturally relevant content and user-friendly interfaces can improve student engagement and learning outcomes (Azubuike et al., 2021). Monitoring and evaluation mechanisms should also be established to assess the effectiveness of e-learning initiatives and inform policy decisions (Asogwa et al., 2022). By adopting a holistic approach that encompasses infrastructure, training, content development, and evaluation, e-learning platforms can significantly contribute to enhancing educational quality in rural Nigerian schools.

CONCLUSION

This study concludes that e-learning platforms have a significant positive impact on student academic performance in rural Nigerian schools, particularly when supported by adequate infrastructure, teacher preparedness, and consistent student access. Students who engaged more frequently with digital platforms demonstrated improved test scores, higher engagement, and greater content retention. However, the effectiveness of such platforms is heavily influenced by contextual factors, including digital literacy, electricity supply, and internet connectivity. Addressing these barriers through infrastructure investment, teacher training, and content customization will be essential in realizing the full potential of e-learning for inclusive and quality education in rural Nigeria. As e-learning becomes increasingly relevant in post-pandemic education models, policy makers must focus on equitable access and sustainability for long-term success.

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