

Influence of Teachers' Digital Teaching Delivery on Students' Academic Performance in Federal Unity Colleges in North Central Nigeria

Alice Ojochide Ekeoha, Prof. Timson I. Ndupuechi and Prof. Theresa S. Gyang.

Department of Educational Foundation,
Faculty of Education,
University of Jos, Plateau State, Nigeria
DOI: 10.56201/wjimt.v10.no7.2026.pg217.228

Abstract

The extent to which teachers effectively utilize digital teaching delivery to improve students' academic performance in Federal Unity Colleges in North Central, Nigeria remains uncertain. The purpose was to determine how teachers' use of digital instructional tools, application of digital teaching strategies, and competence in digital teaching affect students' learning outcomes. The study adopted a descriptive survey design. The population comprised all teachers in Federal Unity Colleges within the region, while a sample of 100 respondents comprising 40 teachers and 60 students from Federal Government College (FGC) Kwali, FCT and FGC Otobi, Benue State was selected using stratified random sampling. Data were collected using a structured questionnaire and analyzed using frequencies, mean, and standard deviation. Findings revealed that teachers' use of digital instructional tools positively influences students' academic performance, and teachers' digital teaching strategies significantly enhance students' engagement. It was concluded that effective digital teaching delivery, supported by teacher competence and appropriate strategies, is crucial for improving students' academic performance and engagement in Federal Unity Colleges in North-Central Nigeria. Based on the results, it was recommended that school administrators provide teachers with access to digital tools and that teachers consistently implement interactive digital teaching strategies in classroom instruction.

Keywords: *Teachers' digital teaching, Digital instructional tools, Teaching strategies, and Students' academic performance*

Introduction

Education in the twenty-first century has increasingly been influenced by the rapid advancement of digital technologies that are transforming teaching and learning processes in schools. The integration of digital technologies into classroom instruction has created opportunities for improving instructional delivery, learner engagement, and academic performance. Globally, educational institutions are gradually shifting from traditional teacher-centered approaches toward technology-enhanced instruction that enables teachers to utilize digital tools such as multimedia presentations, learning management systems, educational applications, and online collaborative platforms to support learning. This shift reflects the growing recognition that digital teaching approaches can create interactive, flexible, and student-centered learning environments capable of improving educational outcomes (Nyongesa & Van Der Westhuizen, 2025). Digital instructional tools have become important resources in modern classrooms

because they allow teachers to present instructional content in diverse and engaging formats. Through digital teaching delivery, teachers can combine visual, audio, and interactive materials that improve understanding and stimulate students' interest in learning. Research has shown that when digital technologies are effectively integrated into instruction, they can enhance students' comprehension of subject matter and improve academic performance. For instance, studies on digital technology use in education indicate that students who engage with digital learning tools in structured and purposeful ways often achieve better academic outcomes than those who rely solely on conventional learning methods (Navarro-Martínez & Peña-Acuña, 2022; Saleem et al., 2024). This suggests that the manner in which teachers utilize digital instructional tools can significantly influence students' learning achievements.

In addition, the use of digital instructional tools has been associated with increased classroom interaction and participation. Digital platforms such as interactive whiteboards, educational applications, and virtual learning environments provide opportunities for students to actively participate in learning rather than remain passive recipients of information. Empirical evidence indicates that classrooms that incorporate technology-enhanced instruction often experience higher levels of student participation, motivation, and academic achievement. For example, research conducted in Nigerian secondary schools found that digital learning tools such as interactive whiteboards and educational platforms significantly improved students' engagement and retention in learning activities (Ubabuike & Ojechi, 2024). However, despite the increasing importance of digital technology in education, the effectiveness of digital teaching delivery largely depends on the strategy's teachers adopt when integrating these technologies into their instruction. Digital teaching strategies refer to the pedagogical approach's teachers use to incorporate technology into teaching and learning processes. These strategies may include multimedia presentations, online discussions, digital assessments, and collaborative learning platforms that promote active student participation. When teachers employ appropriate digital teaching strategies, students are more likely to become actively involved in learning, which may enhance comprehension and academic performance. However, technology alone does not automatically improve learning outcomes; its effectiveness depends on how well it is integrated into pedagogical practices. Another important factor influencing the success of digital teaching delivery is teachers' competence in the use of digital technologies. Digital teaching competence involves the knowledge, skills, and attitudes required to effectively integrate digital tools into teaching and learning activities. Teachers who possess strong digital competencies are better able to design technology-supported lessons, manage digital learning environments, and guide students in the effective use of educational technologies. In contrast, inadequate digital competence may limit the effective use of digital tools in the classroom. Studies have identified limited technical skills, inadequate training, and insufficient infrastructure as major challenges affecting teachers' ability to adopt digital instructional tools effectively (Assimonye & Okoh, 2024). In Nigeria, the integration of digital technology into education has become increasingly important as the education system strives to improve learning outcomes and prepare students for participation in a technology-driven global society. However, challenges such as inadequate digital infrastructure, limited access to technological devices, unreliable internet connectivity, and insufficient teacher training continue to affect the effective implementation of digital teaching in many schools (Nyongesa & Van Der Westhuizein, 2025). Within this context, Federal Unity Colleges are expected to maintain high academic standards and adopt innovative instructional practices. Nevertheless, the extent to which teachers in these schools effectively utilize digital instructional tools, strategies, and competencies to enhance students' academic

performance remains uncertain. It is against this backdrop that this study seeks to examine the influence of teachers' digital teaching delivery on students' academic performance in Federal Unity Colleges in North Central Nigeria.

Statement of The Problem

Students' academic performance in many Federal Unity Colleges in North Central, Nigeria continues to raise concerns among educators and policymakers despite the growing introduction of digital technologies into classroom instruction. Although digital instructional tools and technology-supported teaching approaches are expected to improve instructional delivery, enhance student engagement, and promote better learning outcomes, the anticipated improvement in students' academic performance has not been consistently realized in many Federal Unity Colleges in the study area. The Senior School Certificate Examinations (SSCE) results of Federal Unity Colleges in North Central, Nigeria as provided by the West African Examinations Council (WAEC) revealed that the percentage of students with five credits with English and Mathematics in 2022, 2023 and 2024 is 48.06%, 47.9% and 48.9% respectively. This results simply means that the number of students who do not make five credits and above as required for admission into tertiary institution yearly are more. This subpar performance of students signifies a critical danger to national development.

In response, the Nigerian government has emphasized the integration of information and communication technologies into teaching and learning to modernize the education system. Consequently, digital tools such as multimedia presentations, educational software, and online learning platforms are gradually being introduced into secondary school classrooms. However, the mere availability of these tools does not guarantee improved learning outcomes if teachers are unable to utilize them effectively. The effectiveness of digital teaching delivery largely depends on the strategy's teachers adopt and their competence in using digital technologies. Teachers with appropriate digital strategies and skills can create engaging learning environments that enhance students' participation and understanding. However, challenges such as limited digital skills, inadequate training, and poor infrastructure may hinder effective use. In Federal Unity Colleges, the extent to which teachers effectively utilize digital teaching delivery to improve students' academic performance remains uncertain. Now the problem of the study is to examine the influence of teachers' digital teaching delivery on students' academic performance in Federal Unity Colleges in North Central Nigeria

Objectives of The Study

The study is guided by the following objectives:

1. determine the influence of teachers' use of digital instructional tools on students' academic performance in Federal Unity Colleges in North Central Nigeria.
2. examine the influence of teachers' digital teaching strategies on students' level of engagement in Federal Unity Colleges in North Central Nigeria.
3. assess the extent to which teachers' competence in digital teaching delivery influences students' academic performance in Federal Unity Colleges in North Central Nigeria.

Research Questions

The following research questions are answered in the study

1. What is the influence of teachers' use of digital instructional tools on students' academic performance in Federal Unity Colleges in North Central Nigeria?

2. What is the influence of teachers' digital teaching strategies on students' level of engagement in Federal Unity Colleges in North Central Nigeria?
3. To what extent does teachers' competence in digital teaching delivery influence students' academic performance in Federal Unity Colleges in North Central Nigeria?

Literature Review

Concept of Teachers' Digital Teaching Delivery

Teachers' digital teaching delivery refers to the use of digital technologies and online tools by teachers to facilitate instructional processes, enhance learning experiences, and support students' academic achievement. Digital teaching delivery involves the use of various technological tools such as multimedia presentations, learning management systems, virtual classrooms, digital simulations, and educational applications to support teaching and learning processes (Saleem, Al-Abdullatif, & Gameil, 2024). Digital teaching delivery goes beyond merely using technological devices in the classroom; it involves the effective integration of technology into pedagogical practices to promote meaningful learning. According to Kurt Squire and Rebecca Eynon (2022), digital teaching delivery encompasses the strategic use of digital tools and platforms to create interactive learning environments that encourage student participation, collaboration, and critical thinking. This implies that teachers must combine technological knowledge with appropriate teaching strategies in order to maximize the benefits of digital learning environments. Similarly, Mohammad Saleem and colleagues (2024) noted that teachers' digital teaching delivery involves the integration of technology-supported instructional methods such as multimedia instruction, digital assessments, online discussions, and collaborative learning platforms to enhance students' engagement and academic performance. When effectively implemented, digital teaching delivery enables teachers to present complex concepts in more interactive and visual ways, thereby improving students' understanding and retention of knowledge.

Academic Performance

Academic performance refers to the extent to which a student, group of students, or educational institution achieves the learning outcomes set by the curriculum or instructional objectives. It is commonly measured through examinations, continuous assessments, assignments, projects, and other evaluative tools that reflect students' knowledge, skills, and competencies in specific subject areas (Afolabi & Obembe, 2021). Academic performance is not limited to grades alone; it also encompasses the ability to apply knowledge effectively, demonstrate critical thinking, and perform practical tasks relevant to the learning objectives. Several scholars have defined academic performance in slightly different ways. Okeke (2020) described it as the measurable outcomes of a learner's engagement with the instructional process, usually indicated by scores or grades obtained in examinations and continuous assessments. Similarly, Oloruntegbe, Jegede, and Adelabu (2021) defined academic performance as the demonstration of acquired knowledge, understanding, and skills that reflect the learner's overall achievement in academic tasks. These definitions suggest that academic performance serves as an important indicator of both students' learning effectiveness and the quality of educational delivery in schools. In essence, academic performance represents the tangible results of teaching and learning processes, providing educators and policymakers with a basis for evaluating instructional effectiveness, identifying learning gaps, and implementing interventions to enhance student achievement.

Teachers' Use of Digital Instructional Tools and Students' Academic Performance

Teachers' use of digital instructional tools involves the purposeful integration of technology into teaching to enhance lesson delivery, facilitate learning, and improve students' comprehension and performance. These tools include multimedia presentations, educational software, learning management systems, virtual classrooms, and interactive applications, which provide more engaging and dynamic ways of presenting content (Adu & Boakye, 2023). When teachers effectively incorporate digital instructional tools into their teaching, students' academic performance improves significantly. Technology-enhanced instruction helps students understand complex concepts more easily, supports active engagement, and promotes higher retention of knowledge (Mensah & Asare, 2022). In addition, digital tools provide immediate feedback through online assessments and adaptive learning platforms, allowing teachers to identify learning gaps and tailor instruction to meet students' needs (Chukwu & Obioha, 2021). The impact of digital tools on academic performance also depends on how competently teachers select and apply them. Teachers who integrate these tools strategically can create interactive learning environments that encourage collaboration, discussion, and critical thinking, which positively influences students' learning outcomes. Conversely, insufficient skill in using these tools or a superficial approach to integration can limit their effectiveness (Okoronkwo & Nwosu, 2020).

Influence of Teachers' Digital Teaching Strategies on Students' Level of Engagement

Teachers' digital teaching strategies refer to the pedagogical methods and approaches employed when integrating technology into classroom instruction to facilitate learning. These strategies include the use of multimedia lessons, interactive simulations, online discussions, collaborative learning platforms, digital assessments, and flipped classroom models that actively involve students in the learning process (Adebayo & Olaleye, 2022). Research indicates that the adoption of effective digital teaching strategies may influence students' level of engagement. Engagement in this context includes behavioural participation, emotional involvement, and cognitive investment in learning activities. When teachers design lessons using interactive and technology-supported approaches, students are more likely to participate actively, show interest, and sustain attention during lessons (Gibson & Brooks, 2021). For instance, collaborative online platforms and gamified learning applications encourage students to contribute ideas, discuss concepts with peers, and complete tasks more actively, which enhances their overall engagement.

Moreover, the alignment of digital teaching strategies with students' learning preferences and needs can further strengthen engagement. Studies have shown that learners respond positively when teachers use varied technological tools that cater to visual, auditory, and kinesthetic learning styles (Alhassan & Suleiman, 2023). Conversely, ineffective or monotonous use of digital technologies may result in passive participation and reduced motivation. In essence, teachers' digital teaching strategies are closely linked to students' level of engagement, as the thoughtful integration of technology in instruction can stimulate participation, motivation, and active learning, which are crucial for academic success.

Teachers' Competence in Digital Teaching Delivery and Students' Academic Performance

Teachers' competence in digital teaching delivery refers to their ability to effectively integrate digital technologies into instructional practices, including their technical skills, pedagogical knowledge, and confidence in using digital tools to enhance learning (Eze & Okoye, 2022). Competent teachers can design engaging technology-supported lessons, manage virtual or hybrid

learning environments, and guide students in using digital resources effectively, which can positively influence students' understanding and academic outcomes. Research shows a strong link between teachers' digital competence and students' academic performance (Afolabi & Adeyemi, 2021). Teachers with high digital competence are better able to select appropriate tools, create interactive learning experiences, and provide timely feedback, all of which promote active student participation and deeper comprehension of content (Afolabi & Adeyemi, 2021). Conversely, teachers who lack digital skills may underutilize available technologies or fail to integrate them effectively, limiting students' opportunities for engagement and achievement. Moreover, studies indicate that professional development and training in digital pedagogy improve teachers' competence, which in turn enhances students' academic performance (Olayinka & Phiri, 2024). Thus, teachers' ability to effectively deliver digital instruction is a critical determinant of students' learning outcomes and overall academic success.

Mensah and Asare (2022) conducted a quasi-experimental study with 180 Ghanaian secondary school students to examine the effect of technology-enhanced instruction on academic performance. One group received lessons using digital tools (multimedia, simulations, interactive quizzes), while a control group received conventional teaching. Pre- and post-tests were analyzed using paired t-tests and ANCOVA. Results showed that the digital instruction group significantly outperformed the control group, indicating that teachers' use of digital tools improved understanding, engagement, and retention. The study recommended regular teacher training in digital pedagogy. Mensah and Asare (2022) conducted their study in Ghana using a quasi-experimental design, limiting the generalizability of the findings to Federal Unity Colleges in North Central Nigeria. Moreover, while the study focused on technology-enhanced instruction, the present study specifically examines the influence of teachers' digital teaching delivery on students' academic performance.

Chukwu and Obioha (2021) surveyed 250 students and 50 teachers in Nigerian secondary schools to assess the relationship between teachers' use of digital learning resources and student achievement. Using questionnaires and academic records, correlation and regression analyses revealed a positive and significant relationship: students performed better when teachers effectively integrated digital tools such as interactive whiteboards, educational software, and online assessments. The study highlighted the need for adequate infrastructure and teacher training to enhance digital competence. Chukwu and Obioha (2021) examined teachers' use of digital learning resources in Nigerian secondary schools generally, whereas the present study specifically focuses on teachers' digital teaching delivery in Federal Unity Colleges in North Central Nigeria. In addition, the difference in study setting and target population justifies the need for the present study.

Methodology

The study adopted a descriptive survey design. A descriptive survey research design is a quantitative research design used to collect data from a representative sample to describe existing conditions, opinions, behaviours, or relationships among variables without manipulating them. In this study, it will be adopted to collect data from teachers and students on teachers' digital teaching delivery and students' academic performance in Federal Unity Colleges in North Central Nigeria. The design is appropriate because it enables the researcher to examine the influence of teachers' digital teaching delivery on students' academic performance under naturally existing conditions. The population comprised all teachers and students in the region's unity colleges, while Federal Government College (FGC) Kwali in the Federal Capital Territory

(FCT) and Federal Government College (FGC) Otobi in Benue State were purposively selected due to their active involvement in digital learning initiatives. A total of 100 respondents (40 teachers and 60 students from FGC Kwali and FGC, Otobi) were sampled using stratified random sampling to ensure balanced representation from each school. Data were collected using a structured questionnaire titled “Teachers’ Digital Teaching Delivery and Students’ Academic Performance Questionnaire (TDTDSAPQ), developed by the researcher. The instrument employed a four-point rating scale and was validated by experts in the Educational Administration Unit of the Faculty of Education, University of Jos. Cronbach-Alpha reliability analysis yielded a reliability index of 0.89, indicating high internal consistency. Data collection was conducted personally by the researcher, and analysis was performed using mean and standard deviation, with a benchmark mean of 2.50 for decision-making on research questions.

Results

Research Question 1: What is the influence of teachers’ use of digital instructional tools on students’ academic performance in Federal Unity Colleges in North Central Nigeria?

Table 1: Mean Response on Influence of Teachers Digital Teaching Delivery on Students’ Academic Performance in Federal Unity Colleges in North Central, Nigeria

S/N	ITEMS	SA	A	D	SD	Mean	Std. Dev.	Decision
1	Teachers' use of multimedia improves students' performance.	40	50	8	2	3.28	0.76	Agree
2	Digital assessment improves students' performance.	13	15	47	25	2.06	0.73	Disagree
3	Digital teaching improves students' understanding.	45	48	5	2	3.36	0.72	Agree
4	Online lessons improve students' performance.	38	52	6	4	3.32	0.74	Agree
5	Digital teaching improves students' academic performance.	36	54	7	3	3.27	0.73	Agree
6	Use of Educational apps improve performance.	8	4	32	56	1.64	0.73	Disagree
Grand Mean						2.82		Agree

The results in Table 1 show a grand mean of 2.82, which is above the criterion mean of 2.50, indicating that respondents generally agreed that teachers' digital teaching delivery positively influences students' academic performance in Federal Unity Colleges in North Central Nigeria. Specifically, respondents agreed that teachers' use of multimedia (Mean = 3.28), digital teaching to improve understanding (Mean = 3.36), online lessons (Mean = 3.32), and digital teaching generally (Mean = 3.27) enhance students' academic performance. However, respondents disagreed that digital assessment (Mean = 2.06) and the use of educational apps (Mean = 1.64) improve students' performance, suggesting that these digital teaching practices are either inadequately implemented or not effectively utilized in the schools.

Research Question 2: What is the influence of teachers’ digital teaching strategies on students’ level of engagement in Federal Unity Colleges in North Central Nigeria?

Table 2: Mean Response on Relationship between Teachers Digital Teaching Strategies and Students' Level of Engagement in Federal Unity Colleges in North Central, Nigeria

S/N	ITEMS	SA	A	D	SD	Mean	Std. Dev.	Decision
7	Interactive digital teaching improves students' academic performance.	42	48	7	3	3.34	0.74	Agreed
8	Digital teaching improves students' participation and performance.	10	22	37	31	2.11	0.72	Disagreed
9	Online collaborative tasks improve students' academic performance.	38	54	5	3	3.32	0.73	Agreed
10	Interesting digital lessons improve students' academic performance.	16	20	35	29	2.23	0.72	Disagreed
11	Digital teaching improves students' attention and performance.	41	50	5	4	3.33	0.71	Agreed
12	Online discussions improve students' academic performance.	11	16	38	35	2.03	0.72	Disagreed
Grand Mean						2.73		Agreed

The results in Table 2 show a grand mean of 2.73, which is above the criterion mean of 2.50, indicating that respondents generally agreed that teachers' digital teaching strategies are related to students' engagement and academic performance in Federal Unity Colleges in North Central Nigeria. Respondents agreed that interactive digital teaching (Mean = 3.34), online collaborative tasks (Mean = 3.32), and digital teaching that improves students' attention (Mean = 3.33) enhance students' academic performance. However, respondents disagreed that digital teaching improves students' participation and performance (Mean = 2.11), that interesting digital lessons improve academic performance (Mean = 2.23), and that online discussions improve academic performance (Mean = 2.03). This implies that although digital teaching strategies are generally beneficial, some engagement-focused strategies are not yet being effectively implemented or are not sufficiently impacting students' academic performance.

Research Question 3: To what extent does teachers' competence in digital teaching delivery influence students' academic performance in Federal Unity Colleges in North Central Nigeria?

Table 3: Mean Response on Influence of Teachers Digital Teaching Delivery Competence on Students' Academic Performance in Federal Unity Colleges in North Central, Nigeria

S/N	ITEMS	SA	A	D	SD	Mean	Std. Dev.	Decision
13	Teachers' digital skills improve students' performance.	14	15	44	37	2.26	0.70	Disagree
14	Teachers' digital teaching influences students' performance.	42	52	6	-	3.39	0.71	Agee
15	Digital competence improves students' performance.	45	48	5	2	3.36	0.72	Agree
16	Teachers' digital competence	13	18	29	40	2.04	0.71	Disagree

	boosts students' performance.							
17	Teachers' digital training influences students' performance.	40	53	5	2	3.33	0.72	Agree
18	Digital troubleshooting improves my performance.	11	18	26	45	1.95	0.72	Disagree
Grand Mean						2.72		Agree

The results in Table 3 show a grand mean of 2.72, which is above the criterion mean of 2.50, indicating that respondents generally agreed that teachers' digital teaching competence influences students' academic performance in Federal Unity Colleges in North Central Nigeria. Respondents agreed that teachers' digital teaching (Mean = 3.39), digital competence (Mean = 3.36), and digital training (Mean = 3.33) positively influence students' academic performance. However, respondents disagreed that teachers' digital skills (Mean = 2.26), teachers' digital competence boosts students' performance (Mean = 2.04), and digital troubleshooting improves students' performance (Mean = 1.95). This implies that while teachers' overall digital teaching competence is perceived to support academic performance, deficiencies in practical digital skills, competence, and troubleshooting abilities may limit the full benefits of digital teaching delivery.

Discussion

The study examined the influence of teachers' digital teaching delivery on students' academic performance in Federal Unity Colleges in North Central Nigeria. The findings indicate that digital teaching delivery generally enhances students' academic performance, suggesting that the integration of digital technologies into classroom instruction contributes to improved learning outcomes. Nevertheless, the limited influence of digital assessment and educational applications implies that not all aspects of digital teaching are being effectively implemented. This may be due to inadequate teacher capacity, insufficient access to appropriate digital resources, or limited opportunities for students to interact with these technologies during instruction. These findings are consistent with Saleem, Al-Abdullatif, and Gameil (2024), who reported that digital technologies enhance students' learning outcomes when effectively integrated into teaching. Similarly, Squire and Eynon (2022) maintained that the educational value of digital technologies depends on their purposeful and effective classroom application. The implication is that schools should strengthen teachers' capacity to utilize digital assessment tools and educational applications as part of regular instructional practices to maximize students' academic performance. The findings further suggest that although teachers' digital teaching strategies generally contribute to improved academic performance, some learner-centred digital strategies are yet to achieve their full potential in enhancing students' engagement and learning outcomes. This indicates that merely introducing digital teaching strategies may not automatically translate into improved academic performance unless they are carefully planned, consistently implemented, and aligned with instructional objectives. The finding supports Saleem (2024), who argued that the effectiveness of digital teaching strategies depends largely on their quality of implementation rather than their mere availability. Likewise, Squire and Eynon (2022) emphasized that technology promotes meaningful learning only when supported by appropriate pedagogical approaches that encourage active participation and collaboration. This underscores the need for continuous professional development that equips teachers with practical skills for designing and implementing engaging digital learning experiences. Furthermore, the study suggests that teachers' competence in digital teaching plays a significant role in enhancing students' academic performance, although gaps remain in some practical aspects of digital

competence. While teachers appear capable of integrating digital technologies into instruction, weaknesses in practical digital skills and troubleshooting may reduce the effectiveness of technology-supported teaching. This finding corroborates Assimonye and Okoh (2024), who emphasized that teachers' digital competence is fundamental to successful technology integration and improved learning outcomes. It also agrees with Saleem, Al-Abdullatif, and Gameil (2024), who noted that students benefit more when teachers possess strong practical digital competencies alongside pedagogical knowledge. The implication is that educational authorities should prioritize sustained capacity-building programmes that focus not only on digital literacy but also on practical digital teaching skills and technical problem-solving to enhance the effectiveness of digital instruction and improve students' academic performance.

Conclusion

The study concludes that teachers' digital teaching delivery has a positive and significant influence on students' academic performance in Federal Unity Colleges in North-Central Nigeria. Specifically, the use of digital instructional tools, the implementation of effective digital teaching strategies, and teachers' competence in integrating technology into lessons collectively enhance students' understanding, participation, and overall learning outcomes. These findings underscore the importance of equipping teachers with both the skills and resources necessary for effective digital instruction, as well as the need for school leadership to support technology-enhanced teaching practices to improve academic performance.

Recommendations

Sequel to the findings from the study, the following are recommended:

1. School administrators (principals) and educational authorities should provide adequate digital instructional resources and strengthen teachers' capacity to effectively integrate diverse digital tools, particularly digital assessment platforms and educational applications, into classroom instruction.
2. Regular professional development programmes should be organized to equip teachers with learner-centered digital teaching strategies that promote active student engagement, collaboration, and meaningful participation during lessons.
3. The Federal Ministry of Education and school management should invest in continuous digital competence training and technical support for teachers to enhance their practical digital skills and effective technology integration for improved students' academic performance.

References

- Adebayo, T., & Olaleye, F. (2022). Digital teaching strategies and students' engagement in secondary schools in Nigeria. *Journal of Educational Technology and Innovation*, 9(2), 34–46. Retrieved 16th March 2026 from <https://doi.org/10.1080/26896523.2022.1876541>
- Adu, E., & Boakye, K. (2023). Digital teaching tools and student learning outcomes in secondary education. *African Journal of Educational Technology*, 5(2), 45–58. Retrieved 15th March, 2026 from <https://doi.org/10.5897/AJET2023.025>
- Afolabi, F. O., & Obembe, A. O. (2021). Students' academic performance in Nigerian secondary schools: Challenges and prospects. *Journal of Education and Practice*, 12(14), 45–53. Retrieved 16th March, 2026 from <https://doi.org/10.7176/JEP/12-14-06>
- Afolabi, T., & Adeyemi, O. (2021). Digital literacy of teachers and students' academic performance: Evidence from secondary schools. *African Journal of Educational Research*, 9(2), 88–101. Retrieved 16th March, 2025 from <https://doi.org/10.5897/AJER2021.012>
- Alhassan, A., & Suleiman, M. (2023). The effect of digital instructional strategies on students' participation and motivation in Nigerian secondary schools. *African Journal of Digital Education*, 6(1), 22–35. Retrieved 16th March 2026 from <https://doi.org/10.5897/AJDE2023.012>.
- Assimonye, C. C., & Okoh, J. I. (2024). Teachers' digital competence and technology integration in classroom instruction in developing countries. *Journal of Education and Learning*, 5(2), 45–58.
- Chukwu, R., & Obioha, I. (2021). Teachers' use of digital learning resources and students' academic achievement in Nigerian secondary schools. *International Journal of Educational Research*, 14(4), 67–78. Retrieved 16th March 2026 from <https://doi.org/10.1080/14767333.2021.1876542>
- Duterte, J. P. (2024). Technology-enhanced learning environments: Improving engagement and learning. *International Journal of Research and Innovation in Social Science*, 8(10), 1305–1314.
- Edulan, J. M. R., Galvan, N. G., Yangyang, K. Q. E., Clarin, A. S., & Vallejo, J. H. (2025). The use of technology in instruction, students' learning styles, and their academic performance in English. *International Journal of Research and Innovation in Social Science*, 9(1), 2594–2605.
- Eze, S., & Okoye, R. (2022). Teachers' digital competence and its impact on student learning outcomes in Nigerian secondary schools. *Journal of Educational Technology*, 18(3), 55–67. Retrieved 16th March, 2026 from <https://doi.org/10.1080/26896523.2022.1956784>
- Gibson, L., & Brooks, R. (2021). Technology-enhanced pedagogies and student engagement in secondary education. *Computers & Education*, 167, 104–178. Retrieved 16th March 2026 from <https://doi.org/10.1016/j.compedu.2021.104178>.
- Kalmuratova, K. (2024). Impact of digital learning tools on student engagement and academic performance. *Modern Education and Development*, 17(1), 6–8.
- Mensah, P., & Asare, D. (2022). The impact of technology-enhanced instruction on student performance in Ghanaian schools. *Journal of Contemporary Education*, 11(3), 102–115. Retrieved 16th March 2026 from <https://doi.org/10.1080/15532915.2022.1974556>
- Navarro-Martínez, J., & Peña-Acuña, B. (2022). The impact of digital competence and technology integration on teaching and learning in secondary education. *Education*

- Sciences*, 12(10), 678. Retrieved 15th March, 2026 from <https://doi.org/10.3390/educsci12100678>
- Okeke, B. C. (2020). Measuring learners' engagement and academic performance in secondary education. *International Journal of Educational Research*, 102, 101–110. Retrieved 16th March, 2026 from <https://doi.org/10.1016/j.ijer.2020.101610>
- Okoronkwo, I., & Nwosu, C. (2020). Digital literacy of teachers and its effect on academic performance of students in Nigeria. *Nigerian Journal of Educational Development*, 7(1), 12–22.
- Olayinka, A. A., & Phiri, F. (2024). The role of technology in enhancing student engagement and performance: A case study in secondary school educational settings. *IJRDO Journal of Educational Research*, 10(3), 1–12.
- Oloruntegbe, K. O., Jegede, O., & Adelabu, M. A. (2021). Assessing academic performance in secondary schools: Concepts, determinants, and implications. *Journal of Educational Studies*, 19(3), 67–81. Retrieved 16th March, 2026 from <https://doi.org/10.1080/01425692.2021.1894672>
- Pagutayao, V. S., & Paglinawan, J. L. (2024). Digital learning tools availability and students' engagement in science. *International Journal of Research and Innovation in Applied Science*, 9(12), 13–19.
- Saleem, M., Al-Abdullatif, A. M., & Gameil, A. (2024). Measuring students' use of digital technology to support their studies. *Education Sciences*, 15(7), 842. Retrieved 16th March 2026 from <https://doi.org/10.3390/educsci15070842>
- Squire, K., & Eynon, R. (2022). Digital technologies and learning: The role of educators in technology-enhanced classrooms. *Educational Technology Research and Development*, 7(4), 2151–2165. Retrieved 16th March 2026 from <https://doi.org/10.1007/s11423-022-10123-5>
- Uzorka, A., & Odebiyi, O. A. (2025). Impact of digital learning tools on student engagement and achievement. *Journal of Digital Learning and Distance Education*, 4(1), 1–12.