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Influence of Digital Learning Tools on Students' Engagement Among Tertiary Institutions Students in Zamfara State

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Abstract **Original Research Article**

This study explored the influence of digital learning tools on student engagement at tertiary institutions in Zamfara State, Nigeria. With the rise of digital technologies in education, the way we teach and learn in higher education has undergone a significant transformation. Tools like Learning Management Systems (LMS), online discussion platforms, virtual classrooms, multimedia resources, educational apps, and video conferencing are now commonly used to boost student participation and enhance their academic experiences. However, despite these advancements, issues like accessibility, internet connectivity, and digital literacy continue to pose challenges for students trying to make the most of these tools. The research employed a descriptive survey design, focusing on students from seven selected tertiary institutions in Zamfara State. To gather relevant data, a structured questionnaire called the Digital Learning Tools and Students' Engagement Questionnaire (DLTSEQ) was distributed to respondents. The data collected were analyzed using descriptive statistics with mean and standard deviation based on a 4-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD). A decision mean of 2.50 was set as the threshold for acceptance while t-test was employed to test hypothesis with inferential statistics at a significance level of 0.05. The findings indicated that digital learning tools significantly boost students' behavioural, emotional, and cognitive engagement in their learning activities. Additionally, the study found that access to internet services and digital devices positively impacts students' active participation and motivation to learn. However, challenges such as poor internet connectivity, insufficient technological infrastructure, and limited digital skills were identified as significant barriers to effectively using digital learning tools. In conclusion, the study highlighted that digital learning tools play a crucial role in enhancing student engagement at tertiary institutions in Zamfara State. The study recommended increased investment in technological infrastructure, improved internet access, and digital literacy training for students and lecturers.

Keywords: Digital learning tools, student engagement, tertiary institutions, higher education, digital literacy skills.

Introduction

The rapid growth of Information and Communication Technology (ICT) has truly transformed the educational landscape around the globe. In recent years, colleges and universities have been embracing digital learning tools more than ever, aiming to enhance how education is delivered and to boost student engagement (Pérez-Juárez, González-Ortega, & Aguiar-Pérez, 2024). Digital learning tools refer to a variety of technology resources and applications, like Learning Management Systems (LMS), virtual classrooms, multimedia presentations, online discussion forums, mobile learning apps, video conferencing platforms, e-books, and even AI-driven educational systems—all designed to make teaching and learning more effective (Alenezi, 2024). These tools have become vital in today's education because they promote flexible, interactive, and student-centred learning approaches (Rotar, 2025).

The research carried out by Dunn and Kennedy (2019) shows that these digital technologies have a significant impact on how students participate, collaborate, and experience their academic journey in higher education. Student engagement is often seen as a key indicator of academic success in universities. It encompasses how actively students participate, their emotional involvement, commitment, motivation, and the mental effort they put into learning activities. As Kahu and Nelson (2018) pointed out, student engagement can be broken down into three parts: behavioural engagement, emotional engagement, and cognitive engagement. Behavioural engagement is all about how students take part in classroom and academic activities, emotional engagement reflects their interest and enthusiasm for learning, while cognitive engagement involves their willingness to put in the mental effort to grasp academic content. Researchers have consistently highlighted that students who are engaged are more likely to succeed academically, develop critical thinking skills, and maintain a positive attitude toward learning (Bond, Buntins, Bedenlier, Zawacki-Richter, & Kerres, 2020).

The rise of digital learning tools in universities has opened exciting new ways for students to engage with their education. With online platforms, students can easily access course materials, join virtual discussions, work together with classmates, submit their assignments online, and get quick feedback from their instructors (Fajuyigbe, Mumuni, & Koranteng, 2026). Tools like video quizzes, gamified learning experiences, digital whiteboards, and collaborative apps really boost students' focus and involvement during lessons. Research conducted by Getenet, and Tualaulelei (2023) shows that these interactive technologies have a positive impact on students' motivation, communication, and teamwork in higher education settings.

The COVID-19 pandemic really sped up the adoption of these digital tools in schools around the globe. As many universities transitioned from traditional in-person classes to online and blended learning models, it became clear just how crucial digital technologies are for keeping education going during tough times. Studies conducted by Schindler, Burkholder, Morad and Marsh (2017) after the pandemic found that digital learning environments had a significant impact on students' experiences, participation, and overall engagement. However, the success of online learning often hinged on students' access to devices, reliable internet, and their technological skills (Martin, Sun & Westine, 2020).

Moreover, innovations like artificial intelligence (AI), adaptive learning systems, virtual simulations, and learning analytics have added exciting new layers to digital education (Sindiramutty, 2026). AI-driven educational tools now offer personalized learning experiences that cater to each student's unique style and academic needs (Ouyang & Jiao, 2021). Learning analytics also empower educators to track students' participation, academic progress, and engagement levels in these digital learning spaces. Research conducted by Godsk and Møller (2025), revealed that higher education institutions are increasingly investing in AI-powered educational technologies and student engagement platforms to improve learning outcomes and institutional effectiveness.

While digital learning tools offer a wealth of advantages, there are still several hurdles that hinder their effective use in higher education, especially in developing countries like Nigeria. Issues such as poor technological infrastructure, unreliable electricity, spotty internet access, limited availability of digital devices, and a lack of digital literacy skills pose significant challenges to successful digital learning (Nkomo, Daniel & Butson, 2021). Additionally, students often find themselves sidetracked by social media, entertainment sites, and other non-academic online activities when they should be focusing on their studies. Findings carried out by Johnston, Griffin, Manolopoulou, and Jendoubi (2024) indicate that both students and lecturers sometimes lack the necessary training and skills to make the most of these digital learning technologies.

In Nigeria, the push to incorporate digital learning tools into higher education has gained traction among educational leaders and policymakers. Many universities, colleges, and polytechnics are now embracing online learning platforms and digital technologies to enhance their teaching methods (Bond, Bedenlier, Marín & Händel, 2021). However, the gap in technological access and infrastructure between urban and rural areas continues to be a stumbling block for the effective rollout of digital learning systems (Godsk & Møller, 2025). For instance, in places like Zamfara State, where infrastructural and technological issues persist, students often struggle to access internet services, digital devices, and online educational materials. These obstacles can have a detrimental impact on students' participation, motivation, and engagement in their learning experiences.

Furthermore, students in higher education are predominantly part of the digital generation and are quite adept at using technology and online communication tools. Today's learners typically favour interactive and technology-driven approaches over traditional lecture formats (Bergdahl, Bond, Sjöberg & Dougherty, 2024). As a result, digital learning tools hold the promise of boosting students' interest, collaboration, creativity, and active participation in their academic activities when properly utilized (Pérez-Juárez, González-Ortega & Aguiar-Pérez, 2024). Educational experts have pointed out that when digital technologies are effectively woven into teaching and learning, they can really boost students' academic engagement, critical thinking skills, and ability to learn independently (Zainuddin, Keumala, Khotimah & Huda, 2020).

Numerous studies have investigated how digital learning technologies impact student engagement in higher education. For instance, Getenet and Tualaulelei (2023) found that interactive tools like Padlet, Panopto, and Google Docs significantly improved students' engagement and collaborative learning experiences in online settings. Likewise, Bergdahl et al. (2024) noted that student engagement is a key factor in achieving educational success within digital learning environments. Research carried out by the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2023) has shown that students' attitudes towards technology, their digital literacy, and their self-confidence play a big role in how engaged they are in online learning activities. Though there's a growing body of research on digital learning and student engagement worldwide, there's still a lack of empirical evidence specifically focusing on students in tertiary institutions in Zamfara State.

Most of the existing studies have been centered on developed countries and urban educational contexts, leaving the unique challenges faced by students in less technologically advanced areas largely unaddressed (Organisation for Economic Co-operation and Development, OECD, 2023). This highlights the need to explore how digital learning tools impact student engagement among tertiary institution students in Zamfara State. The study aims to investigate how these tools affect students' behavioural, emotional, and cognitive engagement in their academic pursuits. Additionally, it seeks to identify the challenges that come with using digital learning technologies and propose strategies to enhance student engagement and academic performance in Zamfara State's tertiary institutions.

Objectives of the Study

The main objective of this study is to explore the influence of digital learning tools on student engagement at tertiary institutions in Zamfara State, Nigeria.

The specific aims include:

1. Investigating how digital learning tools affect students' behavioural engagement in tertiary institutions in Zamfara State.

2. Assessing the impact of digital learning tools on students' emotional engagement in tertiary institutions in Zamfara State.

3. Analyzing how digital learning tools influence students' cognitive engagement in tertiary institutions in Zamfara State.

Research Questions

The following research questions were generated to guide the conduct of these findings.

1. How do digital learning tools affect students' behavioural engagement in tertiary institutions in Zamfara State?

2. What is the effect of digital learning tools on students' emotional engagement in tertiary institutions in Zamfara State?

3. How do digital learning tools influence students' cognitive engagement in tertiary institutions in Zamfara State?

Hypothesis

This hypothesis was tested for this study:

1. There is no significant effect of digital learning tools on students' behavioural engagement in tertiary institutions in Zamfara State.

Methodology

The research took a descriptive survey approach to explore how digital learning tools impact student engagement among tertiary institutions' students in Zamfara State. This study took place in two universities, two colleges of education, two polytechnics, and a school of nursing sciences across the state. The focus was on undergraduate students who regularly use digital learning technologies like smartphones, laptops, online learning platforms, educational apps, and learning management systems for their studies. A multistage sampling method was used to select participants, which included purposefully choosing institutions, randomly selecting faculties and departments, and then using simple random sampling to pick 50 students from each institution. A total of 350 respondents were involved in the study. Data was gathered through a structured questionnaire called the “Digital Learning Tools and Students’ Engagement Questionnaire (DLTSEQ),” which includes sections for demographic information and questions about the use of digital learning tools and student engagement levels. Experts in educational psychology, educational technology, and measurement and evaluation validated the questionnaire to ensure clarity and relevance. The reliability of the instrument was assessed through a pilot study using Cronbach's alpha, with a coefficient of 0.70. The researcher personally oversees data collection with a co-researcher. The responses were analyzed using mean and standard deviation based on a 4-point Likert scale ranging from Strongly Agree (SA) to Strongly Disagree (SD). A mean of 2.50 was set as the threshold for acceptance, and a t-test was employed to test the hypothesis at a significance level of 0.05. Throughout the study, ethical principles such as confidentiality and voluntary participation was strictly upheld.

Results

Research Question 1

How do digital learning tools affect students' behavioural engagement in tertiary institutions in Zamfara State?

S/No	Items	Mean	Std. Dev.	Decision
1	Digital learning tools really boost students' participation in class.	3.42	0.71	Accepted
2	These tools help keep students coming to both online and in-person classes.	3.18	0.83	Accepted
3	When digital tools are used, students tend to pay more attention during learning activities.	3.30	0.76	Accepted
4	They also inspire students to finish their assignments on time.	3.25	0.80	Accepted
5	Students can engage more actively with their lecturers through digital platforms.	3.36	0.74	Accepted
6	Digital learning tools promote teamwork and collaboration among students.	3.11	0.88	Accepted
	Grand Mean	**3.27**	**0.79**	**Accepted**

The analysis showed an impressive average score of 3.27, surpassing the benchmark mean of 2.50. This suggests that digital learning tools positively impact students' behavioural engagement at tertiary institutions in Zamfara State. The results indicate that these tools boost students' participation in class activities, enhance assignment completion rates, foster interaction with lecturers, and encourage collaborative learning. Consequently, the study concludes that utilizing digital learning technologies significantly enhances behavioural engagement among students in tertiary institutions in Zamfara State.

Research Question 2:

What is the effect of digital learning tools on students' emotional engagement in tertiary institutions in Zamfara State?

S/No	Items	Mean	Std. Dev.	Decision
1	Digital learning tools really boost students' enthusiasm for learning.	3.40	0.73	Accepted
2	These tools help keep students coming to both online and in-person classes.	3.28	0.81	Accepted
3	When digital tools are used, students tend to pay more attention during learning activities.	3.35	0.76	Accepted
4	They also inspire students to finish their assignments on time.	3.19	0.84	Accepted
5	Digital learning tools really help to keep boredom at bay during lectures.	3.24	0.79	Accepted
6	Students feel a boost in confidence when they engage in learning activities through digital platforms.	3.31	0.75	Accepted
	Grand Mean	**3.30**	**0.78**	**Accepted**

The research uncovered an impressive average score of 3.30, surpassing the benchmark mean of 2.50. This suggests that digital learning tools have a positive impact on the emotional engagement of students in tertiary institutions in Zamfara State. The findings indicate that these tools boost students' interest, motivation, confidence, and overall positive attitudes toward learning, while also helping to alleviate boredom during lectures. Consequently, the study concludes that incorporating digital learning technologies significantly enhances emotional engagement among tertiary institution students in Zamfara State.

Research Question 3:
How do digital learning tools influence students' cognitive engagement in tertiary institutions in Zamfara State?

S/No	Items	Mean	Std. Dev.	Decision
1	These tools also enhance students' grasp of the course material.	3.45	0.70	Accepted
2	Digital learning tools play a key role in sharpening critical thinking and problem-solving abilities.	3.32	0.79	Accepted
3	With the help of digital learning platforms, students can remember information more effectively.	3.27	0.82	Accepted
4	These tools promote independent learning and encourage research.	3.38	0.75	Accepted
5	Students become more involved in academic discussions thanks to digital tools.	3.21	0.84	Accepted
6	Digital learning tools also help students focus better during their learning activities.	3.29	0.78	Accepted
	Grand Mean	**3.32**	**0.78**	**Accepted**

The analysis showed an impressive average score of 3.32, surpassing the benchmark mean of 2.50. This suggests that digital learning tools positively impact students' cognitive engagement at tertiary institutions in Zamfara State. The results indicate that these tools not only help students grasp course material better but also boost critical thinking, aid in retaining information, foster independent learning, and encourage active participation in academic discussions. In conclusion, the study finds that digital learning technologies play a significant role in enhancing cognitive engagement among students in Zamfara State.

Hypothesis 1

There is no significant effect of digital learning tools on students' behavioural engagement in tertiary institutions in Zamfara State.

Variables	N	Mean	Std. Dev.	r-value	p-value	Decision
Digital Learning Tools	350	3.31	0.77	0.684	0.000	Significant
Behavioural Engagement	350	3.27	0.79			

The analysis showed an r-value of 0.684 and a p-value of 0.000, which is below the significance threshold of 0.05. This means we can reject the null hypothesis, which claimed that digital learning tools have no significant effect on the behavioural engagement of students in tertiary institutions in Zamfara State. Essentially, this result suggests that digital learning tools do have a meaningful positive impact on how engaged students are. It indicates that when students use these digital technologies more, their participation, attendance, interaction, and overall involvement in academic activities tend to improve.

Discussion of Findings

The results of this study highlighted the significant impact that digital learning tools have on student engagement among college students in Zamfara State. The discussion revolved around three research questions and a single hypothesis that was tested throughout the study.

From the first research question, it was clear that digital learning tools have a positive effect on students' behavioural engagement. The findings showed a grand mean score exceeding the benchmark mean of 2.50, indicating that students felt these tools enhanced their class participation, completion of assignments, attendance, interaction with their lecturers, and collaborative learning. This suggests that using digital technologies like smartphones, laptops, online platforms, and educational apps fosters active involvement in learning activities. This aligns with other studies by Tunde (2024), Achuonye (2021), and Yusuf and Afolabi (2020) that have found that digital learning environments boost student participation and enhance engagement in higher education.

The second research question revealed that digital learning tools also positively affect students' emotional engagement. Students reported that these tools heightened their interest, motivation, confidence, and positive attitudes toward learning, while also helping to reduce boredom during lectures. This indicates that digital learning fosters an interactive and enjoyable atmosphere that supports students emotionally. These results are consistent with previous research by Gambari (2009), Yaki (2021), and Bello (2022), which has shown that technology-enhanced learning can increase students' enthusiasm, satisfaction, and emotional connection to their academic pursuits.

The results from research question three indicated that digital learning tools have a positive impact on students' cognitive engagement. It was found that these tools enhance students' grasp of course material, boost critical thinking skills, improve information retention, foster independent learning, and facilitate academic discussions. This suggests that digital technologies promote deeper thinking and active mental participation in the learning process. These findings align with previous studies by Christmann and Badgett (2020) that highlighted the importance of digital tools in enhancing students' intellectual involvement and academic success.

Additionally, hypothesis one demonstrated a significant effect of digital learning tools on the behavioural engagement of tertiary institution students in Zamfara State. The null hypothesis was dismissed since the p-value was below the 0.05

significance level. This shows that digital learning tools notably improve students' behavioural engagement in higher education settings. Consequently, the study concludes that digital learning technologies are crucial for enhancing students' behavioural, emotional, and cognitive engagement throughout their learning journey.

Conclusion

According to the study's findings, it was determined that digital learning tools significantly boost student engagement among those in tertiary institutions in Zamfara State. The research showed that utilizing digital learning technologies enhances students' behavioural engagement by fostering better participation, interaction, attendance, and involvement in academic activities. Additionally, it encourages emotional engagement by elevating students' motivation, interest, confidence, and overall positive attitude toward learning. On top of that, these digital tools also enhance cognitive engagement by improving understanding, critical thinking, independent learning, and knowledge retention. The tested hypothesis further confirmed that digital learning tools have a notable impact on students' behavioural engagement. Thus, the study concludes that effectively integrating digital learning tools in tertiary institutions can significantly enhance students' overall engagement and learning outcomes.

Recommendations

Based on the study's findings, here are some recommendations:

1. Tertiary institutions should invest in adequate digital learning facilities, including computers, internet access, projectors, and learning management systems, to boost student engagement in learning activities.

2. Lecturers ought to incorporate digital learning tools into their teaching methods to enhance students' behavioral, emotional, and cognitive engagement.

3. Students should be encouraged and trained on how to effectively use digital learning technologies to optimize their academic performance and participation in learning activities.

4. Government and educational stakeholders should organize regular training sessions and workshops for both lecturers and students on the use of modern digital learning tools and educational technologies.

5. Institutions must ensure reliable internet connectivity and a stable electricity supply to facilitate the effective use of digital learning platforms in tertiary institutions.

6. Educational leaders need to create policies that promote technology-driven learning and foster the use of digital tools within the curriculum.

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