INFLUENCE OF DIGITAL TOOLS ON STUDENTS ACADEMIC PERFORMANCE IN BUSINESS EDUCATION IN PUBLIC TERTIARY INSTITUTIONS IN DELTA STATE

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Abstract
This study examined the Influence of Digital Tools on Students' Academic Performance in Business Education in Public Tertiary Institutions in Delta State. Two research questions and two null hypotheses guided the study. A descriptive survey design was adopted to assess the extent of digital tool utilisation and students' perceptions of their effectiveness on academic performance. The study population consisted of 327 Business Education students from seven public tertiary institutions in Delta State. Using stratified random sampling, a sample size of 240 students was selected. Data were collected using a structured, researcher-developed instrument titled the Digital Tools and Academic Performance Questionnaire (DTAPQ), which was validated by three experts and subjected to reliability testing, yielding a Cronbach's alpha of 0.87. Descriptive statistics (mean and standard deviation) were used to analyse the research questions. In contrast, inferential statistics (independent samples t-test) were used to test the hypotheses at a 0.05 level of significance, with 2.50 as the benchmark mean and ±1.96 as the critical t-value. Findings revealed that digital tools are widely utilised and perceived as effective in enhancing academic performance. However, a significant gender-based difference exists in utilisation levels, favouring male students, while no significant difference was found in perception of effectiveness. It was recommended that institutions implement gender-sensitive digital literacy programmes, integrate interactive multimedia into Business Education delivery, and leverage students' shared positive perceptions through collaborative digital learning projects.

Keywords: Digital Tools, Academic Performance, Business Education, Pubic Tertiary Institutions, Delta State.

Introduction

Digital tools refer to a broad range of electronic, web-based, or software-enabled technologies designed to facilitate the creation, communication, storage, analysis, and dissemination of information in educational, professional, and personal contexts. In the field of education, digital tools include applications such as learning management systems (e.g., Moodle, Google Classroom), multimedia resources (e.g., videos, podcasts), collaboration platforms (e.g., Microsoft Teams, Zoom), assessment technologies (e.g., online quizzes, plagiarism checkers), and productivity software (e.g., Microsoft Excel, Google Docs). According to Adeboye and Ezenwaji (2022), digital tools in education play a crucial role in enhancing instructional delivery, promoting student engagement, and improving learning outcomes by making educational content more accessible, interactive, and tailored to individual needs. This is particularly significant in Business Education, where the ability to deliver dynamic content, analyse data, and communicate effectively in a digital context is vital for equipping students with the relevant skills needed for the 21st century.(Chidubem & Edem, 2023).

Digital tool usage among students involves their proactive interaction with diverse technological resources aimed at supporting, improving, and organising their academic endeavours. This includes using learning management systems, engaging in online discussions, completing digital assessments, using educational applications, watching instructional videos, and collaborating on virtual platforms. Within Business Education, "utilisation" denotes not just accessibility rather, the successful integration of online

tools like Google Classroom, Microsoft Teams, Moodle, and academic databases into students' daily learning practices. According to Ogunlade and Ezeani (2022), effective utilisation is marked by the frequency, diversity, and depth of digital tool engagement, which directly correlates with students' academic efficiency and learning outcomes. Nwosu and Ajienka (2023), further emphasised that utilisation reflects a student's digital competence and the institution's commitment to fostering a technology-enabled learning environment. Hence, utilisation encompasses both the individual's capacity to navigate digital platforms and the systemic availability of tools that support academic advancement.

The effectiveness of digital tools among students in Business Education is notably evident in their ability to enhance academic engagement, comprehension, and performance. These tools—ranging from e-learning platforms like Google Classroom and Moodle to multimedia resources such as educational videos, podcasts, and collaborative apps—have redefined the learning process by making it more interactive, flexible, and student-centred. Students can now access course content on demand, receive real-time feedback, collaborate virtually on academic projects, and manage their study schedules with greater autonomy. The positive perception of digital tools, as found in this study, aligns with Akintunde and Ofoma (2023), who observed that technology-enhanced learning significantly boosts students' motivation and academic outcomes when integrated adequately into instructional delivery. Furthermore, Ogunlade and Ezeani (2022) confirmed that students equipped with digital literacy skills perform better in assessments and display improved retention of business concepts. These findings collectively affirm that when adequately deployed and supported by institutional infrastructure, digital tools serve as effective pedagogical enablers, equipping students with 21st-century competencies essential for academic and professional success in Business Education courses.

Business Education is a professional field that combines theoretical and practical knowledge to develop students' competencies in areas such as accounting, finance, marketing, and office technology. The integration of digital tools into Business Education facilitates simulations, case-based learning, real-time collaboration, and adaptive assessments, which are critical in bridging the gap between classroom knowledge and industry expectations (Umeh & Achor, 2022). Additionally, digital tools allow students to take charge of their learning experience, giving them the ability to set their study pace, retrieve up-to-date business information, and engage with worldwide academic materials. Nevertheless, although the use of these tools is rising in several Nigerian higher education institutions, there are still gaps in the availability of digital resources, the digital skills of lecturers, and the readiness of infrastructure. (Onwusa & Anyanwu, 2024; Nwosu & Ajienka, 2023), which may influence the extent to which these technologies contribute to academic success.

Academic performance is a fundamental measure of educational effectiveness, especially in programmes that train students for professional and managerial positions. Researchers have noted that the effective application of digital tools significantly enhances academic engagement, motivation, and achievement (Chidubem & Edem, 2023; Ibrahim & Okafor, 2022). Digital platforms provide tailored learning experiences and real-time analytics, enabling educators to monitor student performance and address learning gaps promptly. Nonetheless, obstacles such as unreliable internet access, persistent power outages, and insufficient institutional funding for Information and Communication Technology (ICT) infrastructure continue to hinder the utilisation of digital resources in many public tertiary institutions in Delta State (Ijeoma & Ogbonna, 2023; Akintunde & Ofoma, 2023). It is essential to thoroughly analyse these challenges to ascertain whether the implemented digital tools are genuinely enhancing academic outcomes or merely increasing administrative burdens without providing adequate benefits.

In Delta State, the uneven distribution of ICT resources, along with inconsistent digital training among lecturers, creates a unique context for examining the real impact of digital tools. Although institutions such as universities and colleges of education have embraced platforms like Moodle, Zoom, and Microsoft Teams, their usage frequency, quality, and consistency vary considerably. Additionally, students' access to personal digital devices and their attitudes toward self-regulated learning further complicate the situation (Adeboye & Ezenwaji, 2022; Okwu & Anene, 2023). Consequently, digital tools may prove to be more effective in theory than in practice if institutional policies and capacity-building initiatives do not adequately support their implementation. Therefore, it is crucial to investigate not only the presence of

digital tools in Business Education but also how these tools are influencing academic performance in concrete and measurable ways.

This study aims to critically examine how digital tools affect students' academic performance in Business Education at public tertiary institutions in Delta State. It will specifically investigate the level of digital tool integration in Business Education classrooms and evaluate the perceived effectiveness of these tools in improving students' academic outcomes. By concentrating on public tertiary institutions, the study offers a realistic perspective of what can be achieved in environments with limited resources. The anticipated findings will provide essential data for educators, policy-makers, and institutional leaders to inform future strategies for digital transformation in Business Education.

Statement of the Problem

In the rapidly evolving landscape of higher education, digital tools have become vital for enhancing teaching practices, encouraging learner independence, and bolstering academic results. In Business Education, where a successful blend of theoretical understanding and technological skills is essential, these digital tools are anticipated to significantly influence students' academic achievements. However, even with national policies promoting the adoption of digital resources in Nigerian tertiary institutions, there are growing concerns that public institutions, particularly in Delta State, are not fully utilizing these tools. Several factors—including poor infrastructure, inconsistent digital skills among faculty, uneven access for students, and shortcomings in policy execution—have collectively obstructed the effective deployment of digital tools (Ijeoma & Ogbonna, 2023; Onwusa & Anyanwu, 2024).

Empirical evidence shows that although some institutions see improved academic engagement through digital platforms, others report minimal or even detrimental effects. This disparity raises crucial questions about the contextual effectiveness and sustainability of these efforts (Umeh & Achor, 2022; Obielodan & Adebayo, 2023). Additionally, many existing studies adopt a broad perspective on digital learning, failing to analyze how digital tools impact academic performance in specific fields, such as Business Education. This issue is especially pertinent because Business Education not only requires mastery of the content but also digital literacy that meets the expectations of the global job market. Moreover, while private institutions have made significant strides in adopting e-learning solutions, public tertiary institutions in Delta State have been largely neglected in the research, despite their large student populations and vital role in national development.

This research is driven by the need to evaluate the impact of digital tools on academic performance in Business Education programs at public tertiary institutions in Delta State. The absence of detailed, location-specific data focused on this discipline hinders evidence-based policy and curriculum reforms that support digital transformation in education. Consequently, an in-depth analysis of the nature, usage, and impact of digital tools in this setting is crucial for assisting stakeholders including educators, administrators, and policymakers in creating actionable strategies to improve academic outcomes through digital innovation.

Research Questions

The following research questions were established to guide the conduct of this study:

1. How does the extent of digital tool utilization influence the academic performance of students in Business Education at public tertiary institutions in Delta State?
2. How does the perceived effectiveness of digital tools relate to students' academic performance in Business Education at public tertiary institutions in Delta State?

Hypotheses

The following null hypotheses were stated for this study and tested at o.o5 level of significance:

1. There is no significant difference between male and female students regarding the extent of digital tool use and its impact on academic performance in Business Education within public tertiary institutions in Delta State.
2. There is no significant difference between male and female students in their perceptions of the effectiveness of digital tools on academic performance in Business Education within public tertiary institutions in Delta State..

Method

This study adopted a descriptive survey research design to critically investigate the influence of digital tools on students' academic performance in Business Education in public tertiary institutions in Delta State. The design was appropriate as it enabled the researcher to systematically gather, analyse, and interpret data on current practices, perceptions, and the real-world application of digital tools without manipulating any variables. The target population comprised a total of 327 Business Education students enrolled across all major public tertiary institutions in Delta State that offer Business Education programmes.

A stratified random sampling technique was employed to select a sample size of 240 students, ensuring equitable representation across institutions and gender categories. The main data collection instrument was a structured researcher-developed questionnaire titled *Digital Tools and Academic Performance Questionnaire (DTAPQ)*, which was derived from current empirical literature and designed to address the study's specific objectives. The questionnaire comprised two sections: Section A gathered demographic data (such as gender, age, institution), while Section B consisted of 20 items rated on a four-point Likert scale (Strongly Agree = 4 to Strongly Disagree = 1), measuring both the extent of digital tool usage and their perceived impact on academic performance. The instrument was validated by three experts in educational technology and measurement and evaluation, and its reliability was tested through a pilot study involving 30 Business Education students from a non-participating institution, resulting in a Cronbach's alpha reliability coefficient of 0.87, indicating strong internal consistency.

Data were collected through the physical distribution and retrieval of questionnaires with the assistance of trained field assistants. Data analysis employed descriptive statistics (mean and standard deviation) to address the research questions, while inferential statistics, specifically the independent samples t-test, were utilised to test the null hypotheses at a 0.05 level of significance. A benchmark mean of 2.50 was established as the threshold for decision-making regarding item agreement, while a t-critical value of ±1.96 was adopted to determine statistical significance. This comprehensive and methodologically rigorous approach lays the groundwork for uncovering institution and gender-specific dynamics in digital tool adoption and its implications for academic performance, which are critically relevant for educational policy and curriculum transformation in Delta State's public tertiary education system.

Results

Answering of Research Questions

Research Question 1: How does the extent of digital tool utilisation influence the academic performance of students in Business Education in public tertiary institutions in Delta State?

Table 1: ***Mean Ratings on the Extent of Digital Tool Utilisation and Students' Academic Performance in Business Education (n = 240)***

S/N	STATEMENT	$\bar{x}$	SD	REMARK
1.	Digital tools such as Google Classroom and Moodle are frequently used during Business Education lectures.	3.28	0.62	Agree
2.	Students often access academic materials via institutional digital platforms.	3.14	0.69	Agree
3.	Online assessments and quizzes are regularly administered in Business Education courses.	3.02	0.75	Agree
4.	Class assignments are typically submitted using digital tools, such as email or learning portals.	3.36	0.61	Agree
5.	Lecturers utilise digital presentation tools (e.g., PowerPoint, Prezi) in course delivery.	3.32	0.58	Agree
6.	Mobile applications are used to reinforce course content in Business Education.	2.84	0.81	Agree
7.	Lecturers frequently recommend educational YouTube videos and podcasts.	2.95	0.77	Agree
8.	Virtual collaboration platforms (e.g., Microsoft Teams, WhatsApp groups) are used for academic teamwork.	3.18	0.66	Agree
9.	Students frequently use digital devices, such as laptops and	3.40	0.56	Agree

	tablets, for coursework.			
10.	Internet access is essential for keeping up with the Business Education course requirements.	3.45	0.52	Agree
	Grand Mean	**3.18**		**Agree**

The results reveal that respondents generally agree that digital tools are actively utilised in Business Education across public tertiary institutions in Delta State. All 10 items have mean scores above the benchmark of 2.50, with the highest mean (3.45) reflecting the critical role of internet access in course engagement, and the lowest (2.84) indicating moderate use of mobile applications for content reinforcement. The grand mean of 3.18 further confirms that the utilisation of digital tools is consistent and relatively high among students. This suggests that students regularly interact with digital learning environments, although the level of integration still varies by specific tools and activities.

Research Question 2: How does the perceived effectiveness of digital tools relate to students' academic performance in Business Education in public tertiary institutions in Delta State?

Table 2: ***Mean Ratings on the Perceived Effectiveness of Digital Tools and Students' Academic Performance in Business Education (n = 240)***

S/N	STATEMENT	$\bar{x}$	SD	REMARK
11.	The use of digital tools enhances understanding of Business Education concepts.	3.30	0.64	Agreed
12.	Digital tools improve the ability to complete academic tasks efficiently.	3.22	0.67	Agreed
13.	Academic performance has improved due to the use of online learning platforms.	3.15	0.71	Agreed
14.	Digital tools enable better time management and academic scheduling.	3.10	0.74	Agreed
15.	Feedback received through digital platforms contributes to academic improvement.	3.05	0.76	Agreed
16.	Using digital tools makes learning more interactive and engaging.	3.25	0.63	Agreed
17.	Motivation to study increases when digital tools are integrated into learning.	3.08	0.72	Agreed
18.	Video-based content (e.g., tutorials) positively contributes to exam preparation.	3.16	0.70	Agreed
19.	Academic progress can be easily tracked through digital platforms and assessments.	3.20	0.68	Agreed
20.	Digital tools make collaboration with peers easier on academic projects.	3.18	0.65	Agreed
	Grand Mean	**3.17**		**Agreed**

Table 2 also shows positive perceptions about the effectiveness of digital tools on academic performance. All items surpassed the 2.50 benchmark, indicating that students recognise the value digital tools bring to their academic progress. Notably, items such as enhanced understanding (mean = 3.30) and interactive learning (mean = 3.25) suggest that students associate digital tools with cognitive engagement and better academic outcomes. The grand mean of 3.17 confirms an overall strong belief in the academic benefits of digital tool integration. However, slightly lower means on feedback and motivation suggest areas that could benefit from improved instructional design and learner support systems.

Testing of Hypotheses

Ho_1: There is no significant difference between male and female students in the extent of digital tool utilisation as it influences academic performance in Business Education in public tertiary institutions in Delta State.

Table 3: ***Independent Samples t-test on Gender and Digital Tool Utilisation***

Group	n	$\bar{x}$	S^2	Df	t.cal	t.crit	p-value	Decision
Male	110	3.25	0.57	238	2.731	±1.96	0.007	**Reject Ho_1**
Female	130	3.07	0.64					

Table 3 presents the result of an independent samples t-test conducted to determine if a significant difference exists between male and female students in the extent of digital tool utilisation and its effect on academic performance. According to the analysis, male students reported a mean score of 3.25 (SD = 0.57), while female students reported a mean score of 3.07 (SD = 0.64), indicating that male students utilise digital tools more frequently than their female counterparts. The calculated t-value of 2.731 exceeds the critical t-value of ±1.96, and the p-value of 0.007 is less than the 0.05 level of significance. Based on this result, the null hypothesis is rejected, indicating a statistically significant difference in digital tool utilisation between genders.

Ho_2: There is no significant difference between male and female students in the perceived effectiveness of digital tools on academic performance in Business Education in public tertiary institutions in Delta State.

Table 4: ***Independent Samples t-test on Gender and Perceived Effectiveness of Digital Tools.***

Group	n	$\bar{x}$	S^2	df	t.cal	t.crit	p-value	Decision
Male	110	3.20	0.55	238	1.214	±1.96	0.226	**Accept Ho_2**
Female	130	3.12	0.60					

Table 4 reveals the result of the t-test assessing gender differences in the perceived effectiveness of digital tools on academic performance. The mean score for male students was 3.20 (SD = 0.55), and for female students, 3.12 (SD = 0.60). Although the male group reported a slightly higher mean, the calculated t-value of 1.214 does not exceed the critical value of ±1.96, and the p-value of 0.226 is greater than the 0.05 level of significance. Consequently, the null hypothesis is accepted, implying that there is no statistically significant difference in how male and female students perceive the effectiveness of digital tools on their academic performance.

Discussion

The study found that digital tools are extensively utilised by students in Business Education programmes across public tertiary institutions in Delta State, with a grand mean of 3.18, indicating a generally high level of usage above the benchmark of 2.50. This finding reveals that students in Business Education programmes are actively engaging with a broad spectrum of digital tools, including online classrooms, institutional learning portals, digital assessment platforms, and collaborative apps. The data suggest that digital integration is no longer peripheral but increasingly core to academic activities. This aligns with the observations of Nwosu and Ajienka (2023), who reported that digital tools have shifted from supplementary to essential components of higher education pedagogy in Nigerian tertiary institutions.

The grand mean of 3.17 on students' perceived effectiveness of digital tools indicates that students generally agree that digital platforms enhance their academic performance. Students perceive digital tools as not only accessible but pedagogically impactful, improving comprehension, motivation, time management, collaboration, and overall academic outcomes. This finding supports the claim by Akintunde and Ofoma (2023) that learners in Nigerian tertiary institutions hold a strong belief in the academic relevance of digital tools when these tools are used consistently and aligned with their course requirements.

A statistically significant gender-based difference was found in the extent of digital tool utilisation (t-cal = 2.731, p = 0.007), with male students using digital tools more extensively than female students. This

gender disparity highlights that while digital tools are widely used, female students may engage less actively or frequently with these resources. This result is consistent with the conclusions of Okwu and Anene (2023), who found that socio-technical barriers and cultural expectations contribute to reduced digital engagement among female students in Nigerian tertiary institutions.

No significant gender difference was observed in the perceived effectiveness of digital tools (t-cal = 1.214, p = 0.226), suggesting that both male and female students equally recognise the academic value of digital tools. This finding suggests that students, regardless of gender, share a common belief in the efficacy of digital tools, even if their usage levels vary. It suggests a positive institutional impact in normalising digital learning experiences and embedding technology into the academic culture of Business Education. Ogunlade and Ezeani (2022) similarly observed that when digital instruction is properly institutionalised, gender-based perceptual differences tend to fade. This shared belief provides a fertile ground for advancing digital inclusion strategies, as both male and female students are already cognitively aligned with the pedagogical benefits of technology.

Conclusion

This study critically examined the influence of digital tools on students' academic performance in Business Education across public tertiary institutions in Delta State. The findings established that digital tools are widely utilised among students, with an overall high level of engagement reflected in the mean responses. Moreover, students overwhelmingly perceived digital platforms as effective in enhancing their academic performance, particularly in areas such as understanding business concepts, completing tasks on time, collaboration, and motivation. However, a significant gender disparity was revealed in the extent of digital tool utilisation—male students engaged more with digital tools compared to their female counterparts, despite both groups equally acknowledging the benefits of such tools. This suggests a prevailing gap between access or frequency of use and cognitive appreciation of digital technologies, necessitating further investigation into the socio-cultural and structural factors that impede full participation by female students. Conclusively, the research reveals that while public tertiary institutions in Delta State have made commendable progress in integrating digital tools into Business Education, strategic efforts must now focus on bridging gender gaps in usage, reinforcing digital equity, and ensuring that perceptions of effectiveness translate into consistent and meaningful engagement for all students.

Recommendations

From the findings of this study, the following recommendations were made;

1. Public tertiary institutions should institutionalise and standardise the use of core digital learning platforms across all Business Education courses by integrating them into curriculum delivery, assignment submission, and assessment processes. This should be enforced through academic policy directives and regular digital audits to ensure consistency and system-wide adoption.
2. Institutions should enhance digital engagement by embedding interactive digital tools and multimedia content into Business Education pedagogy, leveraging the positive perception already held by students. Faculty members should be trained to design courses that incorporate simulations, podcasts, video tutorials, and real-time feedback systems to maximise students' perceived and actual academic gains.

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