

Digital Education among Business Education Lecturers in Universities: Implications for Effective Teaching and Learning

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Abstract

The study adopted a descriptive survey design. The population consisted of 39 Business Education lecturers from six Federal Universities. The population was selected using stratified sampling technique. The Universities that were used include: Abubakar Tafawa Belewa University Bauchi, Federal University Wukari, Modibbo Adama University Yola, Federal University Gashua, University of Maiduguri, and Federal University Kashere. Data collection was through a structured questionnaire titled "Questionnaire on Digital Education among Business Education Educators in Universities, North-East Nigeria: Implications for Effective Teaching and Learning (QDEBEE)". It measured the extent of use, effectiveness, and challenges of digital education. 39 copies of the questionnaire were administered and retrieved, representing a 100% response rate. The instruments were validated by three experts. The reliability coefficient of .86 was obtained using Cronbach's Alpha. Data collected were analysed using SPSS version 26. Mean and standard deviation were used to answer research questions, while t-tests were used to test hypotheses on differences in adoption rates. The study revealed that digital education can boost teaching and learning in Business Education in North-East Nigeria, but its adoption is hindered by limited availability, accessibility, and low usage. The study recommends that stakeholders address technical, infrastructural, and faculty-related challenges to enhance adoption.

Keywords: Digital Education, Business Education Lecturers, Universities, North East Nigeria Teaching and Learning

Introduction

The advent of the digital age has initiated a fundamental change, altering the methods by which educators and learners acquire knowledge, as well as the means through which education is accessed and provided. The incorporation of digital education within higher education institutions is essential for an efficient teaching process in most developing countries, such as Nigeria. This is

particularly applicable in the domain of Business Education, which imparts students with pragmatic corporate competencies. The necessity for Business Educators to employ digital instruments is increasing as the world becomes increasingly interconnected. Nonetheless, within the universities in North East Nigeria, despite acknowledging the significance of digital platforms such as Google Workspace, Canva, Coursera, Alison, Kahoot, and Trello, there exists a considerable deficiency in harnessing these capabilities of digital education. Observations indicate that instructors in Business Education struggle to incorporate digital resources into their teaching due to inadequate infrastructure and a lack of technical proficiency (Gcabashe, & Ndlovu, 2022). This has led to an examination of how the existing degree of digital education integration by these instructors influences the delivery of superior, career-prepared business education in the area.

Business education constitutes a field of study that equips individuals for professions within the business sector, encompassing essential domains such as finance, management, marketing, and entrepreneurship (Ruel & Tajmel, 2024). It connects theoretical understanding with practical abilities like critical analysis and leadership, to cultivate individuals equipped for corporate, public, or entrepreneurial positions. With the goal of preparing students for the workforce, business education is an essential part of the educational landscape in North East Nigerian universities. The region, which includes states like Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe, has socioeconomic issues that affect the provision of education, including as insecurity and inadequate infrastructure. To prepare students for employment in business, management, and entrepreneurship, local universities like the University of Technology Yobe and the University of Maiduguri offer Business Education programs. Nevertheless, the program's quality is obstructed by issues such as insufficient funding (Eshemogie & Owie, 2023), limited access to technology (Afzal et al., 2023), and a lack of qualified professors (Rashid, 2019). In spite of this, business education is still important for producing graduates with the needed abilities for the digital economy (Gheorghiuńska et al., 2026). Business educators have the chance to take use of digital education and promote economic growth and development in the North East thanks to the region's developing entrepreneurial spirit and government initiatives like the Northeast Development Commission's efforts to repair educational infrastructure.

Digital education is defined as a student-centred approach to learning that facilitates anytime and anywhere access to educational resources to facilitate teaching and learning (Pandey et al 2023). According to Maphosa and Bhebhe (2019), digital education refers to the integration of technology into teaching and learning with the aim of enhancing outcomes, online learning, digital literacy, blended learning and encompassing e-learning. Obla and Ukabi (2021) noted that worldwide, digital education has expanded rapidly, accelerated by online platforms, mobile connectivity Artificial Intelligence (AI) tools, and the COVID-19-driven shift to remote learning. An extensive ecosystem of Massive Open Online Courses (MOOCs), virtual classrooms, learning apps, immersive technologies, adaptive tutors, AI-powered adaptive learning, and open educational resources (OERs), is now available to educators and learners, offering unprecedented flexibility, scale and transforming how education is delivered and accessed. According to Khan et al (2022), investment and adoption by institutions of learning are growing across regions; with strong uptake in Latin America, Asia, and parts of Africa, and increasingly rely on digital education for workforce re-equipping. UNESCO 2022 observes that these innovations can “complement, enrich and transform education” by expanding access and adapting learning to new contexts (Mairal-Llebot et al., 2025).

Digital education is driven by the desire for flexible, accessible, and quality education. In Nigeria, initiatives like the National Digital Education Strategy aim to enhance ICT skills and the integration of technology into education. As a profession that prepares students for the workforce, business education can especially profit from developments in digital education, giving them skills like data analysis, online collaboration, and effective digital communication. According to Raphael et al (2024), the COVID-19 pandemic accelerated computer literacy education adoption, underscoring its significance in ensuring continuity of knowledge acquisition. According to Owan et al (2021), during the COVID-19 pandemic, for example, remote learning reached an estimated one billion students at its peak, though, roughly half a billion educators and learners lacked access to digital tools. Overall internet usage has soared (from 16% of people in 2005 to 66% in 2022) (Strain et al., 2024), and by 2022 about half of all secondary schools globally had internet connections (Owan et al., 2023). These trends demonstrate an unprecedented expansion of digital education platforms and services globally.

Globally, education expenditure remains benchmarked at roughly 4-6% of GDP for 2026. However, most African countries like Nigeria still fall far below this objective, limiting investment in digital learning (Bellefontaine, 2026; Makinwa, 2026). These gaps make it difficult to further plan for digital education tools such as Virtual Reality, MOOCs, and Augmented Reality, etc. Nevertheless, roughly \$10 trillion is expected to be spent in digital education by 2030, with technology taking the pivotal role globally (Moschetti & Verger, 2026). On the other hand, World Economic Forum 2016, experts have pointed out that new technologies, such as AI, will drive most of digital education growth (Li, 2024). They anticipate that the AI-education market alone might expand by nearly \$21 billion by 2028. In short, enormous investments and expanding budgets are supporting a flood of new digital education products and services internationally. As technology continues to grow, Business Education educators in Nigeria need to stay updated on digital trends to successfully prepare students for the digital economy.

Developed nations like the United States, Australia, and the United Kingdom have made significant progress in ICT skills adoption (van der Vlies, 2020). This improvement focuses on technologies like AI, VR, and AR and online learning platforms such as uLearn (for Video lessons, quizzes, works offline. For tertiary + secondary), Eneza Education (for SMS/USSD based works without internet or smartphones), Prepclass/Tutera (Nigerian platforms for recorded lessons + tutoring), Khan Academy (for economics, business fundamentals and free math), Facebook Blueprint (for free digital marketing/ads training for SMEs), LinkedIn Learning (for accounting software, business, leadership courses), and Google Digital Skills (useful for teaching entrepreneurship) (Obla et al., 2025), where developing nations like Nigeria confront issues like poor infrastructure, insufficient funding, and restricted access to technology. Despite these discrepancies, both cultures acknowledge the need of digital education in teaching students for the digital economy and are studying creative techniques like mobile learning and AI-powered education. The adoption of digital education among educators is influenced by numerous aspects, including perceived usefulness, simplicity of use, and attitude towards technology.

Conferring to the Technology Acceptance Model (TAM), lecturers are most expected to adopt digital education, if they believe that it will improve their pedagogical effectiveness and learners learning outcomes (Davis, 1989). According to Kianinezhad (2024), many factors play a significant role in shaping educators' attitudes with respect to digital education. These factors include access to technology, technical support, and professional development opportunities.

Institutional factors that can also influence the adoption of digital education include leadership support, infrastructure, and resources (Singun, 2025). Government policies, societal expectations, and technological advancements are all external factors that can drive or hinder digital education adoption. For instance, government initiatives like Nigeria's National Policy on Education (NPE) emphasise the importance of ICT in education, encouraging educators to adopt digital technologies. Srivastav, and Das, (2025) note that limited infrastructure, inadequate training, resistance to change and technophobia are other challenges that can hinder digital education adoption.

Digital competence with higher education lecturers shows mixed but significant insights. According to Guillén-Gámez et al (2021) no overall gender difference in digital competence, but noted significant gaps in digital skills, ethics, and ICT anxiety, calling for targeted training. Soomro et al (2020) highlighted a digital divide in faculty access to technology across personal and positional categories, supporting concerns of unequal tool availability. Cabero-Almenara et al (2021) reported an intermediate level of digital competence overall, with variations by field of knowledge and age, while Guillén-Gámez et al (2022) found teachers with 15+ years' experience showed the greatest competence gaps. In contrast, Zhao et al. (2021) found males rated their digital competence higher than females and less experienced teachers rated themselves better in content creation. These studies underscore skills gaps, uneven access, and the need for context-specific training.

Literature also highlights the significance of digital education in enhancing teaching and learning outcomes, particularly in Business Education (Masa'deh et al., 2025; Zhou et al., 2025). However, it also reveals a significant gap in digital education adoption among educators in Universities, North East Nigeria (Kuliya, & Usman, 2021), due to factors such as limited infrastructure, inadequate training, vandalization of digital infrastructure, and technophobia (Davidson, & Ezeh, 2023). Despite the recognised importance of digital education, there is a dearth of research on the specific factors influencing its adoption among Business Education educators in this context. The existing literature suggests that digital education can enhance student engagement, improve access to educational resources, and prepare students for the digital economy. Given the socio-economic challenges facing North East Nigeria, understanding the factors influencing digital education adoption is crucial for promoting educational development in the region, hence the need for the study.

Research Questions

1. What is the availability of digital education among Business Education educators in North East Nigeria?
2. How accessible are digital education to Business Education educators in North East Nigeria?
3. To what extent do Business Education educators in North East Nigeria use digital education?
4. How effective are digital education in enhancing teaching and learning in Business Education in North East Nigeria?
5. What challenges do Business Education educators face in implementing digital education in North East Nigeria?

Hypotheses

1. There is no significant difference between the mean ratings of university educators with regard to availability of digital education based on university type (old and new) in North East Nigeria.
2. There is no significant difference between the mean ratings of accessibility of digital education and their extent of use among Business Education educators based on gender in North East Nigeria.
3. There is no significant relationship between the mean rating of extent of use of digital education and their effectiveness in enhancing teaching and learning in Business Education in North East Nigeria.
4. There is no significant relationship between challenges faced by Business Education educators and the effectiveness of digital education in North East Nigeria.

Method

The study employed a descriptive survey design to assess the current digital employed by Business Education educators in universities in North East Nigeria and their implications for teaching and learning. A descriptive survey design is deemed appropriate for this topic because it allows for the systematic collection of data from a large group of educators to describe current digital, identify adoption gaps, and map out training needs regarding ICT in North East Nigerian universities. The target population comprised 39 Business Education lecturers drawn from six Federal Universities in the region, selected using stratified sampling technique. The universities covered were: Federal University Wukari, Modibbo Adama University Yola, Abubakar Tafawa Balewa University Bauchi, Federal University Gashua, University of Maiduguri, and Federal University Kashere. A structured questionnaire titled "Questionnaire on Digital Education among Business Education Educators in Universities, North-East Nigeria: Implications for Effective Teaching and Learning (QDEBEE)" was used for data collection. The instruments (questionnaire) were validated by three (3) experts, one from Business Education, one from Measurement and Evaluation (Psychometrics), and one from Educational Technology all from universities Nigeria Nsukka. The reliability coefficient was tested using Cronbach's Alpha. The instruments yielded a reliability coefficient of .86 showing the instrument is reliable for the purpose it was structured for. The instrument measured the extent of use, effectiveness, and challenges of digital education. All 39 copies of the questionnaire were retrieved, representing a 100% response rate. Data were analysed using SPSS. Mean and standard deviation were used to answer research questions, while t-tests were used to test hypotheses on differences in adoption rates. The study concludes that digital education can boost teaching and learning in Business Education in North-East Nigeria, but its adoption is hindered by limited availability, accessibility, and low usage. The study recommends that stakeholders address technical, infrastructural, and faculty-related challenges to enhance adoption.

Result

Research question one: What is the availability of digital education among Business Education educators in North East Nigeria?

Table 1: Digital education availability for Business Education educators

S/N	Digital education	A		NA		R
		f	%	F	%	

1	Online Learning Platforms (e.g., Moodle, Blackboard)	5	83.3%	1	16.7%	A
2	Virtual Classrooms (e.g., Zoom, Google Meet)	2	33.3%	4	66.7%	NA
3	Digital Content Resources (e.g., e-books, online journals)	4	66.7%	2	33.3%	A
4	Simulation-based Learning (e.g., business games, financial simulations)	2	33.3%	4	66.7%	NA
5	Social Media and Collaboration Tools (e.g., WhatsApp)	6	100%	0	0%	A
6	Assessment and Feedback Tools (e.g., Google Forms)	1	16.7%	5	83.3%	NA
7	Gamification (e.g., using games to teach business concepts)	5	83.3%	1	16.7%	A
8	Flipped Classrooms (pre-recorded lectures, in-class activities)	5	83.3%	1	16.7%	A
9	Blended Learning (mix of online and offline learning)	4	66.7%	2	33.3%	A
10	Online Discussions and Forums	5	83.3%	1	16.7%	A
11	Video Conferencing (e.g., guest lectures, meetings)	4	66.7%	2	33.3%	A
12	Business Software Training (e.g., Excel, accounting software)	5	83.3%	1	16.7%	A
13	Online Quizzes and Tests	5	83.3%	1	16.7%	A
14	Podcasting (educator-created content)	5	83.3%	1	16.7%	A
15	Screen Recording and Tutorials	5	83.3%	1	16.7%	A
16	Online Group Projects and Presentations	2	33.3%	4	66.7%	NA
17	Online Internship and Placement Platforms	2	33.3%	4	66.7%	NA
18	Digital Badges and Micro-credentials	2	33.3%	4	66.7%	NA
19	AI-powered Adaptive Learning Systems	1	16.7%	5	83.3%	NA

Key: A = Available, NA = Not Available, f = Frequency, % = Percentage, R = Remarks

The findings in table 1 show digital tools available for digital education for Business educators. The result show that some infrastructure such as Virtual Classrooms (e.g., Zoom, Google Meet), Simulation-based Learning (e.g., business games, financial simulations), Assessment and Feedback Tools (e.g., Google Forms), Online Group Projects and Presentations, Online Internship and Placement Platforms, Digital Badges and Micro-credentials, and AI-powered Adaptive Learning Systems with percentage values of 50% or less each are not available for Business educators. However, items 1, 3, 5, and 7-15 with percentage values of more than 50% indicate digital education that is available for Business Education educators. They include Online Learning Platforms (e.g., Moodle, Blackboard), Digital Content Resources (e.g., e-books, online journals), Social Media and Collaboration Tools (e.g., WhatsApp), Gamification (e.g., using games to teach business concepts), Flipped Classrooms (pre-recorded lectures, in-class activities), Blended Learning (mix of online and offline learning), Mobile Learning (using mobile devices for learning), Video Conferencing (e.g., guest lectures, meetings), Business Software Training (e.g., Excel, accounting software), Online Quizzes and Tests, Podcasting (educator-created content), and Screen Recording and Tutorials. This showed that majority of digital tools were not lacking for digital education for Business educators in Northeast, Nigeria.

Research question two: How accessible are digital education to Business Education educators in North East Nigeria?

Table 2: Digital education accessible to Business Education educators

S/N	Digital education	$\bar{X}$	SD	R	D
1	Digital Content Creation Tools (e.g., PowerPoint, Google Slides)	2.45	.87	12 th	NA

2	E-books and Digital Textbooks	2.71	.87	7 th	A
3	Online Journals and Research Papers	2.60	1.07	8 th	A
4	Educational Videos (e.g., YouTube, TED Talks)	2.54	1.14	10 th	A
5	Online Learning Platforms (e.g., Moodle, Blackboard)	2.57	.96	9 th	A
6	Online Conferences and Seminars	3.20	.98	3 rd	A
7	Digital Libraries (e.g., academic databases)	3.54	1.00	1 th	A
8	Online Communities and Forums for Educators	2.94	1.07	4 th	A
9	Virtual Conferences and Workshops	2.71	1.10	7 th	A
10	Online Assessment and Feedback Tools	2.71	.93	7 th	A
11	Social Media for Professional Development	2.93	1.17	5 th	A
12	Online Collaboration Tools (e.g., Google Drive, Trello)	3.32	.93	2 nd	A
13	Educational Apps for Business Education	3.20	.90	3 rd	A
14	Online Case Studies and Business Examples	2.85	1.09	6 th	A
15	AI-powered Learning Platforms for Business Education	2.49	1.14	11 th	NA
16	Podcasts on Business Education	2.42	1.15	13 th	NA
	Mean of Mean	2.82	1.08		A

Key: $\bar{X}$ = Mean, SD = Standard deviation, A = Accessible (2.50-4.00), NA = Not Accessible (1.50-2.49), R = Rank, D = Decision

The findings in Table 2 shows that Business educators agreed to the accessibility of all digital tools, except in items 1, and 15 where educators disagree the accessibility of Digital Content Creation Tools (e.g., PowerPoint, Google Slides) ($\bar{X}$ = 2.45, SD = .87) and AI-powered Learning Platforms for Business Education ($\bar{X}$ = 2.49, SD = 1.14). The mean of means 2.82 and SD of 1.08 showed that digital education is accessible to Business educators in North East Nigeria.

Research question three: To what extent do Business Education educators in North East Nigeria use digital education?

Table 3: Extent to which digital education is used by Business educators

S/N	Digital education	$\bar{X}$	SD	R	D
1	E-learning platform is a digital education used	2.32	1.01	11 th	LE
2	Online courses e.g., video lectures education is used	2.60	1.00	3 rd	HE
3	Virtual classrooms e.g., video conferencing and webinars education is used	2.42	1.06	8 th	LE
4	Blended learning combining online, and offline instruction is used	2.47	1.13	7 th	LE
5	Online tutorial e.g., information literacy, research skills education is used	2.53	1.17	4 th	HE
6	Mobile learning e.g., mobile Apps, SMS based leaning education is used	2.50	.78	6 th	HE
7	Online Courses (e.g., MOOCs, Coursera) is used	2.29	.93	12 th	LE
9	E-books and Digital Textbooks is used	1.71	.60	14 th	LE
10	Online Journals and Research Papers are used	2.85	.57	2 nd	HE
11	Online courses platforms e.g., Coursera, EDX education is used	1.59	.55	15 th	LE
12	Virtual learning environment education is used	2.90	.94	1 st	HE
13	MOOCs (Massive online courses) education is used	1.95	.89	13 th	LE
14	AI-powered Learning Platforms for Business Education is used	1.24	1.14	16 th	VL
15	Simulation Based learning education is used	2.41	1.00	9 th	LE

16	Social learning platform e.g., discussion forum and social media education are used	2.51	.98	5 th	HE
17	Micro learning e.g., short, focused learning modules education is used	2.39	.95	10 th	LE
Mean of Mean		2.16	.21		

Key: $\bar{X}$ = Mean, SD = Standard deviation, Very High Extent = VHE (3.50-4.00), High Extent, = HE (2.50-3.49), Low Extent = LE (1.50-2.49), Very Low Extent = VLE (0.5-1.50), R = Rank, D = Decision.

The findings in table 3 shows to what extent do Business Education educators in North East Nigeria use digital education. The result shows that Business Education educators use digital education to a low extent. Items 1, 3, 4, 7, 8, 9, 11, 13, 15, and 17 with percentage values of more than 1.50 and less than 2.50 indicate that respondents agree the items are used to a low extent. They include E-learning platform is a digital education ($\bar{X}$ = 2.32, SD = 1.01), Virtual classrooms e.g., video conferencing and webinars education ($\bar{X}$ = 2.42, SD = 1.06), Blended learning combining online, and offline instruction ($\bar{X}$ = 2.47, SD = 1.13), Online Courses (e.g., MOOCs, Coursera) ($\bar{X}$ = 2.29, SD = .93), E-books and Digital Textbooks ($\bar{X}$ = 1.71, SD = .60), Online courses platforms e.g., Coursera, EDX education ($\bar{X}$ = 1.59, SD = .55), MOOCS (Massive online courses) education ($\bar{X}$ = 1.95, SD = .89), Simulation Based learning education ($\bar{X}$ = 2.41, SD = 1.00), and Micro learning e.g., short, focused learning modules education ($\bar{X}$ = 2.39, SD = .95). However, items other items, Online courses e.g., video lectures education is used ($\bar{X}$ = 2.60, SD = 1.00), Online tutorial e.g., information literacy, research skills education is used ($\bar{X}$ = 2.53, SD = 1.17), Mobile learning e.g., mobile Apps, SMS based leaning education is used ($\bar{X}$ = 2.50, SD = .78), Online Journals and Research Papers is used ($\bar{X}$ = 2.85, SD = .57), Virtual learning environment education is used ($\bar{X}$ = 2.90, SD = .94), and Social learning platform e.g., discussion forum and social media education are used ($\bar{X}$ = 2.51, SD = .98) indicate high extent of use. Generally, the mean of means of 2.16 which is within the real limit of 1.50-2.49, indicates that digital education use by educators is to a low extent.

Research question four: How effective are digital education in enhancing teaching and learning in Business Education in North East Nigeria?

Table 4: Effective use of digital education in enhancing teaching and learning

S/N	Digital education	$\bar{X}$	SD	R	D
1	Frequency of using digital tools for lesson planning	2.48	.98	5 th	LE
2	Ability to engage students in online discussions	2.96	1.05	3 rd	E
3	Quality of digital content created for Business Education	2.34	.80	7 th	LE
4	Use of simulations or games to teach business concepts	2.15	.94	10 th	LE
5	Ability to troubleshoot technical issues in digital classes	2.46	.53	6 th	LE
6	Use of digital tools to personalise learning for students	2.96	.62	3 rd	E
7	Frequency of using data analytics to inform teaching	2.49	.51	4 th	LE
8	Quality of digital collaboration with students and peers	2.32	.52	8 th	LE
9	Ability to adapt digital content to different learning styles	2.24	.49	9 th	LE
10	Use of digital tools to teach real-world business scenarios	3.23	.49	2 nd	E
11	Ability to integrate digital tools with business curriculum	2.46	.50	6 th	LE
12	Use of digital tools to enhance student critical thinking	2.49	.55	4 th	LE
13	Quality of digital resources shared with students	3.43	.38	1 st	E
Mean of Mean		2.61	.64		

Key: $\bar{X}$ = Mean, SD = Standard deviation, VE = Very Effective (3.50-4.00), E = Effective (2.50-3.49), LE = Less Effective (1.50-2.49), NE = Not Effective (0.5-1.50), R = Rank, D = Decision.

The findings in Table 4 show that some items have mean values above the cut-off point of 2.50 and less than 3.50 indicating effective. They include Ability to engage students in online discussions ($\bar{x} = 2.96$, $SD = 1.05$), Use of digital tools to personalise learning for students ($\bar{x} = 2.96$, $SD = .62$), Use of digital tools to teach real-world business scenarios ($\bar{x} = 3.23$, $SD = .49$), and Quality of digital resources shared with students ($\bar{x} = 3.43$, $SD = .38$). However, some of the items have mean scores less than 2.50, indicating less effective of digital education used by Business educators; they include Frequency of using digital tools for lesson planning ($\bar{x} = 2.48$, $SD = .98$), Quality of digital content created for Business Education ($\bar{x} = 2.34$, $SD = .80$), Use of simulations or games to teach business concepts ($\bar{x} = 2.15$, $SD = .94$), Ability to troubleshoot technical issues in digital classes ($\bar{x} = 2.46$, $SD = .53$), Frequency of using data analytics to inform teaching ($\bar{x} = 2.49$, $SD = .51$), Quality of digital collaboration with students and peers ($\bar{x} = 2.32$, $SD = .52$), Ability to adapt digital content to different learning styles ($\bar{x} = 2.24$, $SD = .49$), Ability to integrate digital tools with business curriculum ($\bar{x} = 2.46$, $SD = .50$), and Use of digital tools to enhance student critical thinking ($\bar{x} = 2.49$, $SD = .55$). Generally, the mean of mean of 2.61 and SD of .64 which is within the real limit of 2.50-3.49, indicates effective use of digital tools by Business Education educators.

Research question five: What challenges do Business Education educators face in implementing digital education in North East Nigeria?

Table 5: Challenges Business educators face in implementing digital education

S/N	Digital education	C		NC		R
		F	%	f	%	
1	Lack of Technical Skills	5	83.3%	1	16.7%	C
2	Inadequate Infrastructure	3	50.0%	3	50.0%	NC
3	Faculty Resistance to Technology	5	83.3%	1	16.7%	C
4	Low Student Engagement in Online Courses	5	83.3%	1	16.7%	C
5	Assessment Challenges	2	33.3%	4	66.7%	NC
6	Digital Content Accessibility	4	66.7%	2	33.3%	C
7	Intellectual Property & Copyright Issue	5	83.3%	1	16.7%	C
8	Cyber security Risks	4	66.7%	2	33.3%	C
9	Isolation and Lack of Community	5	83.3%	1	16.7%	C
10	Limited Practical/Lab Experience	1	16.7%	5	83.3%	NC
11	Language and Communication Barriers	5	83.3%	1	16.7%	C
12	Rapidly Changing Technology	5	83.3%	1	16.7%	C
13	Quality Assurance of Online Courses	4	66.7%	2	33.3%	C
14	Time Management Difficulties	2	33.3%	4	66.7%	NC
15	Cost of Digital Resources	4	66.7%	2	33.3%	C
16	Inadequate Support Services Online	5	83.3%	1	16.7%	C
17	Difficulty in Teaching Soft Skills	5	83.3%	1	16.7%	C
18	Digital Divide, unequal access to technology	3	50.0%	3	50.0%	C

Key: C=Challenge, NC=Not Challenge, f= Frequency, % = Percentage, R = Remarks

The findings in table 5 show the challenges Business Education educators face in implementing digital education in North East Nigeria. The result shows that some digital tools such as Inadequate

Infrastructure (50.0%), Assessment Challenges (33.3%), Limited Practical/Lab Experience (16.7%), and Time Management Difficulties (33.3%) with percentage value of 50% or less are not challenging digital education faced by Business Education educator for teaching and learning. However, items 1, 3, 4, 6, 7, 8, 9, 11, 12, 13, and 15-18 with percentage values of more than 50% are indicated as digital tools are challenging digital education faced by Business Education educators. They include Lack of Technical Skills (83.3%), Faculty Resistance to Technology (83.3%), Low Student Engagement in Online Courses (83.3%), Digital Content Accessibility (66.7%), Intellectual Property & Copyright Issue (83.3%), Cyber security Risks (66.7%), Isolation and Lack of Community (83.3%), Language and Communication Barriers (83.3%), Rapidly Changing Technology (83.3%), Quality Assurance of Online Courses (66.7%), Cost of Digital Resources (66.7%), Inadequate Support Services Online (83.3%), Difficulty in Teaching Soft Skills (83.3%), and Digital Divide, unequal access to technology (50.0%). Generally, this showed that majority of digital education are challenging for Business educators for teaching and learning in Northeast, Nigeria.

H0₁: There is no significant difference between the mean ratings of university educators with regard to availability of digital education based on university type (old and new) in North East Nigeria.

An independent sample t-test was conducted to compare the mean ratings of old and new University educators with regard to digital tools available for digital education in Universities in North East Nigeria. The results are presented in Table 6.

Table 6: t-test analysis of mean ratings of old and new University educators regarding digital tools available for digital education

University type	N	$\bar{X}$	SD	Df	F	T	Sig. (2-tailed) P	Decision
Old	23	1.3628	0.12074	39	2.011	1.642	0.109	Not significant
New	16	1.3065	0.09153					

The findings in table 6 presents the result of the independent samples t-test comparing the mean ratings of respondents in old and new University educators with regard to digital tools available for digital education in Universities in North East Nigeria. The mean score for old University educators is 1.3628, with a SD of 0.12074, while the mean score for new University educators is 1.3065, with a SD of 0.09153. The t-test yielded a t-value of 1.642, with 39 degrees of freedom and a p-value of 0.109. Since the p-value (0.109) is greater than the 0.05 level of significance ($p > 0.05$), the null hypothesis not rejected. This indicates that there is no significant difference between the mean ratings of old and new University educators with regard to digital tools available for digital education in Universities in North East Nigeria.

H0₂: There is no significant difference between the mean ratings of accessibility of digital education and their extent of use among Business Education educators based on gender in North East Nigeria.

To test the hypothesis, an independent sample t-test was conducted to compare the mean ratings of accessibility of digital education and their extent of use among Business Education educators

with regard to digital education in university based on gender in North East Nigeria. The results are presented in Table 7.

Table 7: t-test analysis of mean rating of accessibility of digital education and their extent of use based on gender

Gender	N	$\bar{X}$	SD	Df	F	T	Sig. (2-tailed) P	Decision
Male	19	2.3122	0.64957	379	2.008	0.481	0.631	Not Significant
Female	20	2.2792	0.68102					

The findings in table 7 presents the result of the independent samples t-test comparing the mean ratings of accessibility of digital education and their extent of use among Business Education educators with regard to digital education in universities based on gender in North East Nigeria. The mean score for male educators is 2.3122, with a SD of 0.64957, while the mean score for female educators is 2.2792, with a SD of 0.68102. The t-test yielded a t-value of 0.481, with 379 degrees of freedom and a p-value of 0.631. Since the p-value (0.631) is greater than the 0.05 level of significance ($p > 0.05$), the null hypothesis was not rejected. Thus, there is no significant difference between the mean ratings of accessibility of digital education and their extent of use among Business Education educators with regard to digital education in universities based on gender in North East Nigeria. Additionally, the results suggest that male and female educators have similar perceptions or ratings regarding gender of digital education based on the small difference in mean ratings.

H0₃: There is no significant relationship between the mean rating of extent of use of digital education and their effectiveness in enhancing teaching and learning in Business Education in North East Nigeria.

An independent sample t-test was conducted to compare the mean rating of extent of use of digital education and their effectiveness in enhancing teaching and learning in Business Education in North East Nigeria. The results are presented in Table 8.

Table 8: t-test analysis of mean rating of extent of use of digital education and their effectiveness in enhancing teaching and learning

Digital education	N	$\bar{X}$	SD	Df	F	t	Sig. (2-tailed) P	Decision
Extent of use	21	2.4293	0.25022	39	0.705	-164	0.871	Not Significant
Effectiveness	18	2.4410	0.18990					

The findings in table 8 presents the result of the independent samples t-test comparing the mean rating of extent of use of digital education and their effectiveness in enhancing teaching and learning. The mean score for extent of use among Business educators is 2.4293, with a SD of 0.25022, while the mean score for effectiveness among Business educators is 2.4410, with a SD of 0.18990. The t-test yielded a t-value of -0.164, with 39 degrees of freedom and a p-value of 0.871. Since the p-value (0.871) is greater than the 0.05 level of significance ($p > 0.05$), the null

hypothesis was not rejected. This indicates that there is no significant difference between the mean ratings of extent of use of digital education and their effectiveness in enhancing teaching and learning.

H04: There is no significant relationship between challenges faced by Business Education educators and the effectiveness of digital education in North East Nigeria.

To test the hypothesis, an independent sample t-test was conducted to compare the mean ratings of challenges faced by Business Education educators and the effectiveness of digital education in North East Nigeria. The results are presented in Table 9.

Table 9: t-test analysis of mean ratings of male and female LIS Educators on challenges associated to digital education

Digital education	N	$\bar{X}$	SD	Df	F	t	Sig. (2-tailed) P	Decision
Challenges	21	2.7043	0.47432	39	6.286	2.313	0.026	Significant
Effectiveness	18	2.4028	0.32060					

The finding in table 9 presents the result of the independent samples t-test comparing the mean ratings of challenges faced by Business Education educators and the effectiveness of digital education in Universities in North East Nigeria. The mean score for challenges faced by Business Education educators is 2.7043, with a SD of 0.47432, while the mean score for effectiveness of digital education is 2.4028, with a SD of 0.32060. The t-test yielded a t-value of 2.313, with 39 degrees of freedom and a p-value of 0.026. Since the p-value (0.026) is less than the 0.05 level of significance ($p < 0.05$), the null hypothesis was rejected. This indicates that there is a significant difference between the mean ratings of challenges faced by Business Education educators and the effectiveness of digital education in Universities in North East Nigeria.

Discussion

The study revealed that some digital education tools are available to Business Education educators in North East Nigeria while others are not available. These tools include online learning platforms, digital content resources, and social media collaboration tools. Tools such as virtual classrooms, simulation-based learning, and AI-powered adaptive learning systems are not readily available. It implies that there is a lack of provision of digital education infrastructure. The research result shows that digital education is generally accessible for the educators of Business Education. However, the study indicates that digital content creation tools and AI-driven learning platforms are not readily obtainable; regardless of the presence of digital education, Business Education lecturers utilise it to a low extent, which may be attributed to several challenges such as insufficient infrastructure, a deficiency in technical skills, and faculty reluctance toward technology adoption. Additionally, the study reveals that digital education significantly enhanced the pedagogical outcomes.

Notwithstanding, challenges like insufficient infrastructure, assessment difficulties, and restricted practical/laboratory experience impede the effectiveness of digital education; however, the study also indicates no significant differences in the mean ratings of University Educators concerning the availability, accessibility and extent of use of digital education based on university type and gender. Further findings however show significant relationship between challenges faced by Business Education educators and the effectiveness of digital education. The study is supported by

the findings of Guillén-Gámez et al. (2022), Cabero-Almenara et al. (2021) and Guillén-Gámez et al (2021) who noted low extent of use of digital education tools owing to gaps in digital anxiety, ICT skills, quality of ICT resources, and teacher experience, as they also reported intermediate levels of digital competence and the need for strategic training. The finding is also supported by the findings of Soomro et al (2020) who noted gaps in availability and accessibility of digital tools and found significant differences in faculty access to technology that align with the digital divide framework. In contrast, the study is not supported by the findings of Zhao et al (2021) that there is no significant different in digital education availability, accessibility, and use based on gender. That male teachers perceived their digital competence significantly higher than females. Generally, the study underscores the need for stakeholders to address the challenges facing digital education in North East Nigeria, including infrastructure gaps, technical skills, and faculty resistance to technology

Conclusion

This study concluded that despite digital education has what it takes to improve teaching and learning of Business Educators of Universities in North East Nigeria, many challenges still hinder its adoption. The study also revealed that Business Educators use of digital education is to a low extent, resulting from poor accessibility and limited availability of digital education tools. The study notes the need for education stakeholders to manage the challenges confronting digital education, which include institutions infrastructural gaps, technical skills, and faculty members resistance to technology use. Agreeably, when these challenges are addressed, Business educators can count on digital education to improve learners' performance and drive economic growth in the area.

Recommendations

1. Government and institutions should advance in developing digital infrastructure, including reliable internet connectivity, power supply, and digital devices, to support digital education.
2. Provide regular training and workshops for Business Education educators to enhance their technical skills and confidence in using digital education tools.
3. Institutions should address faculty resistance to technology by providing incentives, recognising and rewarding innovative teaching practices, and fostering a culture of digital adoption.
4. Ensure equal access to digital education tools and resources for all educators, regardless of gender or institution type.
5. Integrate digital education into the Business Education curriculum to ensure seamless adoption and effective use.
6. Provide adequate support services, including technical support, to address challenges faced by educators and students.
7. There should be regularly monitor and evaluate the effectiveness of digital education initiatives to identify areas for improvement.

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