NIGERIAN ONLINE JOURNAL OF EDUCATIONAL SCIENCES AND TECHNOLOGY

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To cite this article:

Ayeni, J. O.; Julius, D. N.; & Mkpa, N. D. (2024). Tertiary teachers' use of digital tools for blended learning in the 21st century education in Abia State, Nigeria. *Nigerian Online Journal of Educational Sciences and Technology (NOJEST)*, 6 (1), 34-52

Nigerian Online Journal of Educational Sciences and Technology (NOJEST)

Volume 6, Number 1, 2024

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Article Infor

Article History

Received:
January 29, 2024

Accepted:
March 03, 2024

Keywords
Tertiary Teachers, Digital Tools,
Blended Learning, Attitudes, Challenges.

Abstract

The study investigated the use of digital tools for blended learning among tertiary teachers in the 21st century education in Abia State. Four research questions guided the study and three hypotheses formulated. Data were collected from the federal, state and private institutions. The population of the study was 267 academic staff from the Faculties of Education with a sample size of 110 using convenience sampling technique. The instrument for data collection was a 4-section questionnaire developed by the researchers. Data were analyzed using percentages, mean and standard deviation for the research questions, while t-test was used to test the hypotheses. The study revealed that digital tools are rarely used by tertiary teachers, but social media being the most popular with a percentage of 50.9 at the frequency of 56, followed Projector 32(29.1%), PowerPoint 30(27.3%), Google Meet and Zoom 17(15.5%). The attitudes of teachers towards the use of digital tools in blended learning showed a grand mean of 2.44 to the negative statements indicating positive attitudes while the challenges showed a grand mean of 3.70. The major challenge revealed teachers' lack of technological know-how with a mean score of 4.80, followed by staff poor working condition (4.37), lack of power supply (4.35), poor internet connectivity (4.05), and lack of support from the faculty (3.34). It was recommended that tertiary teachers be exposed to periodic training on digital tools and their utilization for blended learning to keep them abreast of the latest technological advancement.

Introduction

In the current digital era, instructional communication between teachers and students in tertiary institutions has undergone a paradigm shift, as this has taken on a new dimension. A dynamic approach to teaching is required of tertiary teachers, particularly in the context of 21st century education since traditional methods of imparting knowledge have given way to digital ones. The recipients of knowledge in today's tertiary institutions are digital natives who are unapologetically digital-oriented. In tertiary institutions, young educators and digital immigrants are still prevalent and cannot be completely ignored because most of them have embraced the challenge of adjusting to the world of digital natives.

The teachers play a significant role in the determination of the quality of education. No wonder the Nigerian National Policy on Education (FRN, 2013, p39) succinctly states that "no education system can rise above the quality of its teachers" thus implying the important role teachers play in facilitating teaching and learning. Tertiary teachers are the supporting pillars for the realization of tertiary educational goals and as such the utilization of digital tools for blended learning becomes expedient. According to Ertmer *et. al* (2012), the most cited reason for lack of technology implementation in the classroom i**s** inadequate professional development and training**.** With the introduction of digital tools in teaching and learning which can enhance learning experiences in both in-class and off-class, it would be expected that tertiary teachers willingly support its implementation going by the fact that digital technologies have broken the barrier of limitation to information by giving access to the acquisition of 21st century skills.

Use of digital tools by tertiary teachers in complimenting traditional in-class teaching is very paramount as digital technology in education seems to be trendy. Digital tools can be used with or without internet connection depending on the need at the moment and there are varieties of digital tools which are common and user-friendly that can be employed by tertiary teachers such as PowerPoint, interactive whiteboard and projector for in-class teaching and learning; and zoom, Google classroom, Google meet, Moodle and social media pages among others for distance/online learning to improve performance and enhance learning in the 21stcentury education. *Digital tools* have been described by Lazar *et.al* (2020) as all digital resources potentially beneficial in the strategy of blended learning which include high-tech digital tools and traditional digital tools. They (Lazar et al) further gave examples of high-tech digital tools as software that support student learning such as interactive boards, scientific software, apps, digital course wares, digital textbooks, mobile devices among others and described traditional digital learning tools to include digital video support, video overhead projectors, interactive materials, digital collections containing interactive resources and reference texts such as lecture notes or dictionaries among others.

Digital tools have opened up free access to the world whereby one can share ideas, projects and educational contents which are remarkably beneficial to tertiary education teachers where they acquire needed wealth of knowledge that enrich them and the learners in any given concept. The importance of digital tool is that it enhances learning experiences, save teachers' time, aids in tracking students' progress, and provides transparency into the learning process for all stakeholders.

Blended learning is simply the combination of in-class teaching method (face-to-face) and online teaching. It is having an extension of classroom outside the normal school setting. According to Wright (2017) the combination of face-to-face instruction and online learning opportunities allows for individualization, flexibility, and greater chance for student success. Tertiary teachers have the freedom of choosing any tool suitable for the subject matter bearing in mind that the primary objective is to enhance learning and improve performance. Ison (2016) suggested that the "arduous" stuff should be done online such as readings and coverage of those materials and reserve class time for discussions, interaction, and other tasks where the personal touch is appreciated or important. The most important thing for tertiary teachers is to ensure the tools match the concept under study so as to achieve the set objectives.
Blended learning affords the tertiary teachers to take advantage of developed materials and platforms for learning to compliment the traditional method of teaching thereby integrating varieties in their teaching methods. Tertiary teachers are obliged to choose suitable methods and digital tools that will make teaching and learning meaningful putting into consideration the nature of recipients of knowledge and the world of work that has been technologically transformed. Tena et. al (2016) affirmed that most teaching staff do not view the use of various platforms for blended learning as a problem and that attitudes and support from the university are critical to the success of the experience. According to Olumorin (2023), blended learning is an effective strategy for quality teaching and learning even though there are challenges affecting its proper implementation. Having digital literacy skills, that, understands how to use the digital tools as well as online resources among others, make tertiary teachers fully equipped to produce seasoned graduates that will be qualified and employable in the e-world hence, the need to keep up with the trendy innovation is expedient.

Although there have been some challenges faced by some tertiary teachers as Ibe (2017) observed that unreliable power supply, poor internet service, high cost of airtime for browsing constitute constraints that hinder the utilization of digital tools. This was also affirmed by *Alonta et. al.* (2022) that technical knowledge, poor internet facilities and epileptic power supply are some of the challenges being faced in blended learning. Amhag *et. al*, (2019) carried out a study on teacher educators' use of digital tools and needs for digital competence in higher education. They discovered that teacher educators need to identify

the pedagogical surplus value in their own teaching and learning context with digital tools to increase motivation for concrete, effective, and subject-oriented successful examples as presented by experienced teachers. This study focused on tertiary teachers' use of digital tools for blended learning in the 21st century education in Abia State, Nigeria.

Statement of the Problem

The age of technology is projected towards having much to offer for the enhancement of teaching and learning and inculcation of right knowledge as both the teachers and students have access to numerous educational materials online as well as using offline and online digital tools in the delivery of lessons. It is quite unfortunate that the use of digital tools for blended learning is not fully supported by the faculties of education in tertiary institutions and is not fully integrated into the curriculum. Although, some tertiary teachers have adopted blended learning intentionally and inadvertently and have taken advantage of the many benefits provided by digital learning and communication platforms, as evidenced by students accessing some of their course materials and information via digital platforms, it appears such digital platforms are mainly social media pages whereas there are quite a good number of digital learning platforms for blended learning such as learning management system. Tertiary educators must keep up with the latest development in digital pedagogy as the field is constantly changing. They cannot afford to be spectators while basic education and secondary school teachers embrace technology through teacher professional development programs provided by government agencies and other stakeholders.

Objectives of the study

This study sought to:

1 Identify the digital tools used by tertiary teachers for blended learning in the 21st century education in Abia State.

2 Ascertain the extent tertiary teachers use digital tools for blended learning in the 21st century education in Abia State.

3 Determine tertiary teachers' attitude towards utilizing digital tools for blended learning in the 21st century education in Abia State.

4 Investigate the challenges faced by tertiary teachers in utilizing digital tools for blended learning in the 21st century education in Abia State.

Research Questions

1. What types of digital tools do tertiary teachers use for blended learning in the 21st century education in Abia State?

2. To what extent do tertiary teachers use digital tools for blended learning in the 21st century education in Abia State?
3. What is the attitude of tertiary teachers towards the use of digital tools for blended learning in the 21st century education in Abia State?
4. What are the challenges of tertiary teachers in the use of digital tools for blended learning in Abia State?

Research Hypothesis

HO_1: There is no significant difference between male and female tertiary teachers' digital tools used for blended learning in the 21st century education in Abia State.

HO_2: There is no significant difference between male and female teachers' attitude towards digital tools used for blended learning in the 21st century education in Abia State.

HO_3: There is no significant difference between male and female tertiary teachers' challenges on digital tools used for blended learning in the 21st century education in Abia State Abia State.

Literature Review

The use of digital tools in pedagogy has given room for expansion of knowledge not only in understanding the subject matter but also the technological know-how. The best learning happens when real world difficulties are corresponding with real world tools for problem solving; as technology is an essential part of 21st century learners' authenticities, these tools need to be digital to be appropriate (Kuma and Raja, 2019). Adapting to the world of digital natives by speaking their language through the use of digital tools makes learning meaningful and objectives achievable. It becomes imperative for teachers to adapt to instructional practices so as to accommodate this new culture which will also benefit them and the students (Ayeni and Mkpa, 2019).

According to Vaitsekhovska *et. al* (2020) digital tools are today a new technological basis for the development of self-education skills, contribute to overcoming stereotypes, the formation of modern information culture and the required level of digital competence. Digital tools for teaching are perceived to be apps, software and devices that create opportunities for virtual collaboration between students using multimedia, social media, games, and interactive learning to engage students in online materials (Frezier, 2022). Although digital learning tools come in a multitude of forms, Utami (2018) is of the opinion that the teachers should employ diverse approaches that offer students greater chances to acquire knowledge by leveraging multiple sources. Adizu et. al (2020) confirmed that Google classroom can provide a vital chance to promote blended learning while also aiding the lecturers' professional development. In

supporting this view, Beckmann (2020) opined that tertiary teachers should know their options and be able to critically assess whether a digital tool will deliver added value for blended learning.

Blended learning also known as hybrid or mixed-mode learning, is a process of integrating technology into instruction. Its role in tertiary institutions is that it promotes independence and personalization of each student's learning path, which can increase engagement by encouraging learners to take responsibility for their own progress. Blended learning allows for collaborative learning as Ayeni (2020) opined that collaborative learning has been a strategy for improving synergy because it encourages active participation among students. Blended instructional strategies lie in the increased sensitivity of the needs of learners and greater insight into the advantage and disadvantages of different technologies that can be used in teaching and learning processes (Ohagwu & Ugwu, 2023). However, Odo (2017) discovered that the extent of utilization of the blended learning is low because of the lecturers and school administrative challenges.

This research is related to TPACK theory. TPACK is an acronym for Technological Pedagogical Content Knowledge. It is a theory that was developed to explain the set of knowledge that teachers need to teach their students a subject, teach effectively, and use technology (McGraw-Hill Education, 2017). According to Kharbach (2017), three knowledge domains are combined in the TPACK framework: technological, content, and pedagogical knowledge. He further explains that the framework looks at how this trio work together to increase students' motivation and make the content more accessible to students. TPACK was formerly identified as Pedagogy Content Knowledge (PCK) which with the inclusion of technological knowledge then became TPACK. According to Koehler (2011) and Koehler and Mishra (2016) TPACK framework extends Shulman's idea of Pedagogical Content Knowledge by including technology knowledge. Content knowledge has to do with the subject matter, pedagogy knowledge is the methodology or technique the teacher uses to imparted content knowledge while technological knowledge is the device through which the content knowledge is to be impacted. The interaction of these bodies of knowledge makes utilization of digital tools/platforms in teaching more interactive and pleasing to the 21st century learners.

In a study carried out by Adam and Khairuddin (2021) on Google classroom as a tool for blended learning, it was revealed that there was effective student-teacher interaction, the instructions given by the lecturers were well-delivered and that Google classroom should be used more in the future. In the same vein, Simon et. al (2022) in their study on the analysis of Google classroom utilization as a tool to enhance blended learning in Mubi, revealed that 55% of the respondents believed that Google Classroom makes it easy to upload course materials to students, 65% also believed that Google Classroom made it

easy to grade students' assignments/quizzes, while 61% likewise attested that Google Classroom was of great significance in timely completion of course delivery and assessment and based on their findings recommended the adoption of Google Classroom as a tool to enhance blended learning in Nigerian tertiary institutions.

Investigation into University teachers' perception of barriers to the use of digital technologies in Universities in Spain was carried out by Mercader and Gairin (2020) and they discovered that professional barriers are the most prevalent in the use of digital technologies in Universities in Spain. Also, Ado and Amor (2021) in their study on the availability and utilization of blended learning model technologies in teaching business education in the colleges of education found out that the new technologies for blended learning are not available in teaching business education and thus not being utilized. This showed the lapses on the part of the institutions for not being able to make available digital tools necessary for the actualization of the use of blended learning in teaching and learning. Fola-Adebayo (2019) on perceptions of undergraduates on the relationship between exposure to blended learning and development of online critical literacy skills discovered that students perceived a positive relationship between exposure to blended learning and development of online critical literacy skills. It is there expedient to investigate tertiary teachers' use of digital tools for blended learning in the 21st century education in Abia State. Ruiz-Aquino, *et.al* (2022) in their study on the university teachers' attitudes towards ICTs and the use of virtual environments during the COVID-19 pandemic discovered that the use of virtual environments is positively and significantly related to the attitudes of teachers at the University of Huánuco (Peru) towards ICTs and concluded that a more positive attitude towards ICTs will also lead to greater use of virtual environment. Leontev (2023) studied the attitude of teachers and students toward online classes at technical university and found out that most respondents had favorable opinions about the digitalization of education and strongly valued the need for participates in the educational process to be digitally literate.

The impact of gender on the use of digital tools by tertiary teachers has been widely researched on, although some experts are yet to conclude which of the gender mostly influences the other as Olumorin (2023) observed that the effect of gender roles on lecturers' perception on the use of blended learning strategy has been scarcely research, even less in relation to blended learning strategy. He revealed that there was no significant difference in lecturers' perception on the use of blended learning strategy based on gender and submitted that evidence on the effect of gender is far from conclusion. In a research conducted by Alkhasawneh and Alanazy (2015) on how academic staff perceived the use of ICT at a university in Saudi Arabia, they found out that there were no significant gender-based

differences among the staff. The reason was that the use of digital tools is becoming a norm in the world today. Also, Bhat and Bashir (2017) in their study confirmed there was no significant differences between male and female university teachers on the use of digital tools. Tena et. al. (2016) in their study on E-Learning of Andalusian University's Lecturers discovered that the faculty members at the university exhibited favorable attitudes toward the methods employed, the development program, the support provided by the institution, and the e-learning and blended learning processes. The study validates the program's effectiveness and reveals how it leverages a range of individual and professional characteristics to foster diversity at the university. Nonetheless, they discovered two areas where there were notable gender disparities among the lecturers: female lecturers utilized the tools more, and male lecturers knew more about them. The review of literature of academic publications by different researchers confirm the value of digital tools and blended learning, which allows tertiary teachers to stay in constant communication with their students outside of the traditional classroom.

Methodology

This study was a descriptive survey carried out in federal, state and private tertiary institutions in Abia State. The population comprised 267 academic staff in the Faculties of Education in each of the four tertiary institutions. The sample for the study was made up of 110 tertiary teachers using a convenience sampling technique due to the circumstances surrounding the study and the environment. The instrument for data collection was researchers' developed questionnaire titled "Use of Digital Tools for Blended Learning Questionnaire (UDTBLQ)". To answer research question one, the respondents were to indicate 'Use' for any of the listed digital tools being used by them. The modified 5-point Likert scale of Always (5), Often (4), Sometimes (3), Rarely (2) and Never (1) was used to answer research question two while Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1) to answer research question three and four. Data was analyzed using frequency and percentages, bar chart, mean, standard deviation, and t-test. Percentages, and bar chart, were used to answer research questions while t-test was used to test the hypothesis. The following were the decision criteria to answer the research questions and hypotheses - a percentage score of above 50 is considered as used and below 50 is not used. A real limit of numbers with always (4.50-5.00), often (3.50-4.49), sometimes (2.50-3.49), rarely (1.50-2.49), and never (0.50-1.49) as well as SA (4.50-5.00), A (3.50-4.49), U (2.50-3.49), D (1.50-2.49), and SD (0.50-1.49). For clarity, the digital tools under investigation in this study are the ones perceived to be user-friendly with the level of tertiary teachers ICT literacy skill in Abia State.

Results

Research Question 1

What types of digital tools do tertiary teachers use for blended learning in the 21st century education in Abia State?

***Table1*: Percentage analysis of digital tools used by tertiary teachers for blended learning in the 21st century education in Abia State**

S/NO	Item Statement	Frequency	Percentage
1	Google Classroom	7	6.4
2	Google Meet	17	15.5
3	Interactive White Board	14	12.7
4	Moodle	5	4.5
5	PowerPoint	30	27.3
6	Projector	32	29.1
7	Social media	56	50.9
8	Zoom	17	15.5
9	Video	7	6.4

Fig. 1 **Bar chart representation showing the frequency tertiary teachers' use of digital tools for blended learning in the 21st century education in Abia State**

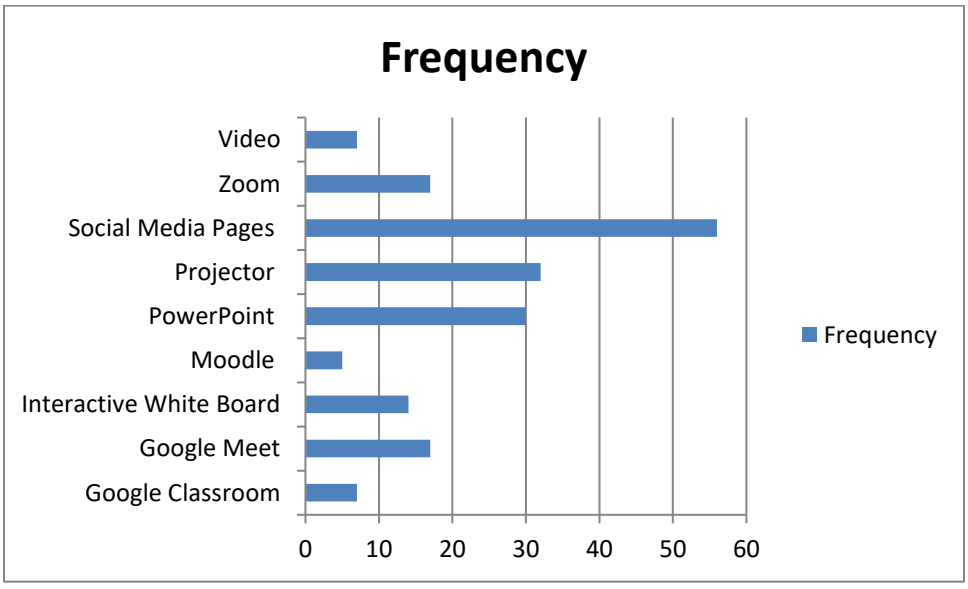

Table 1 and Figure 1 revealed that 50.9% of the respondents with the frequency of 56 use social media for blended learning followed by Projector 32(29.1), PowerPoint 30(27.3%), Google Meet 17(15.5), Zoom 17(15.5), Interactive White Board 14(12.7%), Google Classroom 7(6.4), Video 7(6.4), and Moodle 5(4.5).

Research Question 2

To what extent do tertiary teachers use digital tools for blended learning in the 21st century education in Abia State?

***Table 2*: Mean and standard deviation showing the extent tertiary teachers use digital tools for blended learning in the 21st century education in Abia State**

S/N	Questionnaire Item	A	O	S	R	N	Mean	Std. Dev	Decision
1	Google Meet	1	3	18	23	65	1.65	1.22	Rarely
2	PowerPoint	5	7	20	22	56	1.94	1.34	Rarely
3	Google Classroom	2	6	12	20	70	1.64	1.21	Rarely
4	Interactive Whiteboard	1	9	12	17	71	1.65	1.22	Rarely
5	Video	3	4	10	21	72	1.59	1.19	Rarely
6	Projector	16	9	17	27	41	2.38	1.51	Rarely
7	Social Media Pages	13	21	16	21	39	2.53	1.56	Sometimes
8	Zoom	12	16	21	26	35	2.49	1.55	Rarely
9	Module	1	2	4	8	95	1.24	1.00	Never
	Grand Mean						1.90	1.31	Rarely

Key: Always (4.50-5.00), Often (3.50-4.49), Sometimes (2.50-3.49), Rarely (1.50-2.49), and Never (0.50-1.49)

Table 2 showed the extent tertiary teachers use digital tools for blended learning in the 21st century education in Abia State. The result revealed that social media are used sometimes; Google Meet, PowerPoint, Google Classroom, interactive whiteboard, video and zoom were rarely used while module was never used and Moodle were never used by tertiary teachers for blended learning. The grand mean of 1.90 indicates that tertiary teachers use all the digital tools rarely for blended learning in the 21st century education in Abia State.

Research Question 3

What is the attitude of tertiary institution teachers towards the utilization of digital tools for blended learning in Abia State?

***Table 3*: Mean and standard deviation on the attitude of tertiary teachers towards the utilization of digital tools used for blended learning in Abia State.**

S/n	Item Statement	SA	A	U	D	SD	Mean	SD	Remark
1	Blended learning is boring	0	7	28	42	33	2.08	1.40	Negative
2	Blended learning is time consuming	3	21	21	47	18	2.49	1.55	Negative
3	I am comfortable with the convention method of teaching	12	40	16	28	14	3.07	1.73	Positive
4	I am not technology freak	8	17	26	35	24	2.80	1.57	Negative
5	Blended learning is too sophisticated for my liking	5	20	12	47	26	2.37	1.50	Negative
6	Blended learning is not suitable for my field of study	3	4	14	58	31	2.00	1.37	Negative
7	Technology employed in blended learning is costly	6	58	18	21	7	3.32	1.80	Positive
8	Blended learning distracts me from my routine schedule for teaching	3	9	23	56	19	2.28	1.47	Negative

9	Technology in Blended learning does not capture my interest	0	6	10	67	27	1.95	1.35	Negative
10	Blended learning prevents me from having control over my class	1	3	18	63	25	2.02	1.37	Negative
	Grand Mean						2.44	1.51	Negative

Table 1 showed the attitude of tertiary teachers towards the use of digital tools for blended learning in the 21st century education in Abia State. The result revealed that items 1, 2, 4, 5, 6, 8, 9 and 10 were negative and rejected (indicating that tertiary teachers in Abia State disagree with negative statements about their attitudes towards using digital tools for blended learning) while items 3 and 7 were positive and accepted (indicating their agreement to negative statements about blended learning) with a grand mean of 2.44 which is below the criterion mean of 3.00. This implies that tertiary teachers have positive attitude towards the use of digital tools for blended learning in the 21st century education in Abia State.

Research Question 4

What are the challenges of tertiary teachers in the use of digital tools for blended learning in Abia State?

***Table 4*: Mean and Standard deviation on the challenges of tertiary teachers in the use of digital tools for blended learning in Abia State**

S/N	Item Statement	SA	A	U	D	SD	Mean	SD	Remark
1	Poor working condition of tertiary teachers	60	39	5	4	2	4.37	2.05	Agreed
2	Lack of access to electrical power	52	50	4	3	1	4.35	2.04	Agreed
3	Internet connectivity	31	63	10	3	3	4.05	1.98	Agreed
4	Technology complexity	20	53	23	8	6	3.66	1.88	Agreed
5	Teachers: resistance to change	14	27	23	37	9	3.00	1.71	Agreed
6	Students' lack of interest	6	16	26	57	5	2.65	1.61	Disagreed
7	Teachers' lack of technological know-how	23	45	65	19	8	4.80	2.14	Agreed
8	Lack of support from the faculty	26	35	18	22	9	3.43	1.82	Agreed
9	Unsuitability of digital tools for the course of study	12	24	22	33	19	2.79	1.64	Disagreed
10	High internet cost	26	64	5	7	8	3.85	1.89	Agreed
	Grand Mean						3.70	1.88	Agreed

NB: SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree.

Results from Table 4 revealed that all the items, except items 6 and 9 were accepted as major challenges in the utilization of digital tools for blended learning in tertiary institutions, since their mean scores were above the criterion mean of 3.00 while items 6 and 9 were rejected having means scores below the criterion mean of 3.00, which indicates that students lack of interest and unsuitability of digital tools for the course of study are not part of the challenges in the use of digital tools for blended learning in tertiary institutions. The Grand Mean of 3.70 which is also above the criterion mean of 3.00 implies that tertiary institution teachers are faced with various challenges in the use of digital tools for blended learning.

Hypothesis Testing

Hypothesis 1

There is no significant difference between male and female tertiary institution teachers' digital tools utilization for blended learning in tertiary institutions in Abia State.

Table 5: Summary of t-test analysis comparing male and female tertiary teachers' digital tools utilization for blended learning in tertiary institutions in Abia State

Variables	N	$\overline{X}$	SD	Df	t-cal	t-crit	Decision
Male	39	3.07	1.73	108	0.36	1.96	Not Significant
Female	71	2.80	1.57				

From Table 5, the t-calculated value of 0.36 is less than t-critical value of 1.96 at 0.05 level of significance and 108 degrees of freedom. This implies that the null hypothesis is not rejected. Hence, null hypothesis was accepted, which states that there no significant difference between male and female tertiary institution teachers' digital tools utilization for blended learning.

Hypothesis 2

There is no significant difference between male and female teachers' attitude towards digital tools utilization for blended learning in tertiary institutions in Abia State

Table 6: Summary of t-test analysis comparing male and female teachers' attitude towards digital tools utilization for blended learning

Variables	N	$\overline{X}$	SD	Df	t-cal	t-crit	Decision
Male	39	3.66	1.88	108	1.13	1.96	Not Significance
Female	71	3.00	1.71				

From Table 6, the t-calculated value of 1.13 is less than t-critical value of 1.96 at 0.05 level of significance and 108 degrees of freedom. This indicates that the null hypothesis is not rejected, meaning that there is no significant difference between male and female teachers' attitude towards digital tools utilization for blended learning in tertiary institutions in Abia State.

Hypothesis 3

There is no significant difference between male and female tertiary teachers' challenges on the use of digital tools for blended learning in Abia State.

Table 7: Summary of t-test analysis comparing male and female tertiary institutions teachers' challenges on digital tools utilization for blended learning

Variables	N	$\overline{X}$	SD	Df	t-cal	t-crit	Decision
Male	39	2.80	1.57	108	0.21	1.96	Not Significance
Female	71	2.37	1.50				

From Table 7, the t-calculated value of 0.21 is less than t-critical value of 1.96 at 0.05 level of significance and 108 degrees of freedom. This implies that the null hypothesis is not rejected, denoting that there is no significant difference between male and female tertiary teachers' responses on the challenges of using digital tools for blended learning in Abia State.

Discussion of Findings

The study showed very low utilization of digital tools for blended learning among the tertiary teachers in Abia State. Additionally, it was noted that majority of tertiary teachers have not yet embraced blended learning, let alone the use of digital tools. Research question one revealed that social media is the most used digital tool for blended learning with the highest percentage of 50.9% of the teachers. Next to it was a very low percentage of 29.1% and 27.3% percent of the teachers who use Projector and PowerPoint. Although there are several easily navigable digital tools available, such as Google Classroom, for individuals who are not tech-savvy, the study found that only one digital too was being used by 50.9% of the tertiary teachers. Digital tool like Google classroom was attested to by a good number of tertiary teachers in Mubi as revealed by Simon et. al (2022) in which he vehemently recommended its utilization as a tool to enhance blended learning in Nigerian tertiary institutions.

Data obtained from Research question 2 showed that digital tools are rarely being used by tertiary teachers in Abia State which means that conventional teaching is still dominant in tertiary institutions and by extension, indicating that blended learning is yet to be embraced. In the contrary, Tena et. al (2016) in their study recorded success among university lectures in the use of e-learning and blended learning which required the use of digital tools as they equally enjoy support from the university and development programme. Odo (2017) noted that the extent of utilization of the blended learning is low because of the lecturers and school administrative challenges. It is therefore noted that tertiary teachers in Abia State are yet to incorporate digital tools in teaching while those who claimed to have been using the tools rarely use them, maybe at their own convenience not considering the recipients who are digital learners. The Hypothesis tested on the gender differences towards the use of digital tools for blended learning showed that there was no significance difference in the responses of male and female tertiary teachers indicating that both genders rarely use digital tools for blended learning. This is line with Bhat and Bashir (2017) in their finding that there was no significant difference between male and female university teachers on the use of digital tools, and, in contrary to the findings by Tena et. al. that that male lecturer had more knowledge of the tools while female lecturers made more use of them.

Research question 3 revealed that the attitudes of tertiary teachers towards the use of digital tools for blended learning are positive. They disagreed with what were assumed may be negatively influencing their use of digital tools in blended learning. This suggests that they are still interested in using digital

tools and blended learning and that they have developed interest in adapting to the world of technology even though majority are yet to start utilizing the tools of which the factors responsible for it are revealed in their challenges. Their demonstration of positive attitudes is in line with Ruiz-Aquino *et.al* (2022) and Leontev (2023) in their findings that tertiary teachers demonstrated positive attitudes towards using digital tools for blended learning and distance learning (e-learning). The result of the hypothesis showed no significance difference in the responses of male and female tertiary teachers in their attitudes towards the use of digital tools for blended learning indicating there was no difference in their demonstration of positive attitudes. This aligns with Olumorin et. al (2023) in the perception of lectures towards the use of blended learning strategy based on gender.

The result obtained in research question four revealed numerous challenges of tertiary teachers in the process of employing digital tools for blended learning which include poor working condition of tertiary teachers, poor power supply, technical problems in accessing the internet, the complexity of technology, teachers' resistance to change, teachers' lack of technological know-how, lack of support from the faculty and high cost of internet connectivity. However, teachers' lack of technological know-how topped the challenges with the highest mean score of 4.80 which agrees with Mercader and Gairin (2020) that professional barriers are the most prevalent in the use of digital technologies in tertiary institutions. The challenges are also in confirmation with the assertion of *Alonta et. al* (2022), that technical knowledge, poor internet facilities and epileptic power supply are some of the challenges being faced in blended learning and Ogunode and Ndayebom (2023) who discovered that internet coverage and accessibility are still a problem in Nigeria which, if available and stable will make digital education efficient and effective. It is worthy of note that tertiary teachers' interests in the use of digital tools for blended learning are being negatively affected by the aforementioned factors as revealed in the study. The hypothesis showed no difference in the responses of tertiary teachers with respect to challenges of using digital tools for blended learning. As research in this area seems very scarce, however, referring to Tena et. al (2016), male teachers have more knowledge of digital tools but use it less while female teachers made more use of it than male teachers. This assertion is contrary to the result of the hypothesis and it should be noted that when there is a shortage of tools needed to achieve a task, the objectives of the task would be unattainable which implies that the challenge of a lack of technological-know-how suggests that even in the event that digital tools are made available, there is a tendency they will not be used.

Conclusion

Based on the findings, it was concluded that tertiary teachers in Abia State are yet to dive into using digital tools for blended learning because of lack of technological know-how, support from the faculties

and fund, which is believed, is capable of proffering solutions to other challenges. It is therefore imperative that tertiary institutions in Abia State as a matter of urgency organize trainings on the use of digital tools for academic purposes to enable the teachers discharge their academic activities effectively and efficiently which will in turn enhance teaching and learning and equally improve students' performance.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Tertiary teachers should be exposed to periodic training on digital tools appropriate for blended learning to keep them abreast of the latest technological advancement.
2. The use of digital tools and blended learning should be emphasized by the faculties in order to support teachers and students in adjusting to 21st century learning.
3. The provision of essential digital devices or the subsidization of digital tools for convenient acquisition should foster tertiary teachers' positive attitudes toward the use of digital tools for blended learning.
4. The challenges encountered by tertiary teachers in the use of digital tools for blended learning should be addressed by: reviewing the staff welfare, ensuring power supply and internet connectivity as well as periodic trainings on the use of digital tools for blended learning.

Acknowledgments

This research work was sponsored by TetFund through the management of Abia State University, Uturu.

Profound gratitude is extended to all who contributed in one way or the other to the success of this study. The professorial advice and efforts of Prof U. O. Igbokwe and Prof. E. O. Okorie are appreciated, especially for their willingness to proofread the work and provide insightful comments.

Appreciated, also, are the efforts of Prof. U. N. Akanwa, Prof. Pat. Nwamuo, Prof. Priscilla Ezema, Dr. C.I. Diovu, and Mrs. Maureen Ezeruonye in facilitating the efficient distribution and gathering of data collection instruments, as well as the time commitment of all academic staff members of the faculties of education at the Federal University of Agriculture, Umudike, Gregory University, Uturu, Abia State University, Uturu, and Abia State College of Education (Technical), Arochukwu in responding to the questionnaires.

Thanks go to Associate Prof. Mary Iwuagwu for the motivation to take part in the exercise and Prof. N. E. Okoronkwo for being readily available to offer advice when needed.

Lastly, a special thank you to the management of Abia State University for the opportunity to be part of the beneficiaries.

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