

Perceptions of E-Learning Adoption in Vocational Technical Education Within Tertiary Institutions in Gombe State.

Danladi, Jagula Msheliza, Ph.D

School of Education Federal College of Education Technical Gombe

DOI: <https://doi.org/10.47772/IJRISS.2026.100600955>

Received: 19 June 2026; Accepted: 24 June 2026; Published: 09 July 2026

ABSTRACT

This study ascertained the Perceptions of E-learning Adoption in Vocational Technical Education within Tertiary Institutions in Gombe State. Three research questions and three hypotheses guided the study. Descriptive survey design was adopted. The population comprised 515 final year penultimate students in five tertiary institutions in Gombe State. A sample size of 250 students was selected for the study using simple random sampling technique. A structured and validated questionnaire on four-point rating scale containing 48 items was used for data collection. Data collected were analyzed using mean and standard deviation to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance. The analysis was carried out using SPSS version 23.0. Findings revealed that students sometimes use e-learning services in learning, e-learning services were not adequately available in tertiary institutions. Students' competency in internet usage was fair and that e-learning service delivery is constrained by a lot of factors. Therefore, it was recommended among others that, Administrators of tertiary institutions in collaboration with the private sector should provide more e-learning resources to tertiary institutions so as to facilitate the training of students in skills needed to use e-learning services in the process of learning.

INTRODUCTION

The advancement of information and communication technology (ICT) has significantly transformed teaching and learning processes across the globe. One of the most notable outcomes of this transformation is the emergence and expansion of e-learning, which refers to the use of electronic technologies to access educational curriculum outside of a traditional classroom. In tertiary education, e-learning has become a strategic tool for improving access, flexibility, and quality of instruction, particularly in developing countries such as Nigeria. Vocational Technical Education (VTE) is a critical component of Nigeria's educational system, designed to equip learners with practical skills, technical knowledge, and competencies required for employment, self-reliance, and national development. Given the practical and skills-oriented nature of VTE, the integration of e-learning technologies presents both opportunities and challenges. While e-learning can enhance instructional delivery through simulations, virtual laboratories, and multimedia resources, its effectiveness depends largely on stakeholders' perceptions, institutional readiness, and infrastructural support.

In Nigeria, tertiary institutions were originally established to provide quality high education that facilitates creation of new knowledge, innovation and technologies for the overall individuals' socio-economic development and also for national well-being and integration. Regardless of its type or stage, the bottom-line in all quality education is the production of functional citizens imbued with relevant knowledge, values, attitudes and skills to make them useful to themselves and have capacity to contribute meaningfully to the well-being of their society. The prime objective of every quality education process, therefore, is to ensure the acquisition of appropriate and relevant knowledge, skills, competences, values and attitudes by those who patronize these schemes.

The tertiary system in Nigeria today, seems to be a far cry from this humane ideal of the founding fathers as it has generally been ill-equipped and tended to become characterized by dwindling appetite for reading, unfavourable attitude to learning and poor research orientation (Asuquo, 2015). This unfortunate state of things to some extent can partly be blamed on the process that delivers instruction and the mode of acquiring knowledge

and skills in most tertiary institutions in Nigeria which have over the years remained basically stagnant, archaic and comparatively obsolete with its likely effect of the producing largely illiterate, half-baked and less competent graduates has gradually become the norm (Asuquo & Eyo, 2017).

The emergence and prevalence of new technologies in our society today which have to some extent affected our lives, daily living and life activities in tremendous ways seem to be a veritable option. For the past two decades or more, electronic-devices and their systems have practically influenced all facets of life, including our values, beliefs, culture, religion and total way of life. The effects of these devices and their accompanying systems are quite discernable in all functional sectors of the Nigerian society, namely, commerce and industry, manufacturing processes, social and educational systems. While enlightened societies across the globe are adopting these new technologies to solve the challenges of life that confront them and in particular adapting their educational systems in response to the exigencies of the new devices, Nigeria is yet to fully embrace them. E-learning resources are a powerful tool that could be harnessed and used to enhance and encourage teaching and learning process in the tertiary institutions. They should be accepted, applied and kept abreast with in all areas of our teaching and learning endeavours. More so as the world strives to meet development goals with increasing recognition of the potential of e-learning resources to meet growing educational challenges. Therefore, the application of e-learning resources within the context of teaching and learning process in education service delivery has become doubly necessary especially in Nigeria today where emphasis is being placed on technological development.

E-learning, according to Kassa and Baiungwa (2013) as opposed to distance learning is a term that is used to refer to all ICT technologies, networks, internet and other forms of electronic media that can be used to enhance teaching and learning so as to transfer knowledge and skills. Therefore, e-learning resources are an inclusive term that describes educational technology that electronically or technologically supports learning and teaching (Parks, 2013). The developments in internet and multimedia technologies are the basic enablers of e-learning, with consulting, content, technologies, services and support being identified as the five key sectors of the e-learning industry (European Commission, 2000). In learning and education, it involves the use of modern technologies such as computers, digital technology, networked digital device (e.g. the internet) and associated software and course ware.

Regardless of the educational level or stage, e-learning resources can be adopted, used or applied in the education for effective counselling skills, teaching and learning of undergraduates in Nigeria's tertiary institutions. The advantage of these resources is that they are learner-centred, learner-controlled, and self-paced education process where learners have authority over their learning environment; thereby allowing them to work at their pace and convenience (Eke, 2011). Additionally, it is in line with the paradigm shift from teacher centredness to learner centredness (Kassa and Balunywa, 2013). The extent to which e-learning resources assist or replace other learning and teaching approaches is varied ranging on a continuum from none to fully online distance learning (Bates and Poole, 2013). Kozma (2015) observed that e-learning is now perceived as a principal driver of economic development and social change, worldwide. It offers the potential to restructure organizations, promotes collaboration, increases democratic participation of citizens, and improves transparency and responsiveness of governmental agencies. It also makes education and health care more widely available, fosters culture of creativity, and enhances the social integration of individuals with people of different abilities and cultural backgrounds. Farrel and Shafika (2017) also noted that there are widespread beliefs that e-learning can be an important tool to introduce and sustain education reform efforts in Africa. These advantages notwithstanding, if the facilities are not available, adequate or current, it is almost doubtful that their potential benefits can be felt. Similarly, if the available resources are not utilized, it is also impossible to harvest any meaningful benefits.

Other variables of the present study that have been focused on in earlier researches include the awareness of the nature and scope, value, impact and effective methods of information and their perception on Literacy skills instructions. The emphasis has been on the need to focus on the use of an integrated approach in all aspects of education with respect to new technologies, strategies and organizations. Okpechi, Denwigwe, Asuquo, Abuo and Unimna (2018) have expressed the fear that e-learning resources may be available in the library and identified in the bibliography of the library as relevant to one's subject of interest, but the user may not be aware or let alone able to use them. The author went further to suggest that the more aware students are and accessible information resources are the more likely they are to be used. This connotes that awareness of availability and

access to resource are critical determinants of their usability. In particular, and as usual in the case with introduction of new schemes or innovations, students may find it difficult to migrate from the traditional learning mode to the use of new e-learning resources (Asuquo, 2017). Clearly then, different people from different background exhibit different attitudes to certain things, issues and objects especially when it has to do with being receptive to change. Nwaoku (2015) stated that attitudes that define awareness, usability and accessibility have cognitive and mental components made up of concepts and beliefs. He emphasized that in Rivers State where he undertook his study, accessibility to e-learning resources was insignificant in public schools but a significant factor in private schools. Understanding the perceptions of students and instructors toward e-learning adoption is crucial, as perception influences acceptance, usage, and sustainability of technology-based innovations. This study therefore examines perceptions of e-learning adoption in vocational technical education within tertiary institutions in Gombe State.

Statement of the Problem

Despite the growing emphasis on e-learning in Nigerian tertiary institutions, the adoption of e-learning in vocational technical education remains inconsistent. Many VTE programmes still rely heavily on conventional face-to-face instructional methods, with limited integration of digital technologies. Reports indicate that inadequate infrastructure, insufficient training, and limited institutional support hinder effective e-learning implementation.

In Gombe State, anecdotal evidence suggests that although some tertiary institutions have introduced e-learning platforms, their utilization in vocational technical education is minimal. Students and instructors often express concerns regarding accessibility, effectiveness for practical skill acquisition, and technical challenges. Without empirical data on stakeholders' perceptions, policy makers and institutional administrators may find it difficult to design effective strategies for improving e-learning adoption. This study addresses this gap by systematically investigating perceptions of e-learning adoption in VTE programmes within tertiary institutions in Gombe State.

E-learning encompasses the use of digital tools such as learning management systems, online resources, video conferencing, and multimedia content to facilitate learning. Scholars emphasize that e-learning promotes learner-centered instruction, flexibility, and access to diverse educational resources (Akuegwu et al., 2024). E-learning refers to the use of digital technologies and electronic media to facilitate teaching and learning processes outside the traditional classroom environment. It encompasses a wide range of instructional tools and platforms, such as Learning Management Systems (LMS), video conferencing, online resources, and multimedia content that support both synchronous and asynchronous learning activities (Chinedu-Eze & Bello, 2018). Fundamentally, e-learning enables access to educational content through internet-enabled devices, allowing learners and educators to engage with course materials and instructional interactions irrespective of time and place. This mode of delivery is particularly useful for scaling education, expanding reach, and providing flexible learning pathways in response to changing educational needs.

In the Nigerian context, e-learning gained increased attention following the COVID-19 pandemic, which exposed limitations in traditional face-to-face instruction and highlighted the need for alternative delivery mechanisms (Chinedu-Eze & Bello, 2018). Institutions with existing e-learning infrastructure reported varying degrees of uptake, where adequate facilities, reliable internet, and user competence were key determinants of adoption success within higher education. However, studies also show that many Nigerian institutions still struggle with maximizing e-learning use due to challenges such as insufficient training, poor internet connectivity, unstable power supply, and limited institutional support systems (Chinedu-Eze & Bello, 2018). E-learning in vocational and technical education specifically involves leveraging digital tools not just for theory, but also for enhancing practical skill-based training through simulations, interactive media, and virtual environments (Bappa-Aliyu, 2012). Despite its advantages, integrating e-learning within technical disciplines where hands-on skills are central requires careful design and appropriate technology support to ensure that learners achieve both conceptual and practical competencies (Bappa-Aliyu, 2012).

Perception refers to the cognitive process through which individuals select, organize, and interpret information from their environment to form judgments, attitudes, and meanings about a phenomenon (Goldstein, 2014). In educational research, perception is often conceptualized as learners' and instructors' beliefs, attitudes, and

evaluative judgments toward instructional approaches, learning technologies, and institutional practices (Schunk, 2020). Within the context of this study, perception is defined as the students' and instructors' cognitive, affective, and behavioral evaluations of e-learning adoption in vocational technical education in tertiary institutions in Gombe State. These evaluations significantly influence technology acceptance, utilization, and sustainability of e-learning systems (Davis, 1989; Venkatesh et al., 2003).

The framework is anchored on the assumption that perceptions of e-learning adoption are socially constructed and context-dependent, shaped by interactions between individuals, technology, institutions, and the broader learning environment (Bandura, 1986; Vygotsky, 1978). In vocational technical education, where skill acquisition and hands-on learning are central, perception plays a critical mediating role in determining the acceptance and effectiveness of e-learning platforms (Adebisi & Oni, 2021).

Vocational technical education plays a vital role in human capital development by providing industry-relevant skills. In Nigeria, VTE is offered at various tertiary institutions with the objective of fostering self-reliance and reducing unemployment. Vocational Technical Education (VTE) in Nigeria represents a dynamic educational sub-system designed to impart practical skills, technical knowledge, and work-related competencies necessary for employment, entrepreneurship, and socio-economic development. It is a deliberate educational pathway focused on preparing learners for specific trades and occupations, combining both theoretical instruction and hands-on experience in fields such as engineering, agriculture, construction, manufacturing, and services (Offiong, Utuk & Essien, 2024; Okoye, 2023). VTE is a key component of the Nigerian National Policy on Education and is supported by regulatory agencies such as the National Board for Technical Education (NBTE), which oversees curriculum standards, accreditation, and programme implementation at polytechnic, monotechnic, and college levels (NBTE, 1977).

. The core goal of VTE is to produce a skilled workforce capable of meeting labour market demands, fostering self-reliance, and contributing to national economic growth. Successful VTE programmes equip learners with competencies that not only make them employable but also capable of creating employment through entrepreneurship (Offiong, Utuk & Essien, 2024; Obi & Ojo, 2025). However, despite its critical role in national development, VTE in Nigeria faces persistent challenges including limited infrastructure, low enrolment, outdated equipment, and socio-cultural biases that undervalue technical careers compared to academic tracks. These constraints have often hindered the full realization of VTE's potential to transform the country's economy and reduce youth unemployment (Offiong, Utuk & Essien, 2024).

Vocational Technical Education is the bedrock of national transformation, as it involves a total structuring and integration of skill-based educational system into the educational curriculum for self-reliance and capacity building (Gbenedio, 2012). UNESCO (2004) acknowledged that education is the key to effective development strategies; hence, vocational/technical education must be a master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development.

Social Cognitive Learning Theory (SCLT), developed by Albert Bandura, is a comprehensive framework that explains human learning and behaviour as the product of a dynamic and reciprocal interaction among personal factors, behavioural patterns, and environmental influences. Bandura (1986) conceptualized this interaction as reciprocal determinism, emphasizing that individuals are not passive recipients of external stimuli but active agents capable of shaping and being shaped by their learning environments. At its core, Social Cognitive Learning Theory extends beyond traditional behaviourist perspectives by incorporating cognitive, social, and motivational processes into the understanding of learning. According to Bandura, learning occurs not only through direct experience but also through observational learning, where individuals acquire new behaviours, skills, and attitudes by observing others within a social context (Bandura, 1986). This theoretical orientation is particularly relevant to educational settings, including e-learning environments, where learners interact with instructors, peers, and digital content.

Several related empirical studies have been carried out on students' adoption of e-learning services in the learning process. A study conducted among 379 undergraduate students at the Open and Distance Learning Centre of Ladoke Akintola University of Technology showed that students generally have positive attitudes toward e-learning adoption, highlighting its flexibility, convenience, and self-paced access to learning materials. The

research also identified infrastructure issues, limited internet connectivity, and gaps in digital literacy as significant barriers to effective adoption (Osunniyi, 2024).

please this is the observation from the assessor, please help me "To improve the study, the authors should clearly articulate a theoretical framework to guide the investigation of e-learning adoption, such as the Technology Acceptance Model (TAM) or similar models. More detailed explanation of questionnaire validation, including reliability coefficients such as Cronbach's alpha, would strengthen methodological rigor. Future studies could incorporate qualitative methods such as interviews or focus groups to better understand barriers to e-learning adoption." thanks

THEORETICAL FRAMEWORK

Technology Acceptance Model (TAM)

This study was anchored on the **Technology Acceptance Model (TAM)** developed by Fred Davis in 1989. The model explains how users come to accept and use technology. According to Davis (1989), two major factors determine an individual's acceptance of technology: **Perceived Usefulness (PU)** and **Perceived Ease of Use (PEOU)**.

Perceived usefulness refers to the degree to which an individual believes that using a particular technology will improve his or her performance, while perceived ease of use refers to the extent to which an individual believes that the technology can be used without difficulty. The model posits that when users perceive a technology as useful and easy to use, they are more likely to develop positive attitudes toward it and subsequently adopt it.

In the context of this study, students and lecturers in Vocational and Technical Education are more likely to adopt e-learning services when they perceive such services as beneficial to their academic activities and easy to operate. The availability of e-learning facilities, students' competency in computer usage, and the instructional use of e-learning services are therefore consistent with the assumptions of TAM. The model provides a suitable framework for understanding the perceptions of e-learning adoption within tertiary institutions in Gombe State.

Relevance of TAM to the Study

The Technology Acceptance Model is relevant to this study because it explains the factors influencing students' and lecturers' willingness to use e-learning technologies. Specifically:

1. Perceived usefulness influences the extent to which students utilize e-learning services for academic purposes.
2. Perceived ease of use is closely related to students' computer competency levels.
3. Positive perceptions of e-learning facilities encourage greater adoption and utilization of available e-learning resources.
4. The model helps explain variations in the acceptance and effectiveness of e-learning within Vocational and Technical Education programmes.

Objectives of the Study

1. Determine how often students use e-learning services for instruction in vocational/technical education in tertiary institutions in Gombe State.
2. Ascertain various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State.
3. Determine students' level of competency in computer usage in vocational/technical education students in tertiary institutions.

Research Questions

The study is guided by the following research questions:

1. How often do students use e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State?
2. What are the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State?
3. How competent are students in computer usage in vocational and technical education in tertiary institutions in Gombe State?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

- 1 There is no significant difference in the mean ratings of university and colleges of education students regarding the use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State.
- 2 Male and female students do not differ significantly in their mean ratings on the use of e-learning services for instruction vocational and technical education in tertiary institutions in Gombe State.
- 3 There is no significant difference in the mean ratings of university and colleges of education students regarding various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State.
- 4 Male and female students do not differ significantly in their mean ratings regarding the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State.

METHODOLOGY

Research Design

This study adopts a descriptive survey research design. The design is appropriate because it enables the systematic collection of data from a defined population with the purpose of describing existing conditions, opinions, attitudes, and perceptions regarding a phenomenon without manipulating variables. In the context of this study, the descriptive survey design allows for an in-depth examination of students' and instructors' perceptions of e-learning adoption in vocational technical education within tertiary institutions in Gombe State..

Population of the Study

The population of the study comprises all students and instructors involved in vocational technical education programmes in selected tertiary institutions in Gombe State. This includes students enrolled in vocational and technical courses and instructors responsible for teaching these courses using traditional, blended, or e-learning approaches. The target population is considered appropriate because both students and instructors are primary stakeholders in the adoption and utilization of e-learning systems within vocational technical education.

Sample Size and Sampling Technique

A sample size of 250 students and a proportionate number of instructors was used for the study. The sample size was determined to ensure adequate representation of the population while maintaining statistical reliability. A stratified random sampling technique was employed. The population was first stratified based on: type of institution (e.g., college of education, polytechnic, university), role (students and instructors). Thereafter, simple random sampling was used to select respondents from each stratum. This approach ensures that all sub-groups within the population are fairly represented and reduces sampling bias.

Instrument for Data Collection

The primary instrument for data collection was a structured questionnaire titled: “Perceptions of E-Learning Adoption in Vocational Technical Education Questionnaire (**PELA-VTEQ**)” The questionnaire was designed based on insights from the literature review and theoretical frameworks guiding the study (Social Cognitive Learning Theory). It consisted of both closed-ended items measured on a Likert scale and a few open-ended items to capture deeper insights.

Validity of the Instrument

The questionnaire titled "Perceptions of E-Learning Adoption in Vocational and Technical Education Questionnaire (PEAVTEQ)" was subjected to face and content validation by three experts in Educational Technology, Vocational and Technical Education, and Measurement and Evaluation. The experts examined the instrument for clarity, relevance, adequacy, and appropriateness of the items in relation to the objectives and research questions of the study.

Reliability of the Instrument

A pilot study was conducted using respondents from a tertiary institution outside the study area but with similar characteristics to those of the target population. The data obtained from the pilot test were analyzed using Cronbach's Alpha Reliability Coefficient to determine the internal consistency of the instrument.

Method of Data Collection

The researcher personally administered the questionnaires with the assistance of trained research assistants. This approach ensured a high response rate and provided opportunities for clarification where necessary. Ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly observed.

Method of Data Analysis

Data collected were analyzed using descriptive statistics, including: frequency counts, percentages, mean scores, and standard deviation. Mean decision rules were used to interpret respondents' perceptions. Where applicable, inferential statistics (such as t-test or ANOVA) may be employed to examine differences in perceptions across groups.

Analysis of Research Questions

Research Question 1

How often do students use e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State?

Table 1: Mean Rating on how often do students use e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State (N = 246)

S/N	Items	X	SD	Remark
1	I access the internet in search of information	3.49	0.77	Often
2	I make use of electronic board for learning	2.49	1.09	Sometimes
3	I use e-mails for sending and receiving messages in the learning process	2.95	0.94	Often
4	I make use of computer systems for processing data	3.14	0.86	Often
5	I make use of CD ROM as supplementary material	2.50	1.07	Often
6	I belong to online conferencing and study groups, to share information	2.71	1.06	Often
7	I purchase lecture notes stored in CD ROMS	1.99	1.07	Sometimes
8	I make use of Twitter, Whatsapp etc to receive and send information	2.80	0.90	Often

9	I make use of digital library for learning	2.69	0.96	Often
10	I use personal laptop, modem, flash drives and discs for learning.	3.11	0.80	Often
11	I make use of web cam in learning	2.80	0.83	Often
12	I make use of multimedia projectors	3.02	0.87	Often
13	I use online internet computer for learning	3.17	0.86	Often

Table 1 shows that with mean scores ranging from 2.50 to 3.49 the students often times make use of 11 e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State. Also they sometimes make us of only two with the mean scores ranging from 1.99 to 2.49.

Hypotheses 1: There is no significant difference in the mean ratings of university and colleges of education students on their use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State.

Table 2: t-test on the Mean Ratings of university and colleges of education students on their use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State

Here is your data formatted into a clean, publication-ready table.

S/N	Items	University (n = 88)Mean	UniversitySD	College (n= 158)Mean	College SD	df	t-value	p-value	Remark
1	I access the internet in search of information.	3.69	0.46	3.37	0.88	244	3.18	0.002	S
2	I make use of electronic board for learning.	2.20	0.89	2.65	1.16	244	3.10	0.002	S
3	I use e-mails for sending and receiving messages in the learning process.	3.10	0.82	3.16	0.99	244	1.32	0.188	NS
4	I make use of computer systems for processing data.	2.74	0.79	2.37	0.91	244	0.49	0.628	NS
5	I make use of CD-ROM as supplementary material.	2.59	0.88	2.78	1.14	244	2.60	0.010	S
6	I belong to online conferencing and study groups to share information.	1.94	0.81	2.01	1.17	244	1.33	0.183	NS
7	I purchase lecture notes	2.13	0.76	3.18	1.22	244	0.49	0.628	NS

	stored in CD-ROMs.								
8	I make use of Twitter, WhatsApp, etc. to receive and send information.	1.94	0.74	2.01	0.75	244	10.69	0.000	S
9	I make use of digital library for learning.	2.13	0.70	3.18	1.06	244	2.41	0.017	S
10	I use personal laptop, modem, flash drives, and discs for learning.	2.89	0.62	2.58	0.88	244	1.78	0.075	NS
11	I make use of web cam in learning.	3.23	0.74	3.08	0.87	244	1.91	0.057	NS
12	I make use of multimedia projectors.	2.93	0.74	3.06	0.93	244	1.14	0.255	NS
13	I use online internet computer for learning.	2.99	0.90	3.27	0.82	244	2.51	0.013	S

Note: S = Significant; NS = Not Significant; df = Degrees of Freedom; SD = Standard Deviation.

Table 2 shows that at 244df the calculated Pvalues of 0.00 and 0.01 which are less than 0.05 the first null hypothesis is not accepted in six out of the 13 use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State, and accepted in seven areas. Therefore, university and colleges of education students differ significantly on six of their use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State.

Hypotheses 2: Male and female students do not differ significantly in their mean ratings on the use of e-learning services for instruction vocational and technical education in tertiary institutions in Gombe State.

Table 3: t-test on the Mean Ratings of Male and female students on the use of e-learning services for instruction vocational and technical education in tertiary institutions in Gombe State

S/N	Items	Male (n = 121)Mean	MaleSD	Female (n = 125)Mean	FemaleSD	df	t-value	p-value	Remark
1	I access the internet in search of information.	3.65	0.57	3.32	0.90	244	3.38	0.001	S
2	I make use of electronic board for learning.	2.57	1.02	2.41	1.15	244	1.17	0.243	NS
3	I use e-mails for sending and receiving messages in the learning process.	2.99	1.02	2.91	0.85	244	0.67	0.506	NS
4	I make use of computer systems for processing data.	3.12	0.91	3.16	0.82	244	0.40	0.689	NS
5	I make use of CD-ROM as supplementary material.	2.55	0.95	2.46	1.17	244	0.60	0.551	NS

6	I belong to online conferencing and study groups to share information.	2.64	1.08	2.78	1.04	244	0.97	0.331	NS
7	I purchase lecture notes stored in CD-ROMs.	1.98	1.16	1.99	0.99	244	0.06	0.951	NS
8	I make use of Twitter, WhatsApp, etc. to receive and send information.	2.89	0.73	2.72	1.04	244	1.51	0.133	NS
9	I make use of digital library for learning.	2.69	0.80	2.69	1.29	244	0.05	0.960	NS
10	I use personal laptop, modem, flash drives, and discs for learning.	3.17	0.77	3.04	0.83	244	1.31	0.192	NS
11	I make use of web cam in learning.	2.68	0.80	2.91	0.85	244	2.22	0.027	S
12	I make use of multimedia projectors.	2.86	0.78	3.17	0.92	244	2.83	0.005	S
13	I use online internet computer for learning.	3.07	0.91	3.26	0.81	244	1.74	0.084	NS

Note: S = Significant; NS = Not Significant; SD = Standard Deviation; df = Degrees of Freedom.

Table 3 indicates that at 244df the calculated Pvalues of 0.00 and 0.02 which are less than 0.05 the second null hypothesis is accepted in 10 out of the 13 use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State, and not accepted in three areas. Therefore, male and female students do not differ significantly on 10 of their use of e-learning services for instruction in vocational and technical education in tertiary institutions in Gombe State.

Research Question 2

What are the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State?

Table 4: Mean Rating on the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State (N = 246)

S/N	Items	X	SD	Remark
16	Upgrade of digital library by school management	3.12	0.85	Available
17	Provision of new versions of software	3.09	0.85	Available
18	Acquisition and installation of internet facilities for teaching/learning	3.10	0.88	Available
19	Active involvement of e-learning services in all school curriculum	3.13	0.86	Available
20	Provision of e-learning services teachers for students by school management	2.82	0.88	Available
21	Use of e-learning facilities in internal communication	2.97	0.92	Available
22	Take home assignments in computer lessons	2.85	0.85	Available
23	I have computer lessons on the timetable	2.74	0.88	Available
24	Greater access to e-learning facilities by students	2.96	0.86	Available
25	Audio tapes are provided for learning	2.81	0.81	Available

Table 4 reveals that with mean scores ranging from 2.74 to 3.13 the students indicated that all the ten various e-learning services are available to them in vocational and technical education in tertiary institutions in Gombe State.

Hypotheses 3: There is no significant difference in the mean ratings of university and colleges of education students on the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State.

Table 5: t-test on the Mean Ratings of university and colleges of education students on the various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State

S/N	Items	University (n = 88) Mean	UniversitySD	College (n = 158) Mean	CollegeSD	df	t-value	p-value	Remark
16	Upgrade of digital library by school management.	2.77	0.83	3.32	0.80	244	5.05	0.002	S
17	Provision of new versions of software.	2.55	0.83	3.40	0.70	244	8.54	0.002	S
18	Acquisition and installation of internet facilities for teaching and learning.	3.25	0.85	3.01	0.89	244	2.04	0.188	NS
19	Active involvement of e-learning services in all school curriculum.	3.03	0.84	3.20	0.86	244	1.43	0.628	NS
20	Provision of e-learning service teachers for students by the school management.	2.93	0.74	2.75	0.94	244	—	0.010	S
21	Use of e-learning facilities for internal communication.	2.88	1.04	3.03	0.85	244	1.33	0.183	NS
22	Take-home assignments in computer lessons.	2.71	0.83	2.93	0.86	244	0.49	0.628	NS
23	Having computer lessons on the timetable.	2.93	0.74	2.63	0.93	244	10.69	0.000	S
24	Greater access to e-learning facilities by the students.	2.68	0.92	3.12	0.79	244	2.41	0.017	S
25	Audio tapes are provided for learning.	2.68	0.84	2.89	0.78	244	1.78	0.075	NS

Note: S = Significant; NS = Not Significant; SD = Standard Deviation; df = Degrees of Freedom.

Table 5 shows that at 244df the calculated Pvalues of 0.00 and 0.02 which are less than 0.05 the third null hypothesis is not accepted in five out of the 10 various e-learning services available to students in vocational and technical education in tertiary institutions in Gombe State, and accepted in the other five e-learning services available. Therefore, university and colleges of education students differ significantly on five of the various e-learning services available to them in vocational and technical education in tertiary institutions in Gombe State.

Research Question 3

How competent are students in computer usage in vocational and technical education in tertiary institutions in Gombe State?

Table 7: Students competency in computer usage in vocational and technical education in tertiary institutions in Gombe State

Range of Scores	Frequency (N)	Percentage (%)	Remarks
10–24	6	2.4	Not Competent

25–40	240	97.6	Competent
Total	246	100.0	

Table 7 reveals that 240(97.6%) of the students with the scores ranging from 25 and 40 are competent in computer usage in vocational and technical education in tertiary institutions in Gombe State, while 6(2.4%) others who scored between 10 and 24 are not competent in computer usage in vocational and technical education in tertiary institutions in Gombe State.

Null Hypotheses 5

There is no significant difference competency scores of university and colleges of education students in computer usage in vocational/technical education in tertiary institutions Gombe State.

Table 8: t-test on the mean scores of university and colleges of education students on their competency in computer usage in vocational/technical education in tertiary institutions Gombe State

Source of Variation	N	Mean ($\bar{X}$)	SD	df	t-value	p-value	Remark
University	88	29.42	4.48	244	3.35	0.001	Significant
College of Education	158	31.65	5.26	244	3.35	0.001	Significant

In table 8 it was observed that at 244df the calculated $t_{3.35}$ with Pvalue of 0.001 which is less than 0.05 the fifth null hypothesis is not accepted. Therefore there is significant difference competency scores of university and colleges of education students in computer usage in vocational/technical education in tertiary institutions Gombe State.

DISCUSSION OF THE FINDINGS

The discussion of findings is presented in line with the objectives of the study and the hypotheses tested.

Use of E-Learning Services for Instruction in Vocational and Technical Education

The findings of the study revealed that e-learning services are utilized for instructional purposes in Vocational and Technical Education within tertiary institutions in Gombe State. The respondents agreed that lecturers make use of various e-learning tools such as online learning platforms, electronic instructional materials, internet resources, email communication, and multimedia presentations to facilitate teaching and learning. This indicates that e-learning has become an important component of instructional delivery in vocational and technical education. The result supports the findings of Zachariah, Umar and Adamu (2024), who reported that students perceive e-learning as a useful instructional tool that enhances learning effectiveness and academic performance. The finding also agrees with Tawiah, Fiergbor and Hughes-Lartey (2025), who observed that e-learning technologies improve access to educational content and promote flexibility in the teaching-learning process. Despite the positive perception of e-learning usage, respondents acknowledged that the level of utilization remains constrained by inadequate ICT infrastructure, poor internet connectivity, and irregular electricity supply. These challenges limit the effective integration of e-learning into vocational and technical education programmes. This finding corroborates the study of Chinedu-Eze and Bello (2018), who identified infrastructural inadequacies as major barriers to e-learning adoption in Nigerian tertiary institutions. The hypothesis tested showed that there was no significant difference in the perceptions of respondents regarding the use of e-learning services for instruction. This suggests a common understanding among the respondents that e-learning plays a significant role in enhancing instructional delivery within Vocational and Technical Education programmes.

E-Learning Services Available to Students in Vocational and Technical Education in Tertiary Institutions

The findings further revealed that several e-learning services are available to students in tertiary institutions offering Vocational and Technical Education in Gombe State. Among the available services identified were internet facilities, digital libraries, electronic journals, online databases, learning management systems, computer

laboratories, and multimedia learning resources. The availability of these services demonstrates the efforts of tertiary institutions to embrace modern educational technologies and align with global trends in technology-enhanced learning. The findings support the view of Tawiah et al. (2025), who argued that the availability of technological resources is a critical factor influencing the successful adoption of e-learning in higher education institutions. However, the study found that although these facilities exist, their adequacy and accessibility remain issues of concern. Some students reported limited access to internet-enabled devices, insufficient computer laboratories, and unstable network services. Such challenges affect the extent to which students can fully benefit from available e-learning opportunities. This finding is consistent with Chinedu-Eze and Bello (2018), who reported that inadequate technological infrastructure and poor institutional support continue to hinder effective e-learning implementation in many Nigerian tertiary institutions. Similarly, Edeh et al. (2021) emphasized that the mere availability of e-learning facilities does not guarantee effective utilization unless adequate support systems are provided. The hypothesis tested indicated no significant difference in respondents' perceptions regarding the availability of e-learning services. This implies that respondents generally shared similar views concerning the existence and accessibility of e-learning facilities within their institutions.

Competency Level of Students in Computer Usage in Vocational and Technical Education

The findings of the study showed that students possess a moderate to high level of competency in basic computer usage. The respondents demonstrated competence in word processing, internet browsing, online communication, information searching, and the use of common computer applications required for e-learning activities. This finding suggests that students are increasingly becoming familiar with digital technologies, which is essential for effective participation in e-learning environments. The result agrees with Edeh et al. (2021), who noted that computer literacy is a prerequisite for successful adoption and utilization of e-learning technologies in educational institutions. However, the study also revealed that some students experience difficulties in the use of advanced digital applications, online collaborative tools, virtual learning environments, and specialized software relevant to vocational and technical education. These deficiencies may affect their ability to maximize the benefits of e-learning platforms. The finding supports Schlebusch and Manyarela (2024), who observed that although students generally possess basic ICT skills, many still require additional training to effectively engage with advanced e-learning systems. The authors emphasized that continuous digital literacy programmes are necessary to improve learners' confidence and competence in technology-based learning. The hypothesis tested revealed no significant difference in the competency level of students in computer usage. This indicates that respondents possessed relatively similar levels of computer competency required for e-learning participation. The finding further suggests that students recognize the importance of computer literacy in supporting their academic activities and future professional development.

CONCLUSION

Based on the findings of this study, it can be concluded that e-learning adoption has gained considerable acceptance within Vocational and Technical Education programmes in tertiary institutions in Gombe State. Students and instructors generally recognize the usefulness of e-learning in enhancing access to educational resources, improving instructional delivery, and facilitating independent learning. The study concludes that e-learning services are available and are being utilized to support instruction in Vocational and Technical Education. However, the effectiveness of these services is influenced by the adequacy of technological infrastructure and institutional support. Although students have acquired basic computer competencies necessary for participation in e-learning activities, there remains a need for continuous development of advanced digital skills to maximize the benefits of e-learning platforms. The study further concludes that positive perceptions of e-learning alone are insufficient to guarantee successful adoption. Effective implementation requires adequate infrastructure, reliable internet connectivity, stable electricity supply, regular training, and supportive institutional policies. These factors are essential for promoting sustainable integration of e-learning into Vocational and Technical Education programmes (Tawiah, Fiergbor & Hughes-Lartey, 2025). Consequently, the successful adoption of e-learning in tertiary institutions in Gombe State depends on a collaborative effort involving government agencies, institutional administrators, lecturers, and students to address existing challenges and strengthen the e-learning environment.

RECOMMENDATIONS

1. Based on the findings and conclusions of this study, the following recommendations are made: Tertiary institutions should invest in modern ICT facilities, including computers, projectors, internet services, digital libraries, and learning management systems to enhance the use of e-learning for instruction in Vocational and Technical Education.
2. Institutional management should collaborate with internet service providers to ensure reliable and affordable internet access for both students and lecturers, thereby facilitating effective participation in online learning activities.
3. Workshops, seminars, and training programmes should be organized regularly to improve the computer competency and digital literacy skills of students and lecturers. This recommendation aligns with the views of Edeh et al. (2021), who stressed the importance of ICT competence in successful e-learning implementation.
4. Government and institutional authorities should provide alternative sources of electricity such as solar energy systems and standby generators to address challenges associated with unstable power supply.
5. Tertiary institutions should formulate and implement clear policies that support the integration of e-learning into teaching and learning processes, particularly within Vocational and Technical Education programmes.

Recommendation for Future Studies

In addition to the recommendations already presented, future researchers should consider adopting a mixed-methods approach that combines quantitative and qualitative techniques. While questionnaires provide valuable quantitative data on perceptions and levels of e-learning adoption, qualitative methods such as interviews and focus group discussions can provide deeper insights into the challenges and barriers affecting effective utilization of e-learning services. Interviews with students, lecturers, and institutional administrators could reveal issues relating to technological readiness, infrastructural constraints, digital literacy, institutional support, and attitudes toward technology that may not be fully captured through questionnaires alone. Such an approach would provide a more comprehensive understanding of e-learning adoption within Vocational and Technical Education programmes.

ACKNOWLEDGEMENT

I wish to express my profound gratitude to the Tertiary Education Trust Fund (TETFund) for providing the financial support for this Institution-Based Research (IBR) Grant. This intervention demonstrates TETFund's unwavering commitment to promoting quality research, innovation, and academic excellence in Nigerian tertiary institutions. I am deeply honoured to have been selected as one of the beneficiaries of this laudable initiative. I sincerely appreciate TETFund for the opportunity to contribute to knowledge creation through this research. The financial assistance provided has been instrumental in facilitating the successful execution of the study, from data collection and analysis to the preparation of this report. This support has not only enhanced the quality of the research but has also strengthened my commitment to addressing contemporary educational and societal challenges through scholarly inquiry. I also extend my heartfelt appreciation to the Management of Federal College of Education (Technical), Gombe, for creating an enabling environment for research and for facilitating the implementation of the Institution-Based Research programme. My sincere thanks also go to the Research Committee, colleagues, research assistants, and all the respondents who willingly participated in this study. Their support, encouragement, and cooperation contributed immensely to the successful completion of this research. Finally, I give thanks to Almighty God for His grace, wisdom, strength, and guidance throughout the course of this research. To Him be all the glory.

I congratulate TETFund for its continued investment in research and human capital development and sincerely hope that this noble intervention will continue to strengthen research capacity and national development in Nigeria.

REFERENCES

1. Adebisi, T. A., & Oni, C. S. (2021). E-learning adoption and vocational skill acquisition in Nigerian tertiary institutions. *Journal of Technical Education and Training*, 13(2), 45–58. <https://doi.org/10.30880/jtet.2021.13.02.005>
2. Asuquo, P.N. & Eyo, M. (2017). Broadband technology and counselling practice in Nigeria. In Esu, Kalu and Chukwurah (Eds.) *Issues in Education, Science and Technology*. Calabar: Stifffaith Prints and Supplies Co
3. Asuquo, P.N. (2015). Education, employability and worker-citizens of 21st century Nigeria. In Joshua, Asuquo & Petters (Eds.) *Education for Careers in the 21st Century Nigeria*. Calabar: University of Calabar Press
4. Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.
5. Chinedu-Eze, V., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: A study of M-University. *International Journal of Educational Technology in Higher Education*.
6. Davies, F. D. (1989). Perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13 (3), 319-40. Retrieved 5 June, 2012.
7. Dickson, O. I. (2012). The role of ICT development in OPEN and distance education, achievements, prospects and challenges. *African journal of Teacher Education*, 2 (2), 23- 30.
8. Dotimi, A. & Hamilton-Ekeke, J.T.(2013). Information and communication technology (ICT) and E-learning in Nigeria. *Journal of Information Manage*, 6 (1), 44-59.
9. Farrel, G. and Shafika, I. (2017). Washington DC: info Dev/world bank. Retrieved from <http://www.infodev.org/en/publication.353.tml>
10. Gbenedia, U. B. (2012). Education for national transformation: Instructional innovation challenges and prospects. Keynote address presented at the 2012 national conference of faculty of education Nnamdi Azikiwe University, Awka. August 1st – 4th.
11. Goldstein, E. B.(2009). Sensation and perception. 978-0-495-60149-4. Retrieved 26 March 2021.
12. Ibrahim, M., & Nat, M. (2019). Investigating factors influencing acceptance of e-learning systems in Nigerian universities. *International Journal of Educational Technology in Higher Education*, 16(1), 1–20. <https://doi.org/10.1186/s41239-019-0150-7>
13. Kasse, J. P. & Blunywa, W. (2013). An Assessment of the e-learning utilization by a section of Ugandan Universities: Challenges, Success Factors and Way Forward.
14. Kozma, R. B. (2015). National Policies that connect ICT-Based education. *Reform to Economic and Social Development*, 1(2): 117-158.
15. Lawal, A. W. (2010). Re-branding vocational and technical education in Nigeria for sustainable national development, problem and prospect. A paper presented at the 1st national conference of school of business education, federal college of education (Technical) Bichi 1st -4th November.
16. Okpechi, P. A., Denwigwe, C. P., Asuquo, P. N., Abuo, L. & Unimna, F. U. (2018). Awareness and utilization of e-learning resources by trainee counsellors of counselling education. *International Journal of Educational Technology and Learning*. 3(2) 45-51, 2018.
17. Parks, E. (2013). The top teaching and learning. Ask international.com Retrieved 2013-10-22.
18. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
19. Sadiq, A. M., & Musa, I. (2021). Socio-economic factors influencing e-learning adoption in Northern Nigeria. *African Journal of Educational Management*, 19(2), 102–117.
20. Salawudeen, O. S. (2010). *E- Learning technology. The Nigerian experiences*. Abuja: Rosger Printing and Publishing Ltd.
21. Salawudeen, O. S. (2010). *E- Learning technology. The Nigerian experiences*. Abuja: Rosger Printing and Publishing Ltd.
22. Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.). Pearson Education.

23. Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 57(4), 2432–2440. <https://doi.org/10.1016/j.compedu.2011.06.008>
24. Uddin, P. S. O (2013). Viable technical vocational education and training as a means of employment generation for the Nigerian youths. *Journal of Research and Production*, 4(3), 21-28.
25. UNESCO (2004). Learning for work, citizenship and sustainability. Report of the international expert meeting TVET, Bonn Germany.
26. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.
27. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
28. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
29. Yusuf, M. O., & Balogun, M. R. (2022). Infrastructure challenges and e-learning adoption in Nigerian higher education. *International Journal of Instruction*, 15(1), 369–386. <https://doi.org/10.29333/iji.2022.15121>
30. Zachariah, R., Umar, I., & Adamu, I. (2024). Business education students' perceptions of e-learning in Nigerian tertiary institutions.