

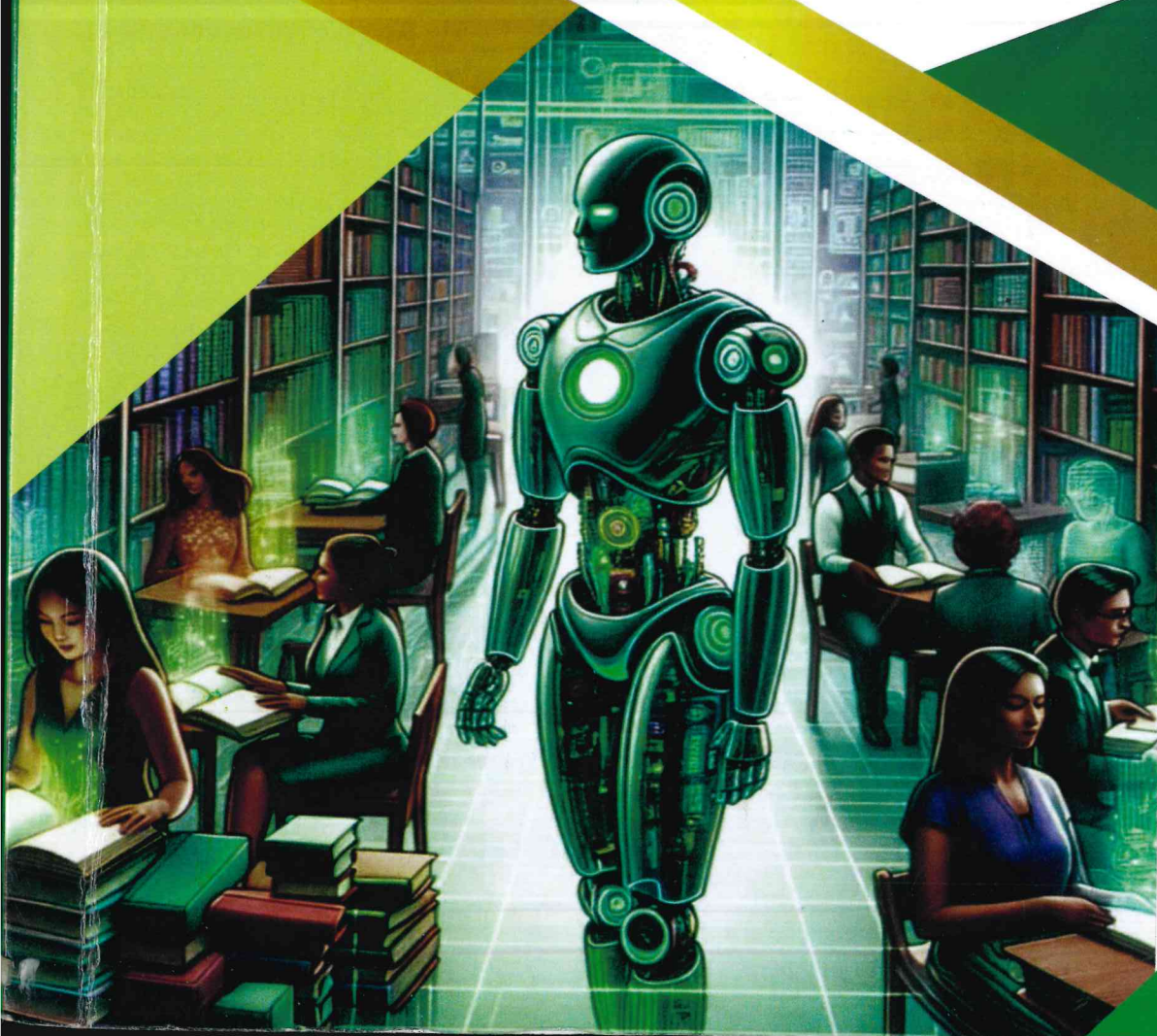


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# Use of Digital Technologies for Teaching among Lecturers in Federal Polytechnics in North-Central, Nigeria

By

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## Abstract

*This paper examined the use of digital technologies for teaching among lecturers in federal polytechnics in North-Central, Nigeria. The study was guided by three objectives and three research questions. The objectives of the study were to: ascertain the teaching activities among lecturers in federal polytechnics in North-central, Nigeria; identify the types of digital technologies available for teaching in federal polytechnics in North-central, Nigeria; and utilisation of digital technologies for teaching by lecturers in federal polytechnics in North-central, Nigeria. The total population for the study consisted of 2,455 lecturers drawn from the federal polytechnics in North-central, Nigeria. Krejcie and Morgan table was used to determine the sample size of the study which was 333. Questionnaire and checklist were the research instruments used for data collection. Out of 333 copies of questionnaire administered, 261 copies were filled, returned and used for the analysis representing 78% response rate. Descriptive statistical tools, mean and standard deviation were used to analyse the data. The findings of the study revealed among others that teaching activities carried out by lecturers such as lectures, organising workshops and laboratory sessions, project, field trips and industrial attachment supervisions, mentoring and advising students were strongly agreed had weighted mean score  $\bar{x}$  of 2.90. The study concluded that the roles of digital technologies in teaching cannot be underestimated because digital technologies is helping to solve many problems in the educational institutions especially the polytechnic system. The study recommended among others that the management of federal polytechnics in North-central, Nigeria should develop programmes through conferences, workshops and seminar organised for lecturers to enhance their teaching activities as well as learning process of students especially with the usage of digital technologies.*

**Keywords:** Digital technologies, Lecturers, Teaching, Use

## Introduction

Teaching is regarded as both an art and science. As an art, it lays stress on the imaginative and artistic abilities of the teacher in creating a worthwhile situation in the classroom to enable students to learn. As a science, it sheds light on the logical, mechanical, or procedural steps to be followed to attain an effective achievement of goals. Different educationists hold different ideas regarding the concept of teaching (Isola, 2019). Various activities are carried out in polytechnics such as learning, research, community development and teaching. The various teaching activities carried out by lecturers include lecture delivery, discussions, giving assignments, setting examinations and test questions, grading assignment and examinations and proving feedback to students, supervising student projects, taking students to field trips, organising practical classes among others. Education in the 21st century has experienced a lot of innovative changes ushered in by technology. This changes has affected a wider area of coverage in educational institutions including teaching and learning. Educational institutions all over the world have recognised the important role technology play in the teaching and learning environment. This is why teaching and learning all over the world has experienced a shift from the existing traditional approach to accommodate the digital based learning environment. This could be the reason why Idika *et al.* (2021) defined digital technologies as information, communication and administration of technologies and software which ranges from devices such as computers, laptops and tablets that are either connected or not to the Internet and mobile phones equipped with Global Positioning System (GPS) sensors of different kinds, as well as whiteboards and projectors with or without interactivity. In a similarly view, Schriever (2018) defined digital technology as a branch of information communication technology (ICT) that enables access to share of information and also provides a means of communication. According to Cambridge International (2017), digital technology can be taken to mean digital processing systems that encourage active learning, knowledge construction, inquiry and exploration on the part of the learners which allow for remote communication as well as data sharing to take place between teachers and/or learners in different physical classroom locations. In this study, digital technologies are instructional technologies which include computer hardware and software, tools and techniques that are used in or outside lecture rooms in facilitating, and improving the effectiveness and efficiency of teaching and learning. Specifically, digital technologies refer to the common technology-based tools such as computer, digital camera, scanner, DVD player, digital pen, PC video camera, mobile phone and projector that are being used by lecturers and students to facilitate teaching and learning processes. Sadaf-Salavati (2019) argued that terms such as information technology (IT), information and communication technology (ICT) and educational technology are used interchangeably to describe digital technology. The utilisation of digital technologies in teaching has the potential for enhancing greater achievement among lecturers through effective teaching as well as collaborations with researchers in other institutions by opening of wider opportunities to share information. The utilisation of digital technologies in teaching expands the range of choices and opportunities by facilitating greater access to educational resources. It also opens up

equal opportunities as well as helps to level the playing field by increasing students' participation. The ineffective use of digital technologies in teaching and learning limits the teaching and learning process and outcomes (White-Harris, 2017).

In situations where these digital technologies are accessible but not utilised, it results in a low pace in teaching which consequently, will affect the learning process and outcome of producing students who can favorably compete with other students elsewhere in the world. Pathetic as it may be most polytechnics in the developing countries fall in this category of which those in North-central, Nigeria are among. It is therefore saddening that the use of digital technologies in polytechnics are bedeviled by a lot of factors. Utilisation is an important factor that may influence the impact of digital technologies in teaching and learning. It is for this reason that this study investigated the use of digital technology for teaching among lecturers in federal polytechnics in North-central, Nigeria.

## 1.2 Statement of the Research Problem

Teaching is one of the activities carried out by lecturers in polytechnics. It enables them to create new ideas and develop the competencies and skills necessary for students to contribute to the nation's development. Due to the importance of teaching, lecturers are expected to apply multiple tasks and goals simultaneously while imparting knowledge to students using modern technology. The continued reliance on the use of traditional tools for teaching such as blackboards, chalks and printed materials leads to limited engagement and interactivity, insufficient use of time and resources, outdated contents and materials as well as impeding the ability of lecturers to provide high-quality, inclusive and effective education and must be addressed through the integration of digital tools and innovative teaching methods.

Hence, it was observed by the researcher that most lecturers in federal polytechnics in North-central, Nigeria do not have the required digital knowledge and right attitude to confidently and creatively integrate digital technologies for teaching and instructional delivery. These limit the knowledge of lecturers on digitally based learning environment and also causing negligence in the use of digital tools for effective teaching.

Internet bandwidth in the polytechnics are not functioning at its optimum point as expected which affect optimal and effective utilisation. Lecturers require students to come with their laptops during practical classes because there are no computers to be used in the computer laboratory. These and more raise doubts on the utilisation of digital technologies in teaching by lecturers in federal polytechnics. Therefore, it is against this backdrop that this study assessed the use of digital technologies for teaching among lecturers in federal polytechnics in North-central, Nigeria.

## Aim and Objectives of the Study

The aim of this study is to investigate the use of digital technologies for teaching among lecturers in federal polytechnics in North-central, Nigeria. The specific objectives were to:

1. ascertain the teaching activities among lecturers in federal polytechnics in North-central, Nigeria;
2. identify the types of digital technologies available for teaching in federal polytechnics in North-central, Nigeria;
3. find out the extent of utilisation of available digital technologies by lecturers for teaching in North-central, Nigeria.

## Literature Review

### 2.1. Teaching Activities among Lectures in Polytechnics

Digital tools refer to online resources and offline tools that enable effective teaching and learning by lecturers and students. Examples of digital tools include graphic tablets, interactive whiteboards, social media applications, learner management systems and so on. Oikonomou and Patsala (2021), described digital technology tools as software, programmes, applications, platforms, and resources (online or offline) that can be used with computers, mobile devices or other digital devices, and which incorporate text, audio and visual stimuli. Additionally, Olurinola (2020) clarifies digital technology tools as educational programs, websites or online resources and digital processing systems that encourage active learning, knowledge construction and exploration in the teaching and learning process. These definitions point to the technical nature of digital technology tools and their association with benefits such as access to information, visualisation of critical concepts, personalisation of teaching and learning and automation (Srinka, 2022; Heick, 2020).

Considering the influence evolution in technology has had on developments in education, one has to consider the corresponding effects in teaching. Technology integrates every branch of learning, providing the management of educational sectors with a heterogenous collection of technological tools and assets to produce, store, transfer, control and optimise information. In education, digital tools (which are technological tools) enforce, promote and augment the delivery of information. Its implementation in education provides movements and methods of integrating ICT into educational activities (Mohammed, 2021). Furthermore, digital technology tools amplify 21st Century skills such as critical thinking, collaboration, communication, creativity and digital literacy. As a result, educational practices are subjected to critical reviews and changes that are arguably the outcome of developments in information and communications technology (Idika and Ezinwa, 2023).

According to Idika and Ezinwa (2023), previous studies conducted have revealed that the proper use of digital technologies can increase the quality of education and link learning to real-life situations. However, the use of digital technologies are associated with a lot of challenges which can affect the effective teaching as well as

learning in the polytechnic environment. Lecturers struggle with the disruptions that digital technology tools can trigger, especially when they are used inefficiently (Hyndman, 2018). Integrating digital technologies in teaching and learning vary in different conditions based on their application. Nevertheless, certain significant steps such as provision of required digital technologies and extensive training of lecturers can be taken to solve the problems associated with the use of digital technologies in teaching.

## 2.2 Types of Digital Technologies Available for Teaching in the Federal Polytechnics

Issues around lecturing in large classes in Nigeria tertiary institutions are becoming more overwhelming probably due to factors associated with already existing crises and challenges confronting the current practice and trends which include overcrowding in lecture rooms resulting from infrastructure deficit; poor classroom control and management (Aina *et al.*, 2020). In an attempt to curtail these menaces, lecturers as well as students in polytechnics and other tertiary institutions of learning can import the use of digital technology that have the potential to effectively manage the outrageous number of students in a class.

Marafa and Shehu (2023) identified some of the digital technologies for teaching and learning which include: Edmodo Device, Socrative Device, Project Device, TED-Ed, EduClipper, Animoto, smart phones, Notability and GoConqr

### 1 Edmodo device

Edmodo is an educational tool that connects lecturers and students and is assimilated into a social network. Using Edmodo device, lecturers can create online collaborative groups, administer and provide educational materials, measure students' performance among other functions. According to Aina *et al.* (2020), Edmodo has more than 34 million users who connect to create a learning process that is more enriching, personalised, and aligned with the opportunities brought by technology and the digital environment.

### 2 Socrative device

Socrative device is a system that allows lecturers to create exercises which students can solve using mobile devices, whether smartphones, laptops or tablets. Lecturers can see the results of the activities and can modify the subsequent lectures in order to make them more personalised.

### 3 Project device

This project is a tool that allows lecturers to create multimedia presentations, with dynamic slides in which they can embed links, online quizzes, Twitter timelines and videos among other options. According to Abah (2019), during a lecture session, lecturers can share with their students, their academic presentations which are visually adapted to different devices.

### 4 TED-Ed

It is an educational platform that allows creating educational lessons with the collaboration of lecturers, students and people who want to expand their knowledge and good ideas. This website allows access to information for both teachers and students. Using TED-Ed, people can have an active participation in the learning process of others (Aina *et al.*, 2020).

### 5 EduClipper

This platform allows lecturers and students to share and explore references and educational material. In the EduClipper, lecturers can collect information found on the internet and then share it with the members of previously created groups, which offers the possibility to manage more effectively the academic content found online, improve research techniques, and have a digital record of what students achieved during the course. Likewise, it provides the opportunity for lecturers to organise a virtual class with their students and create a portfolio where all the work carried out is stored (Song, 2017).

### 6 Animoto

This is a digital tool that allows lecturers to create high-quality videos in a short time and from any mobile device, inspiring students and helping improve academic lessons. The Animoto interface is friendly and practical, allowing lecturers to create audiovisual content that adapts to educational needs. (Abah, 2019)

### 7 Smart Phones

The smartphone has become one of the most valuable tools for students in higher education and has come to play an important role in in-class learning, study organisation and management, dealing with finances, and personal safety and security. (Abah, 2019; Aina, *et al.*, 2020).

### 8 Notability

Notability has been ranked as one of the best note-taking apps available. More than a note-taking app, students can annotate PDFs/images/GIFs, brainstorm their ideas and make quick and easy notes of them for future reference, record lectures, and many other functions. Students can often find it difficult to follow lectures while attempting to take notes. This app lets students manage their own lectures and notes, plus share, connect, and synchronise with other students. Notability can synchronize with Dropbox, Google Drive, and One Drive (Song, 2017).

### 9 GoConqr

In an attempt, to retain the massive information that accumulates over the course of a semester or the first few weeks of school resumption can be so challenging. However, GoConqr can assist with this challenge by providing students with interactive functions such as courses, mind maps, flashcards, notes, quizzes, slides, and flowcharts. This is education and learning management at its best. This app features an extensive digital library for students, the means for lecturers to create their own learning materials and create an interactive community among their students and can provide and support institutions with campus portals and campus groups (Abah, 2019; Aina, *et al.*, 2020).

### 2.3 Extent of Utilization of Available Digital Technologies by the Polytechnic Lecturer

Technology has become an integral part of human life in the 21st century. The advent of globalisation is largely due to the advent of technology. It is probably in recognition of this that technological or digital literacy is an important skill of the twenty-first century. The sure way to equip students is by integrating technology for teaching and learning. According to Danlami, (2021), technology integration in Education is a process by which lecturers plan and use technology purposefully and meaningfully to enhance teaching and learning rather than using it randomly, arbitrarily sporadically. According to Abani, (2015), meaningful integration can only occur when lecturers are grounded in technology and can perceive the interplay between it and content knowledge. Siyam, (2019) posited that successful integration aims at utilising accessible and readily available resources to help students to be more actively involved in the learning process and be engaged in various projects.

The lecturers' perception is a pertinent issue in technology integration for teaching and learning. Despite the advantages of digital technology, many lecturers experience a lack of training opportunities to help them to fully understand how to use and implement the digital technology with their students (Ajuwon *et al.* 2016). The researchers further noted that, lecturers are aware of the significant benefit of how digital technology can support and help them in teaching. However, they are faced with some challenges such as cost and lack of training or preparation to use digital technology during lectures. Many lecturers reported that they need additional practice and experience on how to select, adjust and implement the digital technology tool to be able to provide the appropriate support for students in learning literacy.

Lecturers benefit from the effective use of digital technology as it can provide them with more options to use in addressing different teaching needs. Digital technology also allows lecturers to spend more time on group activities and to give students more one-on-one attention but all these depend to a large extent on how much a lecturer knows about digital technology devices and how competent the lecturers is in the use of these devices.

#### Methodology

The study adopted descriptive survey research design in order to gather data for the study. Descriptive research design is a type of design that describes a population, situation or phenomenon that is being studied. Hess *et al.* (2022) defined survey research as a method used to collect data that is used to gain insight on a specific topic. The population of the study was 2,455 which consisted of lecturers drawn from the federal polytechnics in North-central, Nigeria. The sample size of the population was 333. Krejcie and Morgan 1970 sampling table was used to determine the sample size of the population. The research instruments used for data collection for this study were questionnaire and checklist. The data from this study were organised and analysed using descriptive statistical tools such as the use of frequency tables, percentages, mean and standard deviation.

#### Results and Discussion

**Table 1: Teaching Activities Carried out by Lecturers**

S/N	Statements	SA	A	D	SD	N	FX	$\bar{x}$	STD	Decision
		4	3	2	1	261				
1	I lecture my students	113	97	27	24	261	821	3.14	0.65	Agreed
2	I take part in seminars and tutorials	73	98	62	28	261	738	2.83	0.33	Disagreed
3	I organise laboratory sessions	72	85	77	27	261	724	2.77	0.27	Disagreed
4	I organise workshops for students	99	105	39	18	261	807	3.09	0.59	Agreed
5	I assess and grade students assignments, tests and examinations	88	106	38	29	261	775	2.97	0.47	Agreed
6	I take part in curriculum development	33	45	91	92	261	541	2.07	0.43	Disagreed
7	I mentor and advise students	88	120	37	16	261	802	3.07	0.57	Agreed
8	I supervise research projects	107	99	34	21	261	814	3.19	0.62	Agreed
9	I supervise field trips and industrial attachment	109	73	42	37	261	776	2.97	0.47	Agreed
	<b>Weighted mean</b>							<b>2.90</b>		

**Key: Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD), n = Number of Retrieved Copies of Questionnaire,  $\bar{X}$ =Mean and (Weighted mean = 2.90)**

Table 1 showed the teaching activities carried out by lecturers. Out of the nine items listed, six items listed produced high mean scores which were above the weighted mean of 2.90. These items include item 8: I supervise research projects ( $\bar{x}$ =3.19; SD=0.62), item 1: I lecture my students ( $\bar{x}$ =3.14; SD=0.65), item 4: I organise workshops for students ( $\bar{x}$ =3.09; SD=0.59), item 7: I mentor and advise students ( $\bar{x}$ =3.07; SD=0.57), item 5: I assess and grade students assignments, tests and examinations ( $\bar{x}$ =2.97; SD=0.47) and item 9: I supervise field trips and industrial attachment ( $\bar{x}$ =2.97; SD=0.47). On the other hand, three items produced low mean scores which were below the weighted mean of 2.90. These items include item 2: I take part in seminars and tutorials ( $\bar{x}$ =2.83; SD=0.33), item 3: I organise laboratory sessions ( $\bar{x}$ =2.77; SD=0.27) and item 6: I take part in curriculum development ( $\bar{x}$ =2.07; SD=0.43). The weighted mean of 2.90 and above is considered as the mean rate of the teaching activities carried out by lecturers in the study areas. Above all, the highest mean score was discovered from item 8 on the supervision of research projects. This is not far from the fact that lecturers are expected to supervise students' (both undergraduate and postgraduate) projects, theses and dissertations before the exit of their programme. From the analysis, the study revealed that items 8, 7, 1 and 4 was strongly agreed, while items 5 and 9 was agreed by the respondents. On the other hand items 2, 3 and 6 were strongly disagreed as teaching activities carried out by lecturers.

**Table 2: Types of Digital Technology available for Teaching**

Digital Technologies	Name of Federal Polytechnics											
	Federal Polytechnic, Bida		Federal Polytechnic, Idah		Federal Polytechnic, Nasarawa		Federal Polytechnic, Nyak		Federal Polytechnic, Offa		Federal Polytechnic, Wannune	
	AV	NA	AV	NA	AV	NA	AV	NA	AV	NA	AV	NA
Laptops	√		√		√		√		√		√	
Smartphones	√		√		√		√		√		√	
Collaboration tools	√		√		√			X	√			X
Digital content creation tools such as Adobe spark	√			X		X		X	√			X
Video conferencing tools such as online quizzies, kahool and quiziz		X		X		X		X		X		X
Virtual whiteboards		X		X		X		X		X		X
Electronic smart boards		X		X		X		X		X		X
Learning management system such as Moodle	√		√		√			X	√			X
Digital camera	√		√		√			X	√			X
Digital pen		X		X		X		X		X		X
DVD Player	√		√		√			X	√			X
Projectors	√		√		√		√		√		√	
Smart boards		X		X		X		X		X		X

**Key: Available (√), Not Available (x)**

The result in Table 2 showed the types of digital technologies available and those not available in the federal polytechnics in North-central, Nigeria. Six (6) of the federal polytechnics had laptops, smartphones and projectors, while collaborative tools, digital camera and learning management system such as Moodle were available in only four (4) federal polytechnics (Bida, Idah, Nasarawa and Offa) respectively. Similarly, digital content creation tools such as Adobe spark were available in only two (2) federal polytechnics (Bida and Offa) respectively. On the other hand, video conferencing tools such as online quizzies, kahool and quiziz, virtual whiteboards, electronic smart boards, digital pen and smart boards were not available in all the six (6) federal polytechnics.

**Table 3: Extent of Utilisation of Available Digital Technologies by Lecturers for Teaching**

S/N	Statements	VHE 4	HE 3	LE 2	VLE 1	n 261	FX	$\bar{x}$	STD	Decision
1	I use digital technologies in preparing lecture notes	86	105	57	13	261	786	3.01	0.51	Agreed
2	I use digital technologies to surf through the Internet for research purposes in teaching students	122	103	30	6	261	863	3.31	0.81	Agreed
3	I use digital technologies to project lecture notes and for presentation by students	87	93	57	24	261	765	2.93	0.43	Agreed
4	I use digital technologies to access bulk of information on the world wide web	91	80	49	41	261	743	2.84	0.34	Agreed
5	I use digital technologies to carry out complex analysis	19	53	105	84	261	529	2.03	0.47	Disagreed
6	I use digital technologies with the use of electronic interactive smart boards for instructional delivery	29	40	120	72	261	548	2.09	0.40	Disagreed
	<b>Weighted mean</b>							<b>2.70</b>		

**Key: Very High Extent (VHE), High Extent (HE), Low Extent (LE), Very Low Extent (VLE)**

**n = Number of Retrieved Copies of Questionnaire,  $\bar{X}$ =Mean and (Weighted mean = 2.49)**

Table 3 showed the extent of utilisation of available digital technologies by lecturers for teaching. Out of the six items listed, four items listed produced high mean scores which were above the weighted mean of 2.70. These items include item 2: I use digital technologies to surf through the Internet for research purposes in teaching students ( $\bar{x}=3.31$ ;  $SD=0.81$ ), item 1: I use digital technologies in preparing lecture notes ( $\bar{x}=3.01$ ;  $SD=0.51$ ), item 3: I use digital technologies to project lecture notes and for presentation by students ( $\bar{x}=2.93$ ;  $SD=0.43$ ) and item 4: I use digital technologies to access bulk of information on the world wide web ( $\bar{x}=2.84$ ;  $SD=0.34$ ). On the other hand, two items produced low mean score below the weighted mean of 2.70 which are item 6: I use digital technologies with the use of electronic interactive smart boards for instructional delivery ( $\bar{x}=2.09$ ;  $SD=0.40$ ) and item 5: I use digital technologies to carry out complex analysis ( $\bar{x}=2.03$ ;  $SD=0.47$ ). The weighted mean of 2.70 and above is considered as the extent of utilisation of available digital technologies by lecturers for teaching and vice versa. Above all, the highest mean score was discovered from item 2 on the use of digital technologies to surf through the Internet for research purposes in teaching students. This is not far from the fact the lecturers are expected to update their knowledge by surfing through the Internet, library and other sources to gather materials that will enable them in their teaching and research. From the analysis, the study revealed that items 2 and 1 were strongly agreed, while item 4 and 3 were agreed by the respondents as the extent they utilise available digital technologies for teaching.

### Discussion

The findings of the study as regards to research question 1, revealed that lectures, organising seminars, workshops, laboratory sessions, project, field trips and industrial attachment supervisions, mentoring and advising students were teaching activities carried out by lecturers. Based on the teaching activities carried out by lecturers, the respondents indicated that the lectures organise workshops for students, assess and grade students' assignments, tests and examinations, mentor and advise students, supervise research projects and supervise field trips and industrial attachment.. This is in line with the findings of Danlami (2021) who posited that the various teaching activities carried out by lecturers include lecture delivery, discussions, giving assignments, setting examinations and test questions, grading assignment and examinations and providing feedback to students, supervising student projects, taking students to field trips, organising practical classes among others.

The findings of the study as regards to research question 2, six (6) of the federal polytechnics had laptops, smartphones and projectors, while collaborative tools, digital camera and learning management system such as Moodle were available in only four (4) federal polytechnics (Bida, Idah, Nasarawa and Offa) respectively. Similarly, digital content creation tools such as Adobe spark were available in only two (2) federal polytechnics (Bida and Offa) respectively. The availability of these digital technologies could be because they enhance effective teaching and learning. This is in line with the findings of Danlami (2021) who posited that technology integration in Education is a process by which lecturers plan and use technology purposefully and meaningfully to enhance teaching and learning rather than using it randomly, arbitrarily sporadically.

In response to research question 3, the extent of utilisation of available digital technologies by lecturers for teaching is moderate. The respondents revealed that they use digital technologies in preparing lecture notes, to surf through the Internet for research purposes in teaching students, for projecting lecture notes and for presentation by students and use digital technologies to access bulk of information on the World Wide Web.

However, majority of the respondents disagreed that they use digital technologies to carry out complex analysis and use digital technologies with the use of electronic interactive smart boards for instructional delivery. This could be because the lack experience with the use of digital technologies for teaching and instruction delivery. This is in line with the findings of Ajuwon *et al.* (2016) that despite the advantages of digital technology, many lecturers experience a lack of training opportunities to help them to fully understand how to use and implement the digital technology with their students.

### Conclusion

In conclusion, the roles of digital technologies in teaching cannot be underestimated because digital technologies is helping to solve many problems in the educational institutions especially the polytechnic system. The availability of digital technologies for teaching is low. The extent of utilisation of available digital technologies by lecturers for teaching is moderate. Lecturers revealed that they use digital technologies in preparing lecture notes, surf through the Internet for research purposes in teaching students, project lecture notes and for presentation by students and use digital technologies to access bulk of information on the World Wide Web.

### Recommendations

1. The management of federal polytechnics in North-central, Nigeria should develop programmes through conferences, workshops and seminar organised for lecturers to enhance their teaching

activities as well as learning process of students especially with the usage of digital technologies.

2. The management of federal polytechnics in North-central, Nigeria should provide adequate digital technologies such as online quizzies, kahool and quiziz, virtual whiteboards, electronic smart boards, digital pen and smart boards in order to enhance effective teaching activities. This will enable lecturers and students to develop critical thinking, problem-solving, communication, collaborative skills and knowledge.
3. The management of federal polytechnics in North-central, Nigeria should provide digital technologies for all lecturers at a subsidised rate so that they can effectively make adequate use of these technologies for teaching. Also, digital technologies such as electronic interactive smart boards should be provided in classrooms/lecture rooms and computer laboratories. When these measures are taken, there will be an increase in the extent of utilisation of digital technologies for teaching.

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