INFORMATION AND COMMUNICATION TECHNOLOGY AS AN ENABLER FOR SMART COLLABORATION TOOLS IN THE USES OF LIBRARY

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Abstract

Technological advancements have been greatly felt in virtually every sphere of human society. Libraries are no exception to this trend and the need for libraries to embrace this change is pertinent to their survival. Information and Communication Technology (ICT) has impacted on every sphere of academic library activity especially in the form of the library collection development strategies, library building and consortia. ICT has brought unprecedented changes and transformation to academic library and information services, conventional LIS such as OPAC, user services, reference service, bibliographic services, current awareness services, document delivery, interlibrary loan, audio visual services, and customer relations can be provided more efficiently and effectively using ICT, as they offer convenient time, place, cost effectiveness, faster and most-up-to-date dissemination and end users involvement in the library and information services process. This paper focus on Information and communication technology as an enabler for smart collaboration tools in the uses of libraries. Based on the findings, this study recommended among others that fund should be provided to libraries on regular basis. In addition to this, the Nigerian government, should strive to permanently solve the challenges confronting the power sector, the librarians must become higher system thinkers and fully equip themselves to work in digital and computer environment.

Keywords: *Academic Achievement, E-learning, Secondary School, Students, Pearson*

Introduction

A nation without functional libraries and information centres may lack access to information that would enable her sustainable development. In this era of globalization, in which the world is connected, information gains its power through permanent storage and wide distribution, which could be achieved through Information and Communication Technology (ICT). According to Janakiraman and Subramaniah (2015), the world now experiences a digital scenario in which ICT has changed the possibilities of the library job promotions and has brought changes to expected library performances. ICT is the application of technologies consisting of hardware, software, network and media for collection, storage processing transmission and presentation of information in vocal, textual, pictorial and multimedia formats (Igwe, 2011). ICT is a term used in the library to refer to application of computers and other technologies to library practices such as acquisition, storage, organization, and dissemination of information. The world has become a global village and with ICT, many library users now have access to vast sea of information, without necessarily investing much time or energy. The process of general and distribution of information is now being facilitated using Information and Communication Technology (ICT).

Aina, Okunnu and Dapo-Asaju (2014) postulated that ICT is a term used to describe the ability to access information with the use of telecommunication-based internet resources. ICT provides the ability to create, organize, manipulate, and access information from remote locations across the globe, within a short time. ICT involves incorporation of a range of technologies that are used to support communication and information dissemination. Saidu, Tukur and Adamu (2014) described ICT as the use of computer-based technology and internet for making information and communication services available to a wide range of users. The term is broadly used to refer to a range of technologies including telephones, e-mail and so on. Central to the range of technologies is the internet, which provides the mechanism for transporting data in several formats such as text, images, sound, and video. ICT is system that enables information to be collected, analyzed, processed, and disseminated.

Olise (2010) opined that information communication technologies (ICTs) are new technologies that cannot be ignored in Africa. He further identified that ICTs are significant tools that must be employed to achieve and sustain

development. Information Communication Technology (ICT) has remained a catalyst in the issue of national advancement and development. Information, as power is effectively an infinite resource and a vital tool needed for the development of all sectors in any nation. It is, therefore, imperative that application in libraries would go a long way in satisfying the information need of the citizens. It is worthy of note, that the emergence of ICT has impacted greatly on the quality of information provided through libraries. It also enables proper and adequate provision of library services to library users from all disciplines. In this 21st century, the drastic role of ICT in library operations cannot be over emphasized. Many library routines and operations that were initially performed manually are now being converted to computerized operations which means, applications of ICT techniques to providing better and faster services to the end users.

The use of ICT improves access to digital information, narrows down the digital divide and improves standard of living. Adoption of ICT in libraries is a way of improving on information services provided in libraries. This is an era, when people need to access timely information with ease, and this can only be done through the application of ICT to library services. It is also a way of contributing to sustainable development of the nation, since timely and effective provision of useful information can assist in building up a society ICT as an enabling tool, assist libraries in provision of information, which is very paramount to development of the various sectors in the nation. Libraries are playing a very important role facilitating access to global information and knowledge resources, using ICT. Apparently, ICTs are indispensable tools needed for provision of value-added information that support the sustainable development. Although, many institutions and organizations including libraries face diverse challenges in the process of integrating ICTs to their services. Nevertheless, information provision is paramount to development and growth of any nation. It is therefore important that, effort is made to enable usability of ICTs in all sectors, of the nation ICT and library services. Therefore, this paper focus on Information and communication technology as an enabler for smart collaboration tools in the uses of libraries.

Concept of the Library

According to Akinlubi and Agbato (2016) Libraries in tertiary institutions are known as academic libraries, they have grown alongside with the institutions of learning. The library is principally concern with the collection, processing, storage, and dissemination of recorded information for use. With the global trend of Information and Communication Technology (ICT) there are significant changes from traditional repository, manual service delivery to a more dynamic technology driven environment where information is transmitted instantaneously, creating conducive environments for education, and promoting literacy by offering relevant and attractive reading material (printed and electronic) for all ages in the society are functions of effective libraries (Omehia, 2018).

Some of the ICT-based services that are provided by libraries.

The advent of ICT is indeed a boost to the library services as it now assists many librarians to use their ICT potentials to reach out to library users. Chisenga (2004) identified some of the ICT-based services that are provided by libraries as follows:

Provision of web access to OPAC: Libraries are providing access to web based Online Public Access Catalogue (OPAC) interfaces. The OPAC makes it easier for users to access and use information resources. OPAC is the computer form of library catalogue, to access materials in the library (Afolabi and Abidoye, n.d.)

Electronic Document Delivery: Libraries implement ICT-based interlibrary lending system, with electronic networks for documents delivery. In essence, the Document Delivery Service (DDS) enables a library to use copies of research papers or other research document, from other libraries. These documents could be journal articles or other documents in digital format. They are mainly in portable document format (PDF) and they delivered to library users' desktops.

Online Instruction/User Education: There is implementation of online based bibliographic library user programmes such as online tutorials on searching online resources and virtual tours of library collections. Libraries can also use internet or Compact Disc Read Only and Memory (CD ROM) to educate users.

Online Readers Advisory Services: Libraries now implement web-based versions of reader's advisory services to include informing users about new acquisitions, provide reviews and recommendations and so on in using the web.

Networked Information Resources: Libraries now provide users with access to networked information such as database, electronic scholarly journals, and other publications from various publisher. The services rendered in a library differ from one library to another, depending on the type of library, the type of patrons and the parent body's objectives. Other library services as highlighted by Idowu (2011) include: Reference Service, Current Awareness Services (CAS), Selective Dissemination of Information (SDI), Reprographic Service, Exhibition and Display, Technical Services, Serials Control, Computerized Interactive Search and Borrowing, Renewing and Reserving.

Reprographic Technology: These are widely used in libraries globally. Reprographic machines are provided in libraries to ease photocopying of documents on demand and for copyright protection.

Library Retrieval System: This involves the use of Compact Disc Read Only Memory (CDROM), a technological mechanism for acquisition of specialized CD-ROM databases in various discipline such as law, sciences, medicine technology, agriculture, humanities and so on.

Indexing and Abstracting Services: It is a service that is carried out to provide summaries of documents and to assign descriptors for referencing documents.

Institutional Repositories: It is an online archive for collection, preservation, and dissemination of digital copies of the intellectual output of academic or research of institution, this could be journal articles as well as digital versions of theses and dissertations. This service is mostly provided in academic or research libraries.

Document Scanning Services: Scanner is important equipment in modernization of library. It is useful for scanning text, image and content page of books and providing great help for establishing digital and virtual library.

Benefits of Information and Communication Technology (ICT) in Libraries

According to Olise (2010), the introduction of ICTs in education had brought about computerization of traditional materials such as books, journals newspaper and other information resources in the library. This has also led to the existence of virtual library. Educational researchers, using ICT users can access current literature materials with ease. ICTs also encourage collaboration among researchers irrespective of their locations. Internet provides up-to-date information on any subject. Likewise, earlier research findings can be easily accessed through the internet. In the area of agriculture, ICTs are being used to provide farmers with information as regards their plants and animals, which will eventually improve their productivity. On professional duties, computers are used to automate different manual functions.

Acquisition, cataloguing of library materials, circulation, circulation, and serials management are now automated in libraries, using available software in the market. ICTs enable libraries to locate store, retrieve and disseminate information. ICT tools such as CD-ROM, e-mail is used in libraries for dissemination of information. In addition, digitization of information resources which involves converting print resources to electronic form is also carried out, using ICT.
Other benefits of ICT in libraries as stated by Ashikuzzaman (2014) include: Provision of speedy and easy access to information, Provision of remote and round the clock access to users, Provision of access to unlimited information from different sources, ICT enable easier, faster, cheaper and more effective library operations, ICT helps to manage information overload as information retrieval is made easier in computerized systems and Computerization helps the library to save space and reduce paper.

There is no doubt that integration of ICT into provision of library services can bring great benefits to the entire community and nation. ICT which remains an enabling tool for provision of timely and current library and information services is also indispensable to the sustainable development drive in Nigeria (Nwabueze and Ozioko, 2011) ICT can be applied to every aspect of human endeavor to achieve result-oriented service delivery.

In his study, Olise (2010) found out that majority of the respondents see ICTs as significant tool for sustainable development in Africa. The respondents believed that ICTs improve education and other sectors' services. Using ICT tools, enable organizations and institutions to provide services more effectively.

ICT Tools for enable smart collaboration in the uses of Libraries

ICT as aggregate of computers, telecommunication gadgets, multi-dimensional resources and other related technologies are applied and utilized in the total process of information management and dissemination. The various components of ICT have provided a facelift for the support of varying professional services. Nwabueze and Ozioko, (2011); Umana (2018) identified the following primary ICT tools as imperative in actualizing Nigeria's sustainable development goal. Likewise, the same ICT tools are paramount to effective delivery of library services. The ICT tools include:

1. Computers: These are essential management tools which can be used to handle different operations more efficiently. Computers can be used for various activities such as information generation, processing, storage, analyzing and information dissemination for sustainable development. The use of computers in the library is noted with great assets such as speedy information transmission, cost effectiveness and optimal utilization of available resources. Other computer accessories include Compact Disc (CDs), Flash drive and so on. The computers are used to perform various library operations and routine such as ordering/acquisition, circulation e.t.c.

2) **The Internet:** This ICT resources is a means to speedy flow of information. It is a network of computers, communicating with others, often via telephone line. The internet provides a worldwide platform for information sharing among individuals, institutions, and organizations. The use of internet enables the provision of current and useful information to enhance productivity and good governance.

3) **Electronic Mail (E-mail):** This is the most widely used resource of the internet. It is used for sending and receiving of messages otherwise known as mails. The messages are communicated through electronic device. E-mail enables faster and cheaper organizational communication.

4) **World Wide Web (WWW):** This is also an internet- based resource. Websites help individuals, organizations or institutions find products or information and transacts business. Relevant information is made available to members of the public through the websites of many organizations or institutions. Being on the web, places any nation or organization on the right cause of speedy and sustainable development in line with emergence of changes in technology, economic and political area.

5) **Video Conferencing:** This enables people at different locations to hold conferences by data communication network. It is convenient and less expensive for conducting a conference between two or more participants situated at different remote location (Mishra and Mishra, 2014).

6) **Printing Technology:** A printer is a device that converts computer output into printed images. There are different kinds of printers used in library. They include Laser printer, Inkjet Dot-matrix printer and so on.

7) Online Public Access Catalogue (OPAC): It is the computer form of library catalogue to access information materials in the library. It is an online database of materials held by a library or group of libraries. It is a computerized library catalogue made available to the public. Most OPACs are accessible over the internet to users all over the world (Mishra and Mishra, 2014).

Challenges of Using ICT for Provision of Library Services

There is awareness that a lot of benefits are derived, through the adoption and use of Information and Communication Technologies (ICTs) in libraries, nevertheless, there are many challenges to be addressed. These include:

• **Limited Financial Resources:** The acquisition and maintenance of the relevant equipment depends on the availability of fund. Mostly, there is paucity of funds in many libraries in Nigeria thereby, leading to inability to

acquire, the necessary ICTs that would enable them to connect to the internet, make subscription to various online database and obtain software licenses.

• **Shortage of ICT Facilities and ICT Skills:** The computers are used to receive and store large volumes of information. Likewise, the internet accessibility is made possible using computer, they are used to access Online Public Access Catalogue (OPAC) and also to perform many other routine activities in the library. Shortage of computers and other facilities remains a big challenge to many libraries. Many librarians also lack the ICT skills, and this makes it difficult for them to embrace technological innovations. Lack of ICT skills places a serious restriction on the application of ICT to provision of library services.

Most African countries do not have workable ICT policies which are to act as guideline for implementation of development plans and strategies. When ICT policies are not available or adequately implemented, it can affect the sustainability of a nation's development.

Lack of ICT Policies: There is lack of systematic ICT policy in developing countries and it impedes the deployment of ICTs (Afolabi and Abidoye, n.d).

Poor maintenance of ICT Equipment: Many libraries do not have space and conducive environments for keeping ICT equipment. In addition, most of the ICT equipment are not adequately maintained in most libraries because of the maintenance cost which is usually very high. Also, because of lack of maintenance culture.

Erratic Power Supply: In developing countries, large areas are still without a reliable supply of electricity (Said, Tukur and Adamu, 2014). Other challenges are; • Insufficient bandwidth, Lack of technical IT knowledge by library staff, Constant change of software and hardware, Copyright, and intellectual property right management.

Conclusion

Provision of library services with the aid of ICT is a crucial effort towards sustainable development and smart collaboration in Nigeria. Efforts must be made to provide the right information at the right time for libraries to remain agents that will facilitate sustainable development. With the presence of ICT, the objectives of libraries will not only be achieved, but will also help libraries to compete with their counterparts in the developed world. Developing countries like Nigeria must recognize ICT as key strategic tool for sustainable development.
Organizations, institutions including libraries must be supported and encouraged to embrace and utilize ICT for effective delivery of service. The concept of library and information center as it was in early days has totally changed to the extent that libraries are adopting ICT for providing services to the library patrons. With the aid of ICT, libraries are marching towards achieving the goal of providing exhaustive and expeditious information to those who need that information. Providing information services which are more convenient, better accessible and cost effective was because of information generation, collection and organization are differ in most developing countries.

In this study, an attempt has been made to determine the extent of the use of information technologies in library service. It is, however, necessary to mention that the IT has been tremendously influencing all spheres of our life. The use of such new technologies in Bangladesh has also been profoundly affecting the information use patterns and behaviors of library user, dramatically changing the mode of library information and services, and especially with major impacts in audio visual markets, education and training field, research literature, publishing and so on. Unprecedented changes in the use of information are reshaping our personnel activities, our community, and organizational practices as ITs bring the global information to our finger end in the 21st century. The trends in technology are unrelenting, new gadgets and services keep flocking into the market with possibilities for new services unending. New technologies offer possibilities for reach and collaboration that hitherto would have been impossible with the relationship with the patrons is the only way of helping them.

Recommendations

Based on the conclusions above, it is recommended that:
1) Fund should be provided to libraries on regular basis. All libraries, irrespective of the type need strong financial support from the government.

2) Provision of standards standby generator in libraries, to serve the computers and other ICT facilities in case of power outage. In addition to this, the Nigerian government, should strive to permanently solve the challenges confronting the power sector.

3) The librarians must become higher system thinkers and fully equip themselves to work in digital and computer environment.

4) The Nigeria Library Association (NLA) and National Library of Nigeria (NLN) must encourage and ensure that libraries acquire ICT tools for effective library operations and information disseminations.

5) Policies that would encourage the deployment and development of ICTs in all institution should be formulated and implemented for the nation's development to be sustained.

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INFORMATION LITERACY SKILLS AND ICT USAGE AS DETERMINANTS OF OPEN EDUCATIONAL RESOURCES USE AMONG UNDERGRADUATES IN EKITI STATE, NIGERIA

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Abstract

The study examined information literacy skills and ICT usage as determinants of open educational resources use among undergraduates in Ekiti State, Nigeria. Descriptive survey research design was adopted in the study. The participants were 315 undergraduates in the three universities in Ekiti State which included (male = 126, female = 189) who were randomly selected. Questionnaire tagged Information Literacy skills ICT Use Open Educational Resources Questionnaire" (ILSIUOERQ) was the instrument that was used in data collection. Descriptive statistics of frequency counts and simple percentages, mean and standard deviations and Inferential statistics of Pearson's product moment correlation was used to analyse the data at 0.05 level of significance. The result revealed that the level of awareness of OER among undergraduates was moderate $(\bar{x} = 2.97)$*. The level of usage of OER among undergraduates in was moderate* $(\bar{x} = 2.62)$*. The level of information literacy skills among undergraduates was moderate* $(\bar{x} = 2.56)$*. Information overload* $(\bar{x} = 2.90)$*, intermittent power supply* $(\bar{x} = 2.67)$*, poor internet access* $(\bar{x} = 2.86)$*, difficulty in locating relevant OER materials* $(\bar{x} = 2.87)$ *were some of the challenges encountered by undergraduates in the use of OER. Positive significant relationship was found between information literacy skills and use of open educational resource (r = 0.448; p<0.05), ICT use and use of open educational resource (r = 0.226; p<0.05). It was recommended that undergraduates should be given adequate orientation on OER availability in institutions and ways to access them to improve their level of comprehension.*

Keywords: Information literacy skills, ICT use, Open Educational Resources, Undergraduates, Nigeria

Introduction

Teaching, learning, and research materials in any medium digital or otherwise that reside in the public domain or have been released under an open license that permits no cost access, use, adaptation, and redistribution by others with no or limited restrictions," (Hewlett Foundation, 2016). OERs could be described as "any educational resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials designed for use in teaching and learning) that are openly available for use by educators and undergraduates, without an accompanying need to pay royalties or license fees. OER facilitates all components of e-learning be it online learning, students' assessment process, admission, and other administrative issues. The use of OER is not restricted to eLearning contexts or distance education alone. OER can be used online or in traditional classrooms. Since Open Educational Resources are freely available and their usage and adaption are encouraged under the creative common license, undergraduates can reuse the contents in open courseware and other educational resources (Koenig, 2020). The types of OERs include full courses, course materials, modules, textbooks, streaming media, tests, software, and other tools, and/or techniques used to support access to knowledge. Undergraduates benefit from having course content available with zero costs and a wealth of resources available to them (Jurado & Pettersson, 2020).

One of the variables that could enhance the use of OER is information literacy skills. Information literacy skills refer to the ability to find, evaluate, organize, use, and communicate information in all its various formats, most especially

in situations requiring decision making, problem solving or the acquisition of knowledge. Undergraduates need a level of these skills to enhance their use of open educational resources. Undergraduates' ability to find and retrieve information effectively is a transferable skill that is useful for effective usage of OER which could make them to gather information that would be useful for their academic works (Akpovire, Olawoyin, Adebayo & Ugwunwa, 2019). ICT use refers to the use of all communication technologies, including the internet, wireless networks, cell phones, computers, software, social networking and other media applications and services which enable users to access, retrieve, store, transmit and manipulate information in a digital form. The use of ICT has provided a solid foundation for revolutionary changes in academic libraries and information centres information handling capabilities among undergraduates (Bhangu, 2013). Consistent use of ICT could make undergraduates to be aware and use open educational resources where they could gain access to information that could be relevant to their academic works.

Statement of the Problem

Open educational resources (OER) have proven to aid educational development with technology enabled resources and provision thus it is expected to be well managed in every institution that serves as its repository thereby encouraging the potentiality of undergraduates' utilisation for recreational, retain, reuse, redistribute, remix, and adapt. Studies and observations suggest that awareness, development, and adoption of open educational resources policy in Nigerian universities appear to be low. However, literature has also revealed that undergraduates have low information literacy skill, and their use of ICT skills is not encouraging which could hinder their ability to access and use open educational resources. In addition, some undergraduates may want to use OER but some factors such as poor internet connection, erratic power supply, and lack of ICT search skills among others. If these problems persistent in the Nigerian universities, it could debar the needed academic information that could be useful for undergraduates to augment their academic works. There is, however, a dearth of studies on OER awareness and usage among undergraduates in Nigeria and this is the gap the current study intended to fill by examining information literacy skills and ICT use on the use of open education resources among undergraduates in Ekiti State, Nigeria.

Objectives of the Study

The study investigated information literacy skills and ICT use as determinants of open educational resources use among undergraduates in Ekiti State, Nigeria

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Research Questions

The following research questions guided the study:

1. What is level of awareness of OER among undergraduates in Ekiti State?
2. What the level of usage of OER among undergraduates in Ekiti State?
3. What is the level of information literacy skills among undergraduates in Ekiti State?
4. What are the challenges encountered in the use of OER among undergraduates in Ekiti State?

Review of Related Literature

OER was first used by UNESCO in 2002 at its forum on the impact of Open Courseware for Higher Education in Developing countries and has since then gained significant prominence in recent years throughout the world (Hew & Cheung (2013). Types of OER include lessons, modules, full courses/programmes, guides, e-texts, articles, audio tracks, videos, multimedia, and any other learning materials. OER has been designed to support learning by providing easy accessibility, and potential to reduce barriers to learning through enhanced attention, motivation, and engagement of students (Baloyi, 2014). Downes (2016) defined OER as materials used to support education that may be freely accessed, reused, modified, and shared by anyone. Onaifo (2016) investigated the use of OER among University of Lagos students and found that undergraduates use OER majorly for their academic works. Similarly, Gambo (2017) assessed the use of open educational resources and printed educational materials among students at federal college of education Katsina, Nigeria and revealed 47% of the undergraduates had access to OER majorly to prepare for examination and to solve their assignment. Hu, Li, Li & Huang (2015) investigated the use of open educational resources among undergraduates in China using survey design and purposive sampling. Result revealed that the level of usage of OER among undergraduates was moderate. The author affirmed that lecturers should give their students more assignment that requires the use of OER. Haas, Ebner and Schön (2018) investigated the use of open education resources among undergraduates in Pakistan adopting the descriptive survey design and simple random sampling. One hundred and fifty-five students were used in the study and questionnaire was the instrument used in the collection of data. Result revealed that undergraduates were aware of the use of open educational resources.

In a more recent study conducted by Itasanmi (2020) on OER awareness and usage among 523 (ODL) Open Distance Learning students in Southwestern Nigeria, using descriptive research design. The result of the study revealed that OER awareness among ODL students was on the average while OER usage was high. Lack of orientation on the availability and use of OER and insufficient ICT facilities in the school to access OER materials, amongst others were challenges ODL students faced using OER. The author recommended that there should be conscious efforts by ODL institutions to devise means to increase the level of OER awareness among students and sensitise them on the inherent benefits in OER usage. Issa, Ibrahim, Onojah & Onojah (2020) examined attitude towards the utilisation of open educational resources among 387 undergraduates using descriptive method of the quantitative research. Finding revealed that undergraduates have a positive attitude towards utilization of OER for learning. It was recommended that institutions should endeavor to create their own OERs where students can access anytime and anywhere. In another study conducted by Bradley (2020) on the influence of information literacy skills on open educational resources among 165 undergraduates in US adopting descriptive survey design, questionnaire was used in the collection of data and result revealed that there was significant relationship between information literacy skills and open educational resources.

Harsasi (2015) examined the impact of ICT use on open educational resources among 178 undergraduates in Turkey using descriptive design, questionnaire was the instrument used in the collection of data and result revealed that there was significant relationship between ICT usages on open educational resources. The authors affirmed that the ability

of undergraduates to use ICT effectively could enhance OER and consequently boost their academic activities. Lin (2019) examined the awareness of OER among undergraduates in China adopting descriptive survey design. Questionnaire was used in the collection of data and result revealed that the level of usage of OER among undergraduates was moderate. The author affirmed that Undergraduates should be encouraged by their lecturers to use Open Educational Resources which could enhance their academic work. Akomolafe (2014) examined the utilisation of open educational resources among undergraduates in Nigerian's universities using the descriptive survey design and questionnaire was the instrument used in the collection data. Result revealed that some of the challenges encountered by undergraduates in the use of OER were lack of ICT facilities, poor internet access, Inadequate ICT skills to search for needed OER materials and Difficulty in locating relevant OER. The author affirmed that ICT facilities for easy access to OER materials, including reliable internet, should be provided by ODL institutions to increase the level of OER usage.

An investigation of postgraduate students' information literacy skills at Babcock University carried out by Omeluzor, Bamidele, Onuoha and Alarape, (2013) affirmed that postgraduate students have a moderate level of information literacy skills, even though majority indicated difficulty accessing and retrieving information from external databases, as well as using the online public access catalogue. Streatfield and Markless, (2018) found that information literacy impacts use of library resources and in the long run higher education performance. Students who possess information search skills in today information technology world are more likely to engage in the use of e-resources to improve the quality of their academic work.

Methodology

The study adopted the descriptive method of the quantitative research. Descriptive survey design would best suit this study as a large sample can be selected from the total population to describe a characteristic of that population. The population of the study comprised all undergraduates of the three universities in Ekiti State, Nigeria. Three faculties namely faculty of Natural Science, faculty of Management Sciences and faculty of Human and Social Sciences was selected purposively as these are the three common faculties among the three universities. The population the undergraduates from the three faculties were 1, 054. Distribution of samples per university was done using proportionate sampling technique. Three hundred and fifteen (315) samples were randomly drawn across the three selected faculties. A questionnaire titled Information Literacy skills ICT Use Open Educational Resources Questionnaire" (ILSIUOERQ) was used in the collection of data. It is divided into two parts, part A elicited for demographic information from the respondents, part B seeks to get information based on undergraduates information literacy use, ICT use and use of Open Educational Resources using a four scale response format Strongly agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) to answer questions on open educational resources and ICT use while Very high (VH), High (H), Low(L) and Very low(VL) was used to answer information literacy skills. The questionnaire was subjected to both face and content validity to check if the items are in-line with the major purposes of the research by two academic staff from the College Library, Emmanuel Alayande College of Education College of Education, Oyo after they deemed it fit to be validated. Their advice and suggestions which includes merging of

some items together, rewording of some items, removal of few items that are not in line with the purpose and a few more others were all used to modify the questionnaire to produce a final draft. A pilot study was conducted to ascertain the reliability of the questionnaire by administering thirty copies to undergraduates of university of Ibadan. The Cronbach alpha coefficient reliability value was 0.81. The researcher with the aid of two research assistants visited the faculties chosen for the study to administer copies of the questionnaire to the undergraduates having sought for permission from the various authorities involved. Once the questionnaires have been distributed and they have been filled, they were retrieved immediately and further analyzed. Descriptive statistics of frequency counts, percentages and mean were used to answer research questions 1-4 while inferential statistics of Pearson product moment correlation (PPMC) was used to test hypotheses 1 and 2 at 0.05 level of significance.

Results

Table 1:
Demographic Characteristics of the Respondents

Variables		**Frequency**	**Percentage**
Gender	Male	126	40.0
	Female	189	60.0
Level	100	49	15.6
	200	74	23.5
	300	113	35.9
	400	67	21.3
	500	12	3.70

Table 1 revealed that 126 (40%) were males and the remaining 189 (60%) were females. This means that females participated more in the study. Also, 49 (15.6%) were in 100 level, 74 (23.5%) were in 200 level, 113 (35.9%) were in 300 level, while 67 (21.3%) were in 400 level and the rest 12 (3.7%) were in 500 level. This means that respondents who were in 300 level were more represented in the study.

Research question 1: What is level of awareness of OER among undergraduates in Ekiti State?

Table 2:
Level of awareness of OER among undergraduates in Ekiti State

Items **I am aware:**	$\bar{x}$
that I can find OER in the library	2.70
that OER are free to use	3.03
that many OER are created by instructors from respected and well-known schools across the world	3.11
I can find OER using my mobile phone	2.14
that teaching learning video session could be watched online	3.17
I can access OER from anywhere	3.65

Table 2 shows the level of awareness of OER among undergraduates in Ekiti State. It shows that I can access OER from anywhere $(\bar{x} = 3.65)$ was ranked highest by the mean score rating and was followed in succession by that teaching learning video session could be watched online $(\bar{x} = 3.17)$, that many OER are created by instructors from respected and well-known schools across the world $(\bar{x} = 3.11)$, that OER are free to use $(\bar{x} = 3.03)$, that I can find

OER in the library ($\bar{x} = 2.70$), and lastly I can find OER using my mobile phone ($\bar{x} = 2.14$). The weighted mean is 2.97, it could be inferred that the level of awareness of OER among undergraduates in Ekiti State is moderate.

Research question 2: What the level of usage of OER among undergraduates in Ekiti State?

Table 3:
Level of usage of OER among undergraduates in Ekiti State

Items	$\bar{x}$
OER enables me to prepare for tests and exams	2.76
I get relevant learning materials online	2.41
I use OER to update my knowledge on a particular topic or area of research	3.41
I use OER for personal study	2.33
OER enables me to learn at my own pace	2.17

Decision Rule*: High=3.00-4.00, Moderate=2.00-2.99, Low=1.99-0.01*

Table 3 shows the level of usage of OER among undergraduates in Ekiti State. It reveals that I use OER to update my knowledge on a particular topic or area of research ($\bar{x} = 3.41$) was ranked highest by the mean score rating and was followed in succession by OER enables me to prepare for tests and exams ($\bar{x} = 2.76$), I get relevant learning materials online ($\bar{x} = 2.41$), I use OER for personal study ($\bar{x} = 3.03$), and lastly OER enables me to learn at my own pace ($\bar{x} = 2.17$). The weighted mean is 2.62, it could be inferred that level of usage of OER among undergraduates in Ekiti State is moderate.

Research question 3: What is the level of information literacy skills among undergraduates in Ekiti State?

Table 4:
Level of information literacy skills among undergraduates in Ekiti State

Items	$\bar{x}$
I can initiate how and where to find the information I need	2.52
I find it easy to locate information sources	2.64
I can select the information that is most appropriate to my needs	2.60
I can select search strategies by date, subject, and language	2.60
I can use information to answer questions and/or solve problems	2.44

Decision Rule*: High=3.00-4.00, Moderate=2.00-2.99, Low=1.99-0.01*

Table 4 shows the level of information literacy skills among undergraduates in Ekiti State. It reveals that I find it easy to locate information sources ($\bar{x} = 2.64$) was ranked highest by the mean score rating and was followed in succession by I can select the information that is most appropriate to my needs and I have the ability to select search strategies by date, subject and language ($\bar{x} = 2.60$) respectively, I can initiate how and where to find the information I need ($\bar{x} = 2.52$), and lastly I have the ability to use information to answer questions and/or solve problems ($\bar{x} = 2.44$). The weighted mean is 2.56, it could be inferred that level of information literacy skills among undergraduates in Ekiti State is moderate.

Research question 4: What are the challenges encountered in the use of OER among undergraduates in Ekiti State?

Table 5:
Challenges encountered in the use of OER by undergraduates

Items	$\bar{x}$
Lack of orientation on the availability and use of OER to support learning	2.27
Intermittent power supply	2.67
Poor internet access	2.86
Inadequate/Lack of ICT skills to search for needed OER materials	2.63
Information overload	2.90
Insufficient ICT facilities in the school to access OER materials	2.70
Difficulty in locating relevant OER materials	2.87

Table 4 shows the challenges encountered in the use of OER among undergraduates in Ekiti State. It reveals that Information overload $(\bar{x} = 2.90)$ was ranked highest by the mean score rating and was followed in succession by difficulty in locating relevant OER materials $(\bar{x} = 2.87)$, Poor internet access $(\bar{x} = 2.86)$, Insufficient ICT facilities in the school to access OER materials $(\bar{x} = 2.70)$, Intermittent power supply $(\bar{x} = 2.67)$, inadequate/lack of ICT skills to search for needed OER materials $(\bar{x} = 2.63)$ and lastly lack of orientation on the availability and use of OER to support learning $(\bar{x} = 2.27)$. It could be inferred that the major challenges encountered by undergraduates in the use of OER include; information overload, intermittent power supply, poor internet access, difficulty in locating relevant OER materials, insufficient ICT facilities in the school to access OER materials and inadequate/lack of ICT skills to search for needed OER materials

Discussion of Findings

Result from research question one revealed that level of awareness of OER among undergraduates in Ekiti State is moderate. This means that some of the undergraduates are not fully aware of OER. The finding corroborates that of Itasanmi (2020) who conducted a study on OER awareness and usage among 523 open distance learning students in Southwestern, Nigeria and reported that OER awareness among ODL students was on the average. The authors affirmed there should be conscious efforts by ODL institutions to devise means to increase the level of OER awareness among students and sensitise them on the inherent benefits in OER usage. The finding also supports that of Haas, Ebner and Schön (2018) who investigated the use of open education resources among undergraduates in Pakistan and reported that undergraduates were aware of the use of open educational resources.

Result from research question two revealed that the level of usage of OER among undergraduates in Ekiti State is moderate. The finding validates that of Hu, Li, Li & Huang (2015) who investigated the use of open educational resources among undergraduates in China and reported that the level of usage of OER among undergraduates was moderate. The finding also validates that of Lin (2019) who examined the awareness of OER among undergraduates in China and reported that the level of usage of OER among undergraduates was moderate. The author affirmed that Undergraduates should be encouraged by their lecturers to use Open Educational Resources which could enhance their academic work.

Result from research question three revealed that the level of information literacy skills among undergraduates in Ekiti State is moderate. The finding goes in line with that of Omeluzor, Bamidele, Onuoha and Alarape, (2013) who

affirmed that students have a moderate level of information literacy skills, even though majority indicated difficulty accessing and retrieving information from external databases, as well as using the online public access catalogue.

Result from research question four showed that the major challenges encountered by undergraduates in the use of OER include information overload, intermittent power supply, poor internet access, difficulty in locating relevant OER materials, insufficient ICT facilities in the school to access OER materials and Inadequate/Lack of ICT skills to search for needed OER materials. The findings lend credence to that Akomolafe (2014) who examined the utilisation of open educational resources among undergraduates in Nigerian's universities and reported that some of the challenges encountered by undergraduates in the use of OER were lack of ICT facilities, poor internet access.

Results from hypotheses one showed that there is significant positive relationship between information literacy and open educational resources by undergraduates. The finding corroborates that of Bradley (2020) who examined the influence of information literacy skills on open educational resources among 165 undergraduates in US and reported that there was significant relationship between information literacy skills and open educational resources. Hypothesis two revealed that there is significant positive relationship between ICT use and open educational resources by undergraduates. The finding validates Harsasi (2015) who examined the impact of ICT use on open educational resources among 178 undergraduates in Turkey and reported that there was significant relationship between ICT use on open educational resources.

Conclusion

In current technological age, using OER has been quite beneficial to educational progress. The use of open educational resources (OER) has greatly improved the quality of university education in Nigeria. In this region of the world, maximum use of OER has yet to be achieved, because despite the high level of understanding of OER usage in industrialized countries, undergraduates in Nigeria still have a moderate degree of awareness and use of OER. Nigeria should aspire to contribute to the development of OER, as well as to participate in improving the quality of OER, as developed countries continue to gather momentum in developing more OER and raising the quality of OER. Nigeria should not only desire to consume technology resources, but also to aspire to contribute to the development of OER and to improve the quality of OER. Students' academic performance improves when they use electronic resources because they have access to updated knowledge. Based on the outcomes of this study, it is possible to conclude that information literacy skills and ICT use could improve undergraduates' utilization of open education resources.

Recommendations

1. University management should make a concerted effort to devise ways to raise OER knowledge among students and sensitize them to the inherent benefits of OER use.
2. Open and remote learning students should be given adequate orientation on OER availability in institutions and ways to access them to improve their level of comprehension.

3. Lecturers should encourage undergraduates to use Open Educational Resources because of the multiple advantages it provides for studying and research.

4. To boost the degree of OER utilization among undergraduates, universities should provide the necessary ICT facilities for simple access to OER materials, including stable internet.

5. The institution should make connecting to the internet and making the facilities available to undergraduates a top priority

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TECHNOLOGY INTEGRATION FOR MATHEMATICS INSTRUCTION IN TERTIARY INSTITUTIONS IN OYO STATE: STUDENTS' PERSPECTIVE

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Abstract
The development of a nation is dependent on science and technology on which Mathematics is the bedrock. Learning of this subject can take place either online or offline. The physical class of the subject has been in existence in most Nigerian institutions before the outbreak of COVID-19 pandemic which forced some institutions to go online. This research work investigated the perception of Mathematics students in Emmanuel Alayande College of Education, Oyo on the possibilities of teaching Mathematics in tertiary institutions through e-learning instructions. The study employed survey research design and three research questions were used to elicit reactions from the students. The population of the study was made up of 200 level Mathematics students of Emmanuel Alayande College of Education out of which 136 students were randomly selected. The instrument used to elicit information was a self-designed questionnaire tagged Technology Instruction Delivery Questionnaire (TIDQ) which was correlated using Pearson moment correlation coefficient and the internal consistence of 0.76 way gotten. It was discovered that e-learning instruction is good for teaching of Mathematics and that the institution management, government and parent of students would have great effect on students' involvement in e-learning instruction. It was recommended among others that students should be encouraged to learn through e-learning by visiting educational sites and that lecturers should developed themselves for easy ICT usage.
Keywords: *Technology, Integration, Instruction, Mathematics, e-learning*

Introduction

Technology provides an excellent opportunity for student motivation, exploration, and instruction (Barron, Ivers, Lilavois, and Wells, 2006) It is important to note that teaching, learning, and technology work synergistically to provide valuable and proficient knowledge transfer because educational technology helps teachers create learning contexts that were not formerly possible with traditional teaching methods (Wiske et al., 2005). Using technology in education or teaching helps teachers to provide instant and direct feedback to students which in return motivates active student learning, teamwork, and collaboration. It also helps teachers to provide individualized learning opportunities and elasticity for their students. Kelly and McAnear (2002) stated that to live, learn and work successfully in an increasingly complex and information rich society, students and teachers must use technology effectively.
Within a sound educational setting, technology can enable students to become competent information technology users, proficient information technology users, information seekers, analyzers, and evaluators, problem solvers and decision makers, resourceful and effective users of productivity tools, communicators, collaborators, publishers, and producers, knowledgeable, dependable, and contributing citizens.

Hawkes and Cambre (2001) opined that technology presents new opportunities for students and teachers who are structured, instructional, procedural, and cultural in thinking. The authors further emphasized that technology has impact if learners appreciate and experience the main purpose of technology. They emphasized that one of the main points that must be reflected upon by schools is the need to prepare students for the changing world in which technology plays an enormous part. Bitter and Pierson (2005) described in a research work that students using technology had modest but positive gains in learning outcomes over those students who used no technology. Bates and Poole (2003) also observed that technology does not reduce students' imaginative and creative thinking about teaching and learning but opens a vast range of opportunities for imaginative and creative teaching. An analysis presented by Borba et al. (2016) at ICME-13 identified four phases for the use of digital technology in mathematics education. The four phases demonstrate the strength and the length of the movement which involve many researchers, teachers, and students.

The purpose of education in an institution of learning is to instruct, teach and manipulate behavior. This act is essential for learning to take place. Teachers need strategies to know how and the extent they like to go. What needs to be changed and systematic presentation of instruction would allow for series of learning events to occur. Instruction

would allow for chain of learning events take place. Instruction is therefore the process that allows for the environment of an individual to be deliberately managed to enable him/her to emit or behave in specified way under specific conditions in the educational organization. Instruction is a problem-solving process and learning is a confirmation of a process of problem solved in education while learning system is an organized combination of people, materials, facilities, equipment, and procedures that interact to achieve a goal or objectives in education.

The outbreak of [COVID-19] made everybody in the world to experience the new normal which change the educational system to digital education. The digital education cuts across all subjects including mathematics. Many researchers expressed their view on digital education that the use of online learning is practical as it can be used anywhere and anytime (Ozyurt et al., 2013; Means, 2010; Bourne et al., 2005; Nakamura et al., 2018). Online learning in a pandemic is an alternative solution to classroom teaching (Basilaia & Kvavadze, 2020; Bauerlein, 2008; Laprairie & Hinson, 2006; Taha et al., 2020). Execution of online learning in higher education has advantages and disadvantages. The advantages of online learning are that it is flexible and can be widely used, while the downside is that it is very possible to do plagiarism practices, internet gesture strength, and devices that support fraud (Arkorful & Abaidoo, 2015; Irfan, 2015). Therefore, higher education has limited or no experience of e-learning or e-learning resources and experiences difficulties mostly when lecturers have little or no knowledge of how to use online applications (Kim & Bonk, 2006; Zaharah & Kirilova, 2020). Much research work was carried out in Indonesia field of mathematical modeling since the outbreak of COVID-19 Pandemic. Many experts predict the effect when the pandemic reaches its peak, when it ends, and the transmission mould of the spread of the virus (Kim et al., 2020; Ndaïrou et al., 2020; Nuraini et al., 2020; Peirlinck et al., 2020; Rahimi & Abadi, 2020; Resmawan & Yahya, 2020; Soewono, 2020; Tang et al., 2020).

Mailizar et al. (2020) initiated research on barriers to the use of e-learning in Indonesia with mathematics teachers as participants. This research was carried out at the time of the Pandemic and its focus was to find out the obstacles that occur after the implementation of online learning in mathematics in higher education. Therefore, to see the challenges and obstacles faced by lecturers who teach in mathematics education study programs during the pandemic, researchers feel the need to focus on three aspects, namely basic skills challenges, teaching and learning challenges, and university challenges. During the Covid-19 Pandemic, universities in Indonesia implemented many online-based learning policies which was a form of rapid response from universities in Indonesia to minimize Covid-19 transmission in the campus environment. This policy however provides several obstacles that arise from both lecturers and students, and it was shown that the challenges faced by lecturers in implementing online learning include limitations in presenting material, especially when courses have many mathematical equations and programming languages. This is because lecturers are not good at video editing or animation using various animation maker software. They are limited to presenting material using PowerPoint and text (Iran, Kusumanin, Yulia, Widodo, 2020).

Statement of problem

Mathematics is a subject that is made use by all and sundry. It is the bedrock of science and technology as well as some social science subjects. Some developed countries have been making use of e-learning instruction to teach some subject including mathematics before the outbreak of coronal virus in year 2020. The outbreak of this virus led to the closure of all schools from primary to tertiary institutions. Most of the institution in Nigeria joined other country of the world to use e-learning instruction for the students not to loss semester or session of their academic calendar. Most students are not conversant with the use of e-learning instruction most especially with subject like mathematics.

Objective of the Study

The study sought for the views of mathematics students on the possibilities of learning mathematics in tertiary institutions through e-learning.

Research Questions

The following research questions were generated to guide the study:

1. To what extent can technology integration improve mathematics instruction in tertiary institutions?
2. To what extent has government and institution policy affected mathematics instruction through technology integration?
3. To what extent has parental and environmental factors affected mathematic instruction through technology integration?

Methodology

The study employed survey research design using questionnaire to elicit information from mathematics students. The population was made up of all 200 level mathematics students of Emmanuel Alayande college of Education, Oyo. Simple random sampling was used to select 136 mathematics students from the population. The main instrument used for data collection was questionnaire, titled Technology Instruction Delivery Questionnaire (TIDQ). It was designed by the researcher and validated by an expert in the field of mathematics education. A 20 –item format was administered on the sample and 136 of the instruments were returned. The questionnaire was in two sections. Section A requires the participants biodata and section B requires them to indicate their level of agreement or disagreement with the statement on the questionnaire. Whether they strongly Agreed (SA), Agreed (D), Disagree (D) and Strongly Disagree (SD). The 20 items were validated by the experts in the field and all the necessary corrections pointed out were made before the administration of the instrument. To establish the reliability of the instrument, it was administered outside the research area of study. The responses were correlated using Pearson Moment Correlation coefficient (PMC) to determine the internal consistency of the instrument, which was calculated to be 0.76. The data collected were analyzed using means to determine the degree of agreement or disagreement in each question. Four points rating scale was used with the responses. The numerical values attached to the scale were as follow: SA=4, A= 3, D =2, SD= 1. The mean rating is 3.0.

Results

Research Question 1: To what extent can technology integration improve mathematics instruction in tertiary institutions?

Table 1:

Extent that technology integration can improve mathematics instruction delivery in tertiary institutions

S/N	ITEM	SA	A	SD	D	N	X	Decision
1	Master mind/concept mapping applications are good application for teaching mathematics	51	47	36	2	136	3.08	Accepted
2	Learning of mathematics is possible using digital video	64	46	17	8	136	3.24	Accepted
3	Visiting educational site to solve mathematics problems is possible and easy	19	13	77	25	136	2.21	Rejected
4	I have been mastering applications for online meetings (such as zoom, WebEx, goggle school) before	63	46	18	9	136	3.20	Accepted
5	E- learning is generally easy to adapt to any subject including mathematics	83	19	11	23	136	3.19	Accepted
6	I find it easy learning new digital technology without much assistance	67	50	4	15	136	3.24	Accepted
7	I can learn symbols and mathematical theories on digital technology at a very high speed	5	4	62	65	136	1.67	Rejected
8	Conducting assessment in mathematics through e-learning will be easy and interesting	60	38	30	8	136	3.10	Accepted

From table 1, the respondents accepted Master mind/concept mapping applications are good application for teaching mathematics with a mean score of 3.08, Learning of mathematics is possible using digital video, 3.24, mastering applications for online meetings (such as zoom, WebEx, goggle school) before, 3.20 and conducting assessment in mathematics through e-learning will be easy and interesting with 3.10. This implies that the extent to which technology integration can improves mathematics instruction in tertiary institutions high.

Research Question 2: To what extent has government and institution policy affected mathematics instructional delivery through technology integration?

Table 2: The extent to which government and institution policy affected mathematics instructional delivery through technology integration

S/N	ITEM	SA	A	SD	D	N	X	Decision
1	There is enough facility for e- learning instruction in my institution	83	23	15	15	136	3.28	Accepted
2	The institution management always allow the students to make use of the e- learning facility in the institution for self-development	8	22	38	23	136	1.78	Rejected
3	My mathematics lectures have been giving us assignment using e-learning	0	23	38	76	136	1.60	Rejected
4	All my mathematics lectures are e-learning instruction friendly	5	4	62	65	136	1.67	Rejected
5	The e-learning facilities in my institution are in good condition and support mathematical symbols and theories	24	32	64	16	136	2.47	Rejected
6	The government of my country give full support to e-learning instruction through data usage regulation	25	27	46	38	136	2.29	Rejected
7	There is a good and working Wi-Fi in my institution to support e-learning instruction in mathematics	9	10	92	25	136	2.02	Rejected
8	My institution encourages the use of e- learning instruction in all subjects including mathematics	79	23	11	23	136	3.16	Accepted

Table 2 revealed that there is enough facility for e- learning instruction in my institution and My institution encourages the use of e- learning instruction in all subjects including mathematics with means of 3.28 and 3.16 respectively were accepted while The institution management always allow the students to make use of the e- learning facility in the institution for self-development, my mathematics lectures have been giving us assignment using e-learning, all my mathematics lectures are e-learning instruction friendly and the e-learning facilities in my institution are in good condition and support mathematical symbols and theories with mean scores of 1.78, 1.60, 1.67 and 2.47 were rejected. This shows the extent at which government and institution policy affected mathematics instructional delivery through technology integration.

Research Question 3: To what extent has parental and environmental factors affected mathematic instructional delivery through technology integration?

Table 3:

The extent to which parent and environmental factors affected mathematics instructional delivery through technology integration

S/N	ITEM	SA	A	SD	D	N	X	Decision
1	My parent encourages the use of e- learning by providing enough materials for my usage	12	18	42	64	136	2.32	Rejected
2	My parent believe I cannot learn mathematics through e- learning without support	8	22	38	23	136	1.78	Rejected
3	My parent dread learning mathematics online without a physical teacher to do immediate correction and feedback	64	42	18	12	136	3.16	Accepted
4	My parent believed that teaching mathematics through e- learning consumes time and resources than physical class	5	4	62	65	136	1.67	Rejected

Table 3 shows that my parent encourages the use of e- learning by providing enough materials for my usage, my parent believe I cannot learn mathematics through e- learning without support and my parent believed that teaching mathematics through e- learning consumes time and resources than physical class with a mean score of 2.32, 1.78 and 1.67 respectively were rejected while only parent dread learning mathematics online without a physical teacher to do

immediate correction and feedback with mean score of 3.16 was accepted. This implies that which parent and environmental factors affects mathematics instruction through technology integration is negative.

Discussion of the Findings

From table 1, out of the eight items in the group, only two were rejected while the rest six were accepted which indicates that technology integration improves mathematics instruction delivery in tertiary institutions. This is in line with Peart (2011) where it was found that 80% of the surveyed students accessed panapto, showme and MCQ to support their learning and less than half of the students access twitter. Junco et al (2011) in their study also advocated the use of twitter to support higher education students. It was shown from the table that master mind and concept mapping are good application for teaching mathematics and that learning of mathematics is possible using digital video. The students identified that e- learning is easy to adapt to all subjects including mathematics because they have been mastering applications for on- line meetings such as zoom, WebEx, goggle school, and some other on- line applications before and they find it easy using them. The students find it easy to learn new digital technology without much assistance. The participating students identified that conducting of assessment in mathematics through e-learning will be easy and interesting. The students however show that visiting educational sites to solve mathematical problem is not easy for them and described that they cannot learn symbols and mathematical theories on digital technology at a very high speed.

The students made known from table 2 that their institution of learning and the government of their state has a lot to do in the integration of e-learning into teaching of Mathematics but this has not come to play as their institution of learning has not been allowing them to make use of e-learning facility in the institution for self-development and that their lecturers did not help matter by not giving them assignment or referring them to the net for on line class because most of their lecturers are not e-learning friendly. They ascertained that though the institution has enough material for e-learning instruction, most of them are not in good condition and does not support mathematical symbols and theories. The students identified that there is no good and working Wi-Fi in their institution to support low data usage and that the government of their country does not support e-learning instruction by reducing data usage for students. This is in line with Makhaya et al (2019) where it was discovered that lecturer had positive perception of the usefulness of e-learning but with an inadequate institutional support. As well as Mohad Akmal et al (2018) where it was revealed that both human and technological factors significantly affect the effectiveness of e-learning while the mediating factors are the library and the faculties. They however described that the management of their school encouraged the use of e-learning instruction in all subjects including Mathematics by making sure there is enough material on ground.
It was indicated from table 3 that parent and environmental factors has great effect on Mathematics instruction. They made it clear that their parent does not provide them enough materials to support e-learning instruction and that their parents dread learning Mathematics online without a physical teacher to provide immediate correction and feedback as their parents believe they cannot learn Mathematics through e-learning without support. The students' parents however disagree that teaching Mathematics through e-learning consume time and resources than physical class.

Conclusion

The result of the study showed that for e-learning instruction in Mathematics to be active in tertiary institutions, students must be encouraged to be internet friendly and the institution of learning must make sure they have enough facility on ground to support e-learning instruction while the government and parent must give enough support as their impact has great effect in the success and failure of e-learning instruction most especially in Mathematics due to the nature of the subject.

Recommendations

The following recommendations were made based on the findings of the study:

1. Students should be encouraged to learn through e-learning instruction as most of them have been visiting some educational sites without stress.
2. The lecturers must be encouraged to develop themselves in ICT for it be to easy for them to make use of e-learning instruction without stress most especially in Mathematics.
3. The institution of learning should make sure they have enough material on ground to support e-learning instruction in Mathematics and conduct in-service training for lectures for better usage from their end.
4. The parents should encourage their wards to move with the world and not continue to be analog in thinking most especially in teaching and learning of Mathematics.

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HANDLING ISSUES OF PERSONS WITH DISABILITIES IN THE POST COVID ERA VIA INNOVATIVE TECHNOLOGY

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Abstract
The write up focuses on innovative technology as two words, from two different origins, innovation, and technology and how these concepts narrow our discourse to assistive technology and persons with disabilities and the inclusive education which is the order of the day as deviation from the segregation in the education of the persons with disability. The era of covid 19 that the whole world found itself is also a point of the discussion and how different individuals disabled cope with the new normal and the ideas of hand washing, social distancing, nose covering and independent daily living skills by the disabled individuals. Conclusion and suggestion were made to the government and other stakeholders.

Introduction

The concept innovation might drag average inquisitive mind to the Latin origin of the word Innovation or" Innovare" which means "to make something new" one must generalize or release a new idea (invention and creativity), develop the idea into reality or product (realization) and implement and market this new idea (implementation). To make something new refers to replacing old concept or product with the new ones, continually updating, and improving them. When introducing a concept such as technology into the meaning of innovation and defining the term technological innovation and following changes take place. Generate or release new idea base on technology capability or knowledge. The technological innovation is part of the total innovation discipline. It focuses specifically on technology and how to embody it successfully in product services and process. Technology as a body may be seen as building block for technological innovation, serving as a cornerstone to research design, development, manufacturing, and marketing. Oslo (2005) defines innovation to be an activity that produces new or significantly improved goods (products or services), processes, marketing methods or business organization. Frascati (OECOD 2002)

Technological innovation comprises new or significantly modified technological products and processes where technological novelty emerges, unlike improvement from their performance characteristics. Technology plays an essential role in some aspects of people's life (Erden 2017), With the use of different technology, people today are living independently and becoming connected to others quickly. (Kollak,2017) Technology use became a crucial resource of knowledge and support in the education system. Technology intervention within the education curriculum has changed and improved throughout the year (Sze, 2019). Assistive technology plays a vital role in special education (Sze2019). It is used and created to help students with disability complete a particular task efficiently (Adebisi, Liman & Longpoe2015). Assistive technology is a device that can maintain or improve the mental and physical functioning of a student with disability (Adebisi et al, 2015). Assistive technologies have helped to facilitate the skill that student with a special education need struggle to utilize in daily life (Erdem, 2017). It can be a tool or software programme that can help increase and improve the 21st century skills of students in special education especially when it comes to improve social learning and communication skills (Assistive Technology Industry Association2019). Today with the demand of the 21st century skills. The use of assistive technology in special education is essential to complete tasks efficiently.

Person with Disabilities

Disability is any physical or mental condition that limits a person's movements, sense, or activities. The term disability is conventionally used to refer to attributes that are severe enough to interfere with or prevent normal day to day activity. According to the U.N Convention on the rights of persons with disabilities, persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others. Disabilities can be permanent or temporary or episodic.

Covid-19 and Persons with Disabilities

Covid-19 has brought a lot of change to the average living style of an average individual world-wide. Person with disabilities were tremendously affected in varieties of way especially being a set of people that have already been experiencing discrimination against them. Impact of Covid-19 is greatly felt by them in terms of securing and protecting their jobs, and income for those who are self-employed affected. Government needs to put some measure in place for these people to survive the challenges of this period. Due to these Covid-19 occurrences, government should see opportunity for the upgrading of the special education system by redesigning of the special education system, by redesigning the curriculum to accommodate the technological needs of the changing time. Also, teachers should be exposed to training in the use of modern technology to assist these learners to fulfil their potentials.

Inclusion of the excluded individuals; the disabled

Researchers on inclusive education have predominantly focused on the success stories of inclusion in developed countries of North America and Western Europe that have made significant progress on inclusive education (Arnsen and Lundahl2006; Ferguson 2008; Gronlund et al 2010; Kearney and Kane 2006; Maijor et al 2007; Norwich2008) however the status of inclusive education in the developing countries in Africa, Asia and the Eastern Europe, typically highlights difficulties in the implementation of inclusive education (Charema2007, Chitiyo and Clutiyo 2007, Singal2006). Among the prevalent barriers to the successful implementation of inclusive education, government support, ineffective policies and legislation, inadequate funding, insufficient trained teachers and support staff, political instability and economic crisis, the ineffective and inefficient use of assistive technologies is seen to be a major obstacle hindering inclusion (Chitiyo2007, Ellsworlt and Zhang 2007, Gronlund et al 2010, Singal 2008). Students with disabilities are often found being trapped in a vicious cycle of exclusion from education, society and mainstream development programmes due to lack of necessary support and the means for equal participation (Ahmad2015) Effective technology Integration can help provide all learner the ability to access the general education curriculum; offering them multiple mean to complete their work with greater ease and independence in performance of tasks that they were formerly unable to accomplish or had great difficulty in accomplishing (Robert et al 2008, Van2007) thus addressing the functional barriers by increasing, maintaining or improving their learning outcome in a diverse world of abilities and expectations.

Taking Cognizance of Diversity in disabilities in Innovative Technology

Education is the most essential ingredient in the development and empowerment of individual and inclusion in education irrespective of the varied socio-economics differences and the differences in "abilities" and 'disabilities' (Praisner2003), undoubtedly makes the foundation much stronger (Ahmad2014). A school system emphasizing education for all should ensure the right of all children to a meaningful education based on individual needs and abilities. Any child may experience a special need during the education years (UNESCO1994) and as a result, some children feel left outs and never enter school or entered only for few years and as repeater or become "dropouts" or 'pushed outs' without their need having been met. These children are the vivid illustration of the failure of school to teach rather than their own failure to learn (Lindsey2007, Norwich 2008). The geographical and social segregation of student with disabilities from their non – disabled peers in learning and development is further a failure of meaningfully integrating students into the mainstream schools. Inclusive education, more than mainstreaming the learners with special needs, is also concerned with identifying and overcoming all barriers for effective, continuous, and quality participation of all in education (Ramchand and Dummugudem,2014, Ahmad2015) and providing a Least Restrictive Environment (LRE) to satisfactorily afford children with disabilities a meaningful education benefits together with others in an accessible physical and human environment. (ICF,2001).

Overtime, there has been a considerable shift in the understanding of disability from the earlier medical interpretations of seeing disability as a deficit within the individual to the concept of human right and equitable opportunities for participation of all individuals (Wolery2000). Interventions to be inclusive should therefore not only be at the individual level like medical rehabilitation but also at the societal level with provision of necessary support services, a universal design to make infrastructure more accessible and a change in attitude and perception regarding disability. The interrelatedness of the concept "impairment" disability and handicap, the handicap is what results from an impairment or a disability and limits or prevents the fulfillment of a role considered normal (depending on age, sex, social and cultural factors) for that individual. Assistive technology devices here aids in reducing, if not eliminating the handicap and circumvent the deficit to help the individual participate in learning and related tasks, reducing barrier and promoting accessibility with considerable ease and efficiently which otherwise might not have been possible.
Assistive technology broadly spells out a continuum of tools, strategies and services that match a person needs abilities and tasks and includes evaluation of the needs of an individual with a disability, a functional evaluation of the individual on the individual customary environment and the selection, designing, fitting, customization, adaptation, application, maintenance, repair and replacement of assistive technology services and their coordination with the existing education and rehabilitation plans and programme for inclusive development.

Innovative Technology: Making Room for The Disabled Individuals

Technology has great potential in providing access to all learners and the ability to access the general education curriculum Innovation technology includes assistive, adaptive and rehabilitation devices to individuals with disabilities and includes virtually anything that might be used to compensate for lack of certain abilities (Red and Bawser,2005)varying from Low- tech device like crutches or a special grip or a pen to a more advanced items like hearing aid and glasses to high tech devices such as computer with specialized software for helping dyslexics to read (WHO2009). Also known as 'technical aids' or "assistive equipment" including Information and Communication Technologies (ICT) universally designed technologies, educational technologies, emerging and innovation technological and accessible technologies, they can be any item or piece of equipment or product system that is used to increase, maintain or improve the functional capabilities of individual with disabilities and help them to work around or compensate for a disability (Goddard2004) in order to participate in the activities of daily life. Assistive technology devices can be used by students with disabilities on their own or with assistance in and outside the learning set up. Some examples of assistive technological alternative keyboard and mouse, speech programmes, word processor, grammar checker compact disc recording (CD-R & CD – RW) drives and spell checker (Pelty2012).

Assistance technology is innovative in the sense that it involves using technology to train or rehearse and a just and enable learning. A large population of at-risk students are seen to need assistance, but they often don't early fit into a diagnostic profile they often lack assistance. Assistive technology serves in bridging their gap by assisting in the practice of educating children in the same classroom, including children with physical, mental, and developmental disabilities (Smith2005) helping them to learn the materials in a way that they can understand by eliminating barriers that had been preventing them from being at the same level as their peers.

Use and application of Assistive Technology in Education

For students having difficulty in reading and understanding reading text and in paying attention to the reading assigned, electronic books, books adapted for page turning, single word scanners predictable texts, Tab, talking electronic devices software, speech software functioning in reading area. For students having difficulty in seeing or lack complete vision, eye glass, magnifier screen magnification, screen reader, braille, large print books, CCTV, Audio Lesson Tapes for students who have difficulties in hearing or area absolutely hearing impaired, hearing aid pen and paper signaling device closed caption captioning. For students having problem in language development, reading and writing (Dyslexia) hand eye coordination, written expression and composition (Dysgraphia), difficulties in motor skill coordination (Dyspraxia) Math (Dyscalculia) and ADHD, use of application/ device depending upon the degree of disability/ difficulty in the area of reading waiting (Dyslexia) have eye coordination written expression and composition (Dysgraphia) difficulty in fine motor skill, coordination (Dyspraxia) math Dyscalculia attention (ADHD) like talking electronic device calculator, Electric Organizers, spelling grammar checker, Electronic Organizers, print or picture schedule Electronic Diaries etc.

All these are applicable to students with learning disability and attention deficit hyperactivity disorder (ADHD) to determine the source and application of an assistance/ innovative technology device factors to be considered include its actual usage, ease in accessibility by its users and their satisfaction in interaction with their environment. It is essential that an assistive technology device is need based, inexpensive to produce, purchase and maintain, easy to use and effective which can be ensured by the direct involvement of the potential user at each stage of designing and development summarily certain factor are to be considered

1. Suitability to user and their environment
2. Inexpensive and easy to purchase
3. Easy – to – use

Conclusion

Summarily Individuals with disabilities should be seen as part of the society and should not be excluded. Assistive technologies are ways of their connectivity to the society especially during this new normal situation. They have the possibility of being independent of the abled people. They can walk, speak, hear or communicate via assistive technology. Even though they could not afford it, government should take the responsibility for providing assistive technology for them to make life worth a living for persons with disabilities despite the challenges. Nevertheless, according to world report on disability (2011) most countries do not have such technology. Related with the rapid change in technology, accessibility and communication become much easier than before (Ford and Rabe, 2011). The high-speed internet connection especially with the contribution of wireless and 4G technology to remove a barrier so that more people with disabilities can become a real part of community.

Recommendations

The study recommended that appropriate assistive technology tools be made available for persons with disabilities. Continuous training should be given to their facilitators as regards emerging technology

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SUSTAINABILITY OF E-LEARNING IN TEACHING AND LEARNING IN SECONDARY SCHOOLS DURING COVID-19 PANDEMIC

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Abstract

This paper examined the sustainability of the use of e-learning in teaching and learning in secondary schools in Oyo state, Nigeria. Education was among the first casualties in the time of emergencies like armed conflict, natural disasters, epidemics such as Ebola outbreak in West Africa, and COVID-19. At the height of the pandemic, school closures lasted for many months leaving millions of students out of school. Literatures were reviewed on the education emergency, impacts, interventions, challenges, and prospect in COVID-19 Pandemic. Governments and non-governmental organizations are implementing various learning interventions using technological platforms of e-learning and traditional media to alleviate the impact of the school's closure. Introduction of technology in teaching and learning of Mathematics has enrich the quality of instruction and collaboration. It was suggested that there should be increased parental cooperation and engagement, teachers and students as well need training in skill acquisition in the use of technology in education and fund for reliable internet access, power supply among others.
Key words: Sustainability, e-learning, covid -19, and digital technology.

Introduction

Globally education is disrupted by crises caused by armed conflict, natural disasters and sometimes, epidemics. According to World Bank (2015), in West Africa, the Ebola virus epidemic which killed over 11,000 people, kept at least 5 million children out of school. COVID-19 elicited a spike in the use of e-learning in teaching and learning of Mathematics as a measure to cushion the impact of school closure on education. The online education business has grown massively over the last decade and the COVID-19 pandemic has seen even more people accessing education using online technology. The internet has provided the opportunities for many online school owners to access students from all over the world. However, it has been proposed that the development of ICT has become a vital issue to meet the needs of the education system (Chao, 2015). ICT is a tool that supports the learning process and holds the promise of new solutions to all the challenges that education is facing.

E-learning is a pedagogical action based on information and communication technology, which is defined as the pedagogical act that takes place online, using internet and technological devices, whether mobile or not, with synchronous or asynchronous connection, and from anywhere. Therefore, the e-learning method becomes a pedagogical tool that facilitates access to learning for the whole of society. The method is not of recent creation, since its beginnings date back to 1993, when it began to be used more assiduously, having a greater impact in the field of education (Hamutoglu, Savasci, and Sezen-Gultekin, 2019). Prior to that date, distance learning was widely used. This method of teaching is currently on the rise due to COVID-19 and other education emergencies. It focuses on the cycle of prevention of, preparedness for, response to, and recovery from emergencies situation (Sathiyamoorthi, 2020). During the COVID-19 pandemic in Nigeria, a research study conducted by The Education Partnership (TEP) Centre and the Nigerian Economic Summit Group (2020) revealed that majority (41%) of the teachers reported that their students were learning via virtual platforms. 39% of the respondents also reported that the students were learning through radio and television programmes, while 20% reported that students were learning via social media. It was reported that 65% were engaging with zoom during the pandemic, 56% selected social media as the tool they were engaging with less than 10% used Cisco Webex, Microsoft teams, Google team, Edmodo, and schoolbooks. It is a critical response in emergency contexts as it offers numerous benefits. First, it helps to meet the psychosocial needs of children and youth affected by trauma. Second, it provides physical and social protection for children and youth who face higher risks such as unwanted pregnancies, violence, sexual assault, substance abuse, among others. Third, Education in emergencies helps young people keep familiar routines by maintaining study skills to mitigate the number of school dropouts and easily reintroduce schooling. Finally, it is important in conveying survival and peace building messages and skills especially in the time of emergencies.

Education in emergencies is refers to as the provision of safe, relevant, and quality education to people affected by conflict, health-related crises, or natural disasters. Before the pandemic, there was an estimated total of 10.2 million out-of-school children. In response to this education emergency, the federal and state governments and private sector are implementing various learning interventions using technological platforms, internet-based tools, and traditional media to mitigate the impact of the closure of schools. Education emergencies in time of COVID-19 pandemic and previous emergencies portends some good practices according to Winthrop (2020), these includes the current educational responses, whether by remote learning, printed packets, or online learning, which lacks COVID-19 public health messages and training. Although, the emphasis on continued learning is vital, but it is equally important to provide information on how schools can actively support ongoing public health campaigns. Secondly, it is important to consider that school closures may last for months and not just weeks. Hence, education administrators and educators need to see current remote learning interventions as immediate response strategies with long term goals. Thirdly, given that crises tend to worsen inequalities, education activities in this period need to be safe, appropriate, and inclusive. Education planners should consider potential risks related to the design and implementation of education responses and seek to mitigate them. Fourthly, post-crisis recovery should be leveraged to build better and more resilient school systems (The Education Partnership (TEP) Centre and the Nigerian Economic Summit Group, 2020).

E-learning is flexibility in terms of location, time, and costs (Qian, 2018). This makes e-learning the most appropriate option for training and evaluating students. Two types of resources are required to develop the e-learning method according to Qian (2018) these includes: digital and technological. Among the digital resources are educational videos, teaching platforms, videoconferences, podcasts, and social networks, among many other resources. While technological resources can be the desktop computer, tablet, smartphone, among others. Teachers' competency is an essential component of e-leaning integration in teaching and learning of Mathematics. The use of e-learning by the members involved in the teaching and learning process becomes a challenge, because an average level of digital competence is required to apply it with guarantees. Therefore, teachers and students need to be trained in the use of the various technological and digital resources (Wongwuttiwat, Buraphadeja, & Tantontrakul, 2020). Some researchers see technology integration in teaching and learning of Mathematics as an evolution of distance education while others see it as a new teaching modality that differs substantially from face-to-face teaching (Sathiyamoorthi, 2020).

COVID-19 Pandemic and Nigerian Education System

Educational activities were disrupted in Nigeria and other part of the world due to outbreak of COVID-19 Pandemic. As a result of school closure, about 1.2 billion learners are out of school and 36,400,000 primary and secondary school learners across Nigeria, including those in internally displaced camps (UNESCO, 2020). Although this has affected education access, quality, and equality, it has propelled the reshaping of education delivery across the world. On March 19, 2020, the Federal Ministry of Education in Nigeria approved the closure of all learning institutions (Nlebem, 2020). This abrupt closure led to significant disruptions in the education system in Nigeria, including learning modes, access to school related services, parenting, and crisis management capacities of the federal and state ministries of education. As the pandemic began to spread globally, many countries instituted a lock down which meant that education services as traditionally know to be, were suspended. However, government and private organizations swung into action to ensure that learning continued for students in Nigeria. In a short period of time, many innovations sprung up online and children began to access alternative means of learning.

Government Interventions

In Nigeria, Federal Ministry of Education and the Universal Basic Education Commission set up the Nigeria Education Sector COVID-19 Response Strategy (Federal Ministry of Education, 2020). This strategy includes plans for the Learn at Home Programme and is aimed at minimizing the learning slide during the pandemic. Through partnership with educational technology companies, the ministry launched virtual learning platforms and provided links to e-learning resources. These virtual learning platforms include SchoolGate, Mobile Classroom, WAEC E-learning toolkit and Unity Schools virtual learning platforms. Other e-learning resources whose links are provided on the Federal Ministry of Education websites are Khan Academy, Seesaw, National Open University, UNESCO School Meets Learner Approach, Teacher Development Programme, British Council, state government owned e-resources, Oracle Academy, IBM University Relations, and Development Learning Partners Educational Resources. The SchoolGate virtual

platform gives primary school children free access to instructional materials for subjects ranging from Mathematics to Civil Education resources.

Other Interventions

First Bank of Nigeria has partnered with the State governments in Nigeria to equip and empower primary, secondary and tertiary institutions with e-learning solutions and devices as part of efforts to minimize the effect of disruption of schools' academic calendar due to the COVID-19 pandemic (The Education Partnership Centre and the Nigerian Economic Summit Group, 2020). Lagos state Government announced the distribution of 10,000 radios to students in the State beginning from the 29th of June 2020. The radios were purchased through crowd funding efforts that the Lagos State Honourable Commissioner for Education initiated with several partners (Technext, 2020). Ogun State ministry of education together with SUBEB came up with a one-month broadcast of education programs on the state television (OGTV) scheduled in the morning (9am-11am) and afternoon (1pm-2pm). Also, the Ogun Digital Classroom (Ogun Digiclass) focuses on educating primary and secondary school students in the state. To cushion the effect of the pandemic, teach for Nigeria, a non-profit organization partnered with the Ogun state government to deploy online capacity building workshops for teachers on programming using an application called Scratch (a block based visual programming language and website targeted primarily at children). The workshops are aimed at developing the skill sets of teachers and students for science and technology education (STEM). Following several weeks of teaching through the Ogun state television and radio programmes, which were also streamed on YouTube and the official Ogun Digiclass website. There have been discussions about how the current state-led education responses to COVID-19 are driven by broadcast media rather than modern ICTs.

Challenges of teaching and learning during the COVID-19 Pandemic

E-learning offer unique opportunities to strengthen education in Nigeria. In Nigeria, ICT in education landscape is still rife with many challenges. According to the Digital 2020 Global Overview Report, 58% of Nigerians are not connected to the internet. However, mobile devices show more promising trends. The report pointed that 169.2 million people – 83% of Nigerians have access to mobile phone connections; but 50% of these are urban dwellers (We are Social & Hootsuite, 2020). If we consider subscribers with multiple devices and subscriptions, the numbers would be significantly lower raising concerns for inequality of access to learning for many children. Specifically, we can highlight the following challenges from our study.

Access to digital devices and internet access

Teachers' opinion on the effectiveness of the teaching tools they were using to teach during the pandemic shows that the major challenges cited by teachers are infrastructural and pedagogical challenges (The Education Partnership Centre and the Nigerian Economic Summit Group, 2020). It was found that among those with internet access, digital devices, and other resources to learn remotely, majority attended private schools, placing them at an advantage over their counterparts in public or lower quality schools, with no such privileges. Private school students were more likely to report that they had all they needed to study the way they wanted. The quality of the internet network access was also highlighted as a major challenge for students to access learning online. These findings were reiterated by teachers' experiences of teaching their students remotely: students who lived in rural areas experienced more challenges accessing learning via the e-learning platforms. Teachers also faced challenges teaching their students through the online platforms because of access to internet services and network quality (We are Social & Hootsuite, 2020).

The multidimensional aspects of access

Studies shows that access is not restricted physical access to technology, but social dimensions that do not allow for complete digital inclusion when it comes to remote learning. Inequalities in: technical apparatus, inequality in autonomy of use like having to share devices with parents, inadequate knowledge of how to use a platform efficiently, and social or technical assistance from family members (The Education Partnership Centre & the Nigerian Economic Summit Group, 2020); Nwoke & Kwuanusi, 2016)

Financial implications of learning remotely

Parents and teachers highlighted that the cost implications of learning remotely were significant since internet data costs in Nigeria are still relatively expensive. Some parents in reported that their inability to support their children's learning during the pandemic was because of the costs of remote learning (We are Social & Hootsuite, 2020). Children

from poorer households are more likely to experience these challenges relating to the affordability of learning online because they have even less access to internet connectivity, devices, power supply, functional ICT skills, and active parental support, among others.

Power supply

Another major challenge in technology integration according to Nwoke and Kwuanusi (2016) is the electricity power supply. Most students were adopting learning through television programs as an alternative to online platforms which could substantially mitigate the issues around internet access and the costs of learning online. However, at the times when the learning programmes are being aired power cuts become a major obstacle to their learning.

Student concentration and the need for physical connections

Parents reported that children are not familiar with the new learning platforms, there was low concentration amongst younger children. Teachers indicated that their students were not actively learning during the pandemic (Obiakor & Adeniran, 2020). Students were not able to ask questions directly and students' preferences for face-to-face learning is among the challenges of remote learning. Teachers also complained about not feeling connected to their students through the virtual platforms (Chao, 2015). Their students were not actively engaged with learning platforms because they did not ask questions after teaching. Students missed their friends and their teachers. learners observed that they were not able to get immediate feedback from their teachers when they had challenges in the learning process. Moreover, other challenges identified in remote learning includes assessing the effectiveness of remote learning platforms, teachers' and parents' inexperience with teaching and supporting students remotely, and students with learning disabilities and the issues around keeping children safe online.

Education Learners with Special Needs

The COVID-19 pandemic has also threatened the education of learners with special needs and disabilities. Without a crisis, this group of the society already experience some form of marginalization (Obiakor & Adeniran, 2020). Hence, the likelihood of losing learning opportunities during and post-COVID; due to combination of factors including the socio-economic income of their families, the non-availability of special needs teachers and the inexperience of parents or guardians in facilitating their learning needs. Moreover, for students with disabilities, remote home-schooling not only requires access to adequate information technology (IT) resources and internet, books, and other learning materials; but also, access to specific assistive devices or special education curricula that allow for a continuous education at home and accommodates the child's specific learning needs (UNICEF, 2020). The COVID-19 pandemic presents unique challenges for Nigeria's already fragile education system (Obiakor & Adeniran, 2020).

Prospect in COVID 19

The closure of schools due to the COVID-19 pandemic presents an opportunity for education stakeholders to play their part in developing and executing strategies that will position the education system to prepare students to compete in the global scene. This period of home-schooling also presents parents with opportunities to better diagnose their children's academic strengths and weaknesses and make more informed decisions.

- **Blended learning**

Schools and tertiary institutions can develop frameworks that allow them to provide a blend of traditional classroom and e-learning opportunities for their students even after the pandemic. Reseach Studies found that most teachers now prefer a blended teaching approach where they can have both physical and online teaching with their students (Wongwuttiwat, Buraphadeja, &Tantontrakul,2020; Obiakor & Adeniran, 2020). This provides an opportunity for school owners to minimize operating costs of running traditional schools' system.

- **Enhancement of innovation and creativity**

Several avenues for the government to partner with education technology companies and internet service providers to create online academies and provide related partnership services that would cater for the learning needs of students have risen because of the COVID-19 Pandemic. Accordin to The Education Partnership Centre and the Nigerian Economic Summit Group (2020) several educational innovations that were assessed during the lockdown were developed in partnership between governments and private organizations. Private organizations also provided funding and donations for a few interventions.

- **Entrepreneurial opportunities**

The current situation also presents entrepreneurial opportunities for the private sector. These opportunities can be maximized by private investors, individuals interested in education franchising, Original Equipment Manufacturers focused on education related equipment (Ikoku, 2020). This would be a chance for these companies to make exponential profit while also creating social impact. It would also allow internet service providers to engage in more meaningful corporate social responsibility projects.

- **Accelerated acquisition of digital skills**

The COVID-19 pandemic has led to a higher adoption of digital teaching learning and innovation amongst teachers, students, parents, and private organizations. Much more than was ever before, stakeholders in the education sector have been exposed to digital skills because of the pandemic. Some parents reported that their children have adapted well to learning online and this has improved their digital skills. As the world changes and we move to a post-COVID era, these skills are likely to become even more important for the future of work and the productivity of workers.

Many schools are limited in their capacity to purchase the required infrastructure for remote learning and often do not have teachers with the appropriate digital skills. For schools that may be better resourced, it has been challenging facilitating practical-oriented subjects and courses that typically engage students through laboratory experiments. With the closure of schools, there are very few schools that can afford set up and maintain virtual science laboratories where students and the teachers or lecturers can work together to simulate experiments (Abbey & Hoxley, 2020). These students will have to make do with learning the theoretical aspects of science subjects alone, until schools re-open.

Conclusion

Globally, teaching and learning amidst COVID-19 is largely driven by technology. In Nigeria this could be because of the growing mobile penetration, making the consumption of internet-related services largely "mobile-first" (GSMA, 2018). The use of e-learning in the development of mathematics teaching and learning increases the commitment of students and improving performance. It also increases interest, and thus, acquired results. It also improves the acquisition of mathematical content Schools situated in urban centres used sophisticated platforms like Moodle, Zoom and Microsoft Teams with higher data consumption. While some middle or low fee private schools, including those away from city centres used options that required minimal or no internet connectivity such as WhatsApp and printed materials. However, state-owned schools are still lagging the e-learning transition for reasons including large student population, existing student and teacher capacity, poor internet facilities and incessant union strikes (Adeoye, Adanikin, & Adanikin, 2020). Given the infrastructure issues prevalent in Nigeria, low-tech options like radio and television are the most popular platforms of remote learning due to the government's capacity and the relative accessibility of these platforms compared to online alternatives. This is largely comparable to interventions in other African countries like Kenya and South Africa where the national governments have rolled out similar broadcast programmes (World Bank, 2020). Research study has indicated that social media and mobile applications are the platforms through which stakeholders are accessing learning interventions (The Education Partnership Centre and the Nigerian Economic Summit Group, 2020). E-learning is growing in relevance and the government in Nigeria seems to recognize this based on the numerous initiatives that have been rolled out.

COVID-19 pandemic and other education emergencies was overall disruptive to the education system, and it was discovered that it also gave rise to innovation and technological integration in teaching and learning process, especially Mathematics education. Most teachers posited that they would prefer a blended approach to conventional method of teaching to improve learning outcomes. Stakeholders in education believe that education planning and learning process will forever be changed by the COVID-19 Pandemic and that many parents, students, and teachers have come to accept and adapt to for learning.

Recommendations

1. Teachers, students should be given skills acquisition training in e-learning on a continuous basis.
2. Integration of technology in teaching and learning of Mathematics in education emergencies and beyond for better preparedness in schools should be sustained for improve students' achievement in the subject.
3. There is need for increased parental cooperation and engagement in the use of e-learning.
4. Teachers needed financial support and technical equipment for producing pre-recorded educational content, access to learning management systems, partnerships.
5. Reliable internet access and internet enabled devices for parents, students, and teachers. electricity supply.

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THE ROLES OF INTERNET OF THINGS (IoT) AS A NEW TECHNOLOGY IN ACADEMIC LIBRARIES

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Abstract
Internet of Things (IoT) is a new technology that can be applied to the services of academic libraries. This paper examines the development of technology since 18th century. It also looks at the definitions of IoT by scholars. The paper examines the roles of IoT in academic libraries such as saving time and spaces in the libraries, creating global library links, provision of security for library materials, safe delivery of library materials to the targeted patrons, provision of information literacy. The paper also examines the challenges of IoT such as security, lack of regulation about IoT, limited bandwidth, complexity etc. The paper concludes and recommends that government and other stakeholders should make funds available to operate IoT, that library staff and users should be given information literacy about IoT and other emerging technologies.

Keywords: Internet of Things (IoT), New Technology, Academic Libraries, Fourth Industrial Revolution.

Introduction

The development and growth of technology keep on going from one stage to another. At a particular period, there is one technology or the other, and what we call new technology today becomes old in the nearest future because of the advancement of knowledge. Okere et al (2020) trace four revolutions called Industrial Revolutions. The revolutions deal with the invention of technologies to carry out one operation or the other different from the existing ones. The first industrial revolution began in the latter half of the 18th century which was powered through the introduction of mechanical production facilities powered by steam and water. It was the period when the power of steam and water dramatically increased the productivity of human (physical) labour. The second industrial revolution started after the American civil war with the introduction of mass production based on the division of labour powered by new forms of energy such as electricity and oil. The third industrial revolution brought the introduction of electronics and information technology (IT), digital technologies such as computers, cell phones and internets, which in turn has revolutionarized communications and trade. It was termed a digital revolution where with electronics and information technology were applied to drive the automation of production.

The Fourth Industrial Revolution is a radical change that emerges when Information Technology (IT) proliferates in all industries, including the primary, secondary and tertiary sectors and it is a consequence of the horizontal development of IT. Fourth Industrial Revolution is the fourth major industrial era since the initial industrial revolution of the 18th century. Okere et al describe 4IR as an umbrella term for a new industrial paradigm that embraces a set of future industrial development regarding Cyber-Physical Systems (CPS), Internet of Things (IoT), Internet of Services (IoS), Artificial Intelligence (AL) and Robotics etc. The society is experiencing changes at a speed unlike anything the world has experienced before, which requires librarians to live and create realities that was previously unconceivable. These transformative technologies would have impact not only in the library environment, but in all discipline's economics, business, societies, and individuals (Okere et al, 2020). Academic libraries as a matter of fact must be current with the emerging technologies to be relevant and meet the needs of their users as much as possible. This paper is to examine Internet of Things and the roles it plays in the services of academic libraries.

Internet of Things (IoT)

Internet of Things (IoT) has been defined by many scholars. Purnik (2019) defines Internet of Things (IoT) as the extension of internet connectivity into physical devices and everyday objects. Embedded with electronics, internet connectivity, and other forms of hardware (such as sensors), these devices can communicate and interact with others over the internet, and they can be remotely monitored and controlled. Abo-Seada (2021) described IoT as physical devices that are connected to and exist as entities on the internet. The devices may be in the form of appliances or security systems in homes: the OSs in cars, trucks, and construction or farming equipment, the sensors in traffic signals and street lighting; the smart tags on items in stores, and the mobile devices that many users always wear or carry with them. Abo-Seada citing Okee et al (2019) opine that Internet of Things (IoT) was coined by Kevin Ashton in 1999. He was an innovator and consumer sensor expert and he described IoT as the network connecting objects in the

physical world to the internet. IoT refers to the use of intelligently connected devices and system to obtain data gathered by embedded sensors, actuators in machines and other physical objects. IoT uses connecting media such as wireless sensor network and physical objects to connect devices to each other and the internet, with minimal direct human intervention to deliver service that meet the needs of wide range of academic libraries (Nag and Nikam, 2016).

Abo-Seada (2021) citing TechTarget (2018) further describes IoT as a scenario in which objects, animals, or people are provided with unique identifiers and the ability to transfer data over a network without requiring human interaction. Mohammadi (2019) describes IoT as a grant network of connected things and people. He stresses that the relationship will be between people-people, people-things, and things-things. Quoting technopedia, Mohammadi sees the internet of things as a new concept that describes a future where every day physical objects will be connected to the internet and be able to identify themselves to other devices. Mohammadi opines that IoT changes all activities that have been done by human and machine hence it would be changing many aspects of human life cycle. IoT includes an unusual number of objects of all shapes and sizes. The Internet of Things consists of many devices – from very small sensors to smart phones that are connected to each other. The term IoT includes everything connected to the internet, and "talk" to each other (Mohammadi, 2019).

Internet of Things can simply be defined as objects that are connected to objects, people through internet at home, in the office, in the libraries at the business centers etc to gather and disseminate information as it can be remotely controlled. For good library services, academic libraries must be aware and adopt the implementation of IoT in their libraries as a new technology for quick delivery of services, for security of materials, patrons, and staff etc. This paper is to examine the roles of IoT as a new technology in academic libraries. Academic libraries are libraries in higher institutions of learning. They are varied and distinctive as the institutions they serve. These include college libraries, polytechnic libraries, and university libraries. Academic libraries are a place where students, lecturers, and researchers can seek for themselves information needed for their academic pursuit, which is the goal of education. The basic function of academic libraries is to aid the academic and research programs by acquiring and making available books, other materials, and services needed (Agbo and Onyekweodiri, 2014). It is the function of the academic libraries to provide all forms of information services both print and electronic formats readily available for the users.

Roles of IoT in Academic Libraries

Many academic libraries are already operating Information Technology (IT), and that is why many of them have computers, electronic libraries etc. But the emergency of IoT has brought new development to the technology which academic libraries must be aware of and be ready to adopt for their better operations. The establishment of Internet of Things in academic libraries will be of great benefits to the libraries as it will save time, cost etc. The following are the roles the Internet of Things can play that will increase the efficiency of library services. Mohammadi (2019) identifies some advantages of IoT which are of immense benefits to the academic libraries. They are as follows: changing of libraries by IoT technologies to the modern buildings, as well as smart buildings. He stresses further that the number of smart devices will certainly affect libraries and their services including building, collections, management, instruction, and security. Smart technologies can allow libraries to have more time to devote to tasks that require human inventiveness. He cited the example of North Carolina University Library that has employed a book bot, a robotic book delivery system, that allows students and faculty members to access any of the two million items held in climate-controlled storage with a click on the catalogue. The space-saving shelf allowed the library to offer many more learning and meeting spaces for their users. Another role the IoT plays to boost the services of academic libraries is the establishment of global links which can allow researchers to access the unknown valuable scientific resources. The creation of a global library link among other collections can create a global online library that can provide universal access to the human big knowledge collection.

IoT saves the time of users. If a library user finds a book in the catalogue, borrowed by someone else, he/she makes a reservation and when the book is returned through the automatic station, it goes to a special bin for ordered books. The patron immediately receives a message or email that the book is available. All books from this bin, are transferred to the special bookshelves located at the library's entrance, so that patrons do not spend much time searching for their orders (Purnik, 2014). Another advantage of IoT is the installation of Radio Frequency Identification (RFID) which provides security for library materials. Purnik explains that if all the stacks in the library are equipped with RFID, librarians can figure out very fast where a book is located (to within 20cm). then librarians can provide a patron with directions to the right bookshelf –whether printing them from a search terminal or using a special app. We can also

find a lost book, get a book back to the depository even if its return had been documented in a wrong way. We can easily check out a book, do a fast inventory etc. Purnik asserts.

Another benefit which internet of things can bring to the libraries is to save time of staff and to deliver library materials safely to the targeted patron. Purnik cited an example of Amazon using unmanned aerial vehicles, drones to deliver their goods. When a customer orders an item, a robot attaches it to a drone, which flies to the client. The implication of this to the library operations is that one day books will be delivered to remote places this way. A drone starts from a special platform on the roof of the library, and then the books come back the same way. It is possible and more effective than library buses. Another roles IoT plays in libraries is the role of cost-saving. The academic libraries may install smart lightning inside and outside the libraries. The libraries can then use the internet to monitor and control the lighting (and the costs associated with it), via the library's Wi-fi network to turn the lighting on and off. The same goes for installing a smart energy system in which energy consumption can be controlled according to need and not just made available all the time – thus saving a lot on expenses (Abo-Seada, 2014).
IoT to academic libraries is by using fire sensors that are connected to the internet. The advent and progress of a potentially disastrous fire could be followed and dealt with safely from outside the library, pinpointing the danger areas and remotely dealing with them (Abo-Seada, 2021). More of the benefits of IoT system is information literacy. Information literacy is offered to new users to educate them about a library, and its resources. IoT can help academic libraries to provide self-guided virtual tour of the library. IoT in the library system has to do with safeguarding the books in the library. According to Mohammadi (2019) when the book holders pass the electronic access gate control, a reader receives the signal of tag passed on the book as well as ID-card. In this section information will be sent to the central cloud system, then they will be ready for analyzing and displaying the information of the user and book in the monitoring system. Citing Bayan et al's model, IoT system can make a previous registration of the borrowed to system. By using the WSNs (Wireless Sensor Networks) and attaching the micro-sensors on documents, none of the documents or books will be lost. It is therefore interesting for academic libraries to be aware of IoT and adopt the system for better and updated service delivery.

Challenges of IoT

As good as Internet of Things is, it has some challenges that make it risky to operate. Some of the challenges are discussed as follows: The first challenge is security. Cybercriminals don't have to crack a IoT device's plastic enclosure to access sensitive materials. They can only finesse their way in through one of the many security vulnerabilities that are found throughout the IoT. Many IoT devices have default passwords left unchanged, unpatched software and other major security vulnerabilities (Began, 2020). Another challenge which Began identified is lack of regulation about IoT. Began asserts that it is another common characteristic of technological innovations that government regulation often takes a long time to catch up with the current state of technology. With the rapid evolution that's happening every day in IoT, the government is taking its time in catching up and businesses are often left without crucial information they need to make decision. Another challenge is limited bandwidth. Connectivity is a bigger challenge to the IoT. As the size of the IoT market grows exponentially, some experts are concerned that bandwidth – intensive IoT applications such as video streaming will soon struggle for space on the IoT's current server-client model (Bsan, 2020). Another problem that IoT faces is the customer expectation as Began (2020) identifies. When customer expectations and product reality don't match, the results can be system failures, orphaned technologies, and lost productivity. Another challenge identified by Roe (2021) is complexity. The major reason is that IoT turned out much more complex than previously estimated. First and foremost, there are numerous IoT connectivity options, but this variety proves overwhelming rather than helpful. IoT adopters need to either opt for one and limit their choice of devices and technologies or take pains to orchestrate several. IoT also requires a rich and well-equipped hardware, software, and data storage infrastructure, so its adoption usually entails IT system revamp and sufficient investments – a feat that not every company is up for (Roe, 2021).

However, the only thing that can be said for the Internet of Things (IoT) is that no matter what set figures you look at, the IoT is growing – or spreading and is likely to continue to do so in the future. That said, the speed of that growth is less certain. (Editor, CMS Wire, 2021).

Conclusion

The Internet of Things (IoT) is a recent shift in technology that academic libraries and library staff should be familiar with as it may help improve the services, resources, and experience that libraries can provide. This study has examined

the definitions of internet of things as it has been defined by scholars. It also examined the roles of IoT in academic libraries and of course looked at the challenges of IoT to the library users and other operators of IoT. Whatever may be the challenges of IoT, it is spreading increasing every day and academic libraries must key into it for effectiveness and efficiency of their service delivery.

Recommendations

1. The following recommendations are made based on this paper:
2. The government and other stakeholders of academic libraries should provide funds so as to make connectivity of IoT possible
3. The library staff and users of academic libraries should be given information literacy so that they will be aware of these emerging technologies and be able to operate and utilize them appropriately.
4. The library management must as a matter of importance take the safety of patrons' data seriously so that users' data will not be hacked by cybercriminals. Designers and professionals should be aware of this issue and they should use new security protocols to safe their collection and user information.
5. Academic libraries must develop their websites so that internet services would be available and accessible to patrons around and far of the libraries.
6. Academic libraries need to understand and apply the new concepts, paying particular attention to providing the best services by improving the IT infrastructure, especially the speed of their internet connections.

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SOCIOLOGICAL IMPACT OF INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN THE CURRICULUM OF COLLEGES OF EDUCATION IN NIGERIA

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Abstract

Information and Communication Technology (ICT) in education has become increasingly important. The use of computers and other information technology in classroom has steadily grown over the last few decades as governments and educational institutions recognized the benefits of technological approach to teaching; the advantages of applying ICT in teaching and learning have not only led to expansion of learning opportunities thereby making education accessible to much more participants than erstwhile, but have also facilitated advancing knowledge and skills necessary for effective fiction in the modern world. Besides portraying the sociological impact of integrating ICT in making ICT central to education in Nigeria Colleges of Education. This paper, therefore, discusses the advantages of ICT, and its integration into the Colleges of education curriculum as well as its sociological impact while proffered recommendations and conclusion.

Keywords: Teaching, Information and Communication Technology, Sociological impact, Technology

Introduction

Education is very crucial to national development. It deals with psychology to equip for living. Therefore, it can be realized that education is the bedrock of any nation, continent and even the whole universe. It is the only means by which a nation could develop socially, politically, economically, and technologically and maintain active international relationship with other countries. Information Communication Technology (ICT) refers to technologies that provide access to information through telecommunication. This includes the internet wireless networks, cell phones and other communication mediums, according to UNESCO (2004) ICT is a scientific technological and engineering discipline and management technique used in handling information, its application and association with social, economic, and cultural matters. The rapid development in technology has made creatively changes in the way we live, as well as the demands of the society. Recognizing the impact of new technologies on the workplace and everyday life, today institutions try to restructure their education program and classroom facilities to minimize the teaching and learning technology gap between today and the future.

Dike (2013) and Aboho (2015) asserts that information and communication technologies is an umbrella term that includes any communication device encompassing radio, television, cellular phones, computer and network hardware and software, satellite system, as well as the various services and application associated with them such as video conferencing and distance learning. The role of tertiary education in today's world is immense and vital with a wide range of challenges and possibilities. There is a great demand for higher education among others is the awareness of its vital importance for economic and socio-cultural development of a nation. The adoption of ICT into the higher education provides opportunities for leaners to access more advanced and wider areas of learning to develop analytical skills. Tertiary education institutions should be encouraged to lead in gaining the advantages and potentials of ICT. This is to ensure quality and maintaining high standards for education practices as the rapid breakthrough in the ICT will change the way know ledge is developed, acquired, and delivered.

In Nigeria, it is necessary to use Information and Communication Technology to make education more relevant, responsible, and effective not only for the school setting but also for lifelong learning to compete successful in a competitive global economic environment. It is highly skilled and educated workforce with aptitude and skills in the application of ICT is very essential. This makes knowledge and use of ICT central to education in the 21" century. People need to be effective and efficient in the use of ICT for success in today's rapidly changing and highly competitive globalized world that depends every much on knowledge economy and skills. Encourages all stakeholders in education in Nigeria to be concerned about how best to take advantage of the knowledge extrapolating on the wise counsel stated that:

> "Beyond the immediate educational goal is the question of how to provide the best education to form the next generation, of competent

> leaders from community to the national and global levels, economic planners, scientists, artists humanists and more generally informed citizens especially in this fastpaced technology prone and globalized world." (Nnabuo, P.O. and Obasi, F.N. 2004).

Nigeria launched the Universal Basic Education Programme in 1999 and developed an ICT policy in 2001. One of the objectives of the policy focused on integrating ICT into the mainstream of education and training including basic education. The educational system in Nigeria has been delineated into levels primary, secondary and tertiary levels. The increasing development of the educational system at all levels brings greater demands on education practitioners such as curriculum planner's evaluators and teachers particularly in their bid to move along with the information technology of Nigerian institutions. As the world changes steadily, information and knowledge also change rapidly, educational technology, encompassing instructional theory and learning theory and implicating teaching and learning processes as well as the management of schools are bound to change as well.

The use of Information and Communication Technology in education as a means of enhancing skills and building capacity for the promotion of economic development is critical to bringing about viable change within the educational system Aduwa-Ogieagbaen (2005). Information and Communication Technology in education encompasses the use of computers and their peripherals like printers, software, scanners projectors for the purpose of teaching and learning.

ICT represents a paradigm shift in the way mankind processes information using the computer and the internet, it has moved information exchange from a static to a dynamic mode, an example of information processing at the static stage is seen in an Africa village where drums and metal gongs were used to herald events. Information at this stage is not portable beyond the carrying capacity of the wind, sight, and the state of readiness of participations. Díke (2013) Yakubu and Aboho (2015) asserts that Information and Communication Technology is an umbrella term that includes any communication device encompassing radio, television, cellular phones, network hardware and software, satellite system, as well as the various services and applications associated with them such as video conferencing and distance learning.

Impact of Information and Communication Technology on Tertiary Education

Tertiary institutions are designed to create quality workforce by growing, training and attracting the finest talents, support current business and industry, improve learning and teaching from pre-school through graduate school, take strong and visible roles in regional initiatives, disseminate research and employ a diverse workforce, (Myamoto, 2010). The use of information and Community Technology in education settings will act as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning students using ICTs for learning purposes usually become immersed in the process of learning and use computers as information sources and cognitive tool (Reeves and Jonassen, 2006).

The trend towards a knowledge-based economy has emphasized the importance of higher institutions as repositories of valuable human capital to help secure shares in the global market. The accelerating shift to high technology and information technology economies require sustained human resources development and training Driven by globalization and pressures to teach and train knowledgeable, skilled and competitive professionals, tertiary institutions face a huge challenges to increase access to higher education and improve the quality of higher education against the stark reality of decreasing resources Andechina Okolo (2013), Gbadamosi (2016) identifies ICT as a factor that promote quality in higher education, communication is a fundamental act of the education process, therefore to enhance quality education attention must be given to ICT. The impact of Information and Communication Technology is becoming more and more pronounced worldwide such that rarely is anything mentioned in any area of human endeavour without reference to this technology, the development of ICT is truly unique in history Akubullo (2007). Information and Communication Technology is a force that has changed many aspects of the way people have published. This brings the need for effective methods of information processing and transmission.

Nwosu (2012) this has paved way for change not only the way society assesses knowledge but also transform and restructure traditional models of tertiary education. Information technology is one skill area that is now essential for young people to gain a foot hold in the labour market in developed and increasingly in developing countries. Laura & Brown (2005) presently higher institution of learning have been focusing on e-learning environment and much less on traditional methods because of the newly acquired capacity for students and teachers to have access to the internet any point in time. ICT also helps teachers and students become actively engaged together in online collaborative work to enhance traditional learning methods ICT involves the development of effective and integrated tools as well as training modules to enable ICT application through effective teaching and learning.

The State of ICT Integration in Nigeria Colleges of Education

Inadequate of digital technologies are used in pedagogical practices by teacher educators in Nigerian Colleges of Education and other institutions of higher learning. Most of the institutions do not have the necessary ICT facilities for instructions and research neither do teacher educators possess the needed skills and competence for effective integration of ICT in classroom instructions, (Agbatogun, 2006). Level of ICT literacy among academic staff and students in Nigerian Colleges of Education is still very low Ololube (2006). Most of the teachers in Nigeria at all levels do not have the needed experience and competence in the use of computers either for educational or industrial purposes nor the needed skills and knowledge in the use common computer software, Yusuf (2005) Onasanya et al. (2010), ICT education is more learn than it is practical in terms of physical use. Nnabuo & Obasi (2004) stated that when teaching and learning is accessed critically in Nigerian Colleges of Education, it could be observed that the challenge for educators is no longer in covering the course contents, but in having access to ICT and using it to enhance teaching and learning.

ICT integration in instruction would facilitate and motivate learners' active involvement in the exploration of information that can be applied in solving real life problems. Okoye and Udegbe (2004) opine such documented and programmed instruction with ICT would assist the learner in his learning process. Learner will acquire relevant information, ideas, knowledge, learning experience and thought-provoking drills are disseminated for leaners consultation using computer and the internet. ICT as instructional materials in education facilitates students' achievement creativity and the development of higher order thinking Ogboji (2006). This is because ICT as instructional material use combination of text, sound videos that attract, engage, and retain learning. Mezieobi (2008) reported that the use of computer, internet, the smart board, and web resources supports and enhance the teaching and learning in education. ICT impacted on virtually every sector of humanity. It also helped in re-engineering and repositioning education through various modern tools and techniques. The following are the advantages of ICT:

- Educational Networks- The whole world is indeed engrossed in what has been described as the information age in which computerization has become the order of the day. It is expected that if we belong to this information age then we must all be computer literate to exploit the benefits of educational networks.
- E-mail. This information flow in the form of computer-to-computer communication is described as e-mail. It is a system that allows test-based messages to be exchanged electronically between computers or cell phone.
- Computer-based instruction: The computer can serve as a teaching machine to deliver programmed instruction to learner. This could be adopted for regular instruction from pre-primary to university level in conjunction with textbooks lectures, films, and discussion, for enrichment of curriculum especially for students who want to pursue their interests outside scheduled class lesson.
- Electronic learning: This is the acquisition of knowledge and skill using electronic technologies such as computer and internet-based courseware and local and wide area networks.
- Special interactive guidance information: Teachers can organize special guidance and counseling services system through educational network.

This makes students to secure help from their teachers without physical contact with them.

Impact of ICT on Teaching and Learning

The following impacts are:

- ICT supports the delivery of educational resources particularly course materials ranging from printed books and charts through radio and television to multimedia computers and internet.
- ICT makes education to become more productive by speeding up learning and enabling students to invest more time in the application of acquired knowledge and creativity which can lead to breakthrough.
- It provides a more scientific basis for designing instruction in a sequential manner and utilizing adequate instructional materials and other reinforcement strategies.
- It makes instruction richer and more powerful in influencing learning through the application of new forms of communication and technology by which distant and remote events can be brought close into the learning situation, use of films slides photographs and film strips.

- Information and Communication Technology simplifies the task of the teacher in communicating abstract concepts to learners by helping to bridge the gap between theory and practice Learner can study reality through computer simulation and the use of various media that are capable to bringing the world into the classroom.
- ICT has further led to individualized instruction thereby enabling learners to proceed at their own rates using programmed instruction learning packages and computer terminals
- Emphasis on technology has led to broadening of the academic curricula to include legitimate courses in vocational areas such as home economics, journalism, accountancy, photography environmental design, animal husbandry, television, and broadcasting, electronic and puppetry.
- ICT improve access and equity in education by influencing open and distance learning. ICT has made it possible for instruction to be brought to individual homes through radio, television broadcasts and through the internet.
- ICT can improve students' literacy. Stated by Adonis (2006), the effective use of ICT can upgrade the students' literacy and numeracy. Microsoft word can motivate the student to learn writing skill. They can enjoy and being excited typing many new words using computer. It can also improve the students speaking and listening skills, they may work collaboratively with their peers, teacher, and parents.

ICT Integration in Nigeria College of Education

Much of digital technologies are used in pedagogical practices by teacher educators in Nigerian Colleges of Education and other institutions of higher learning. Most of the institutions do not have the necessary ICT facilities for instructions and research neither the teacher educators possess the needed skills and competence for effective integrating of ICT in classroom instruction Agbatogun (2006). Level of ICT literacy among academic staff and students in Nigerian Colleges of Education is still very low, Ololude (2006). Most of the teachers in Nigeria all levels do not have the needed experience and competence in the use of computers either for educational or industrial purposes, neither do they have the needed skills and knowledge in the use of common computer software, Onasanya (2010). ICT education is more literary thus it is practical in terms of physical use. When teaching and learning is accessed critically in Nigerian Colleges of Education it could be observed that the challenges for teacher educators is no longer in covering the course contents, but in having access to ICT and using it to enhance teaching and learning (Nnabuo and Obasi, 2004).

The application of ICTs in teaching and learning includes radio lessons, T.V broadcast lesson, computer assisted instruction, distance learning, video conferencing and simulations. All these applications communication is involve the learner in visual contact with the source of information. In its information development programme, a series of knowledge maps that revealed what is known about the benefit of ICTs to education led to these conclusions.

- Radio instruction has been used widely and is reasonable well studied.
- Television has been used with success in a few places-in Latin America and China mechanism for reaching out of school youth
- The use of handheld devices is receiving widespread attention. Although little research has been done on the use of handheld devices such as personal digital assistants and mobile phones in education, it is becoming very popular especially in Nigeria.

From the foregoing analysis, ICTs offer opportunities for dynamism in the application of teachers' creative imagination. Contrivances used in conventional classroom situations can now be transformed into digital forms to make them more exciting and intellectual challenging teaching aids.

Conclusion

Education is the cornerstone of sustainable development: it contributes to building a modern and thriving society and empowers communities and citizens to fully participate in development and prosperity. ICT can help respond to these challenges and create the environment that is conducive for effective and quality educational systems toward this end ICT supported education should be high on the agenda of the Nigerian government, in order to reach the Millennium goal of Education for All, ICTs should be integrated in our national educational systems at all levels and should serve as a major wake-up call to Nigerian government and stakeholders and all other people working on the educational

Colleges in the country to stop talking and start acting. If ICT properly implemented, it would position the country's educational system on pedestal capable of transforming the education sector to become comparable globally.

Recommendations

1. Government at all levels should make available adequate funds and resources particularly for the funding and sustenance of tertiary education.
2. Tertiary institutions should be equipped with modern and advanced technological infrastructure to enable the effective use of appropriate technologies required for teaching and learning programmes.
3. Government should ensure the constant supply of power to tertiary institutions to aid the use of ICT associated facilities.
4. Information and Communication Technology foundation classes should be made compulsory at both primary and secondary levels to integrate ICT into the curriculum of schools. This will make ICT to become part of students.
5. Students in tertiary institutions should be encouraged on the use of internet to solve their academic problem.

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INQUIRY READING AND ICT INTEGRATION FOR ALLEVIATING SECONDARY SCHOOL STUDENTS' COMPREHENSION UNDERACHIEVEMENT

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Abstract
The teaching of reading is an essential aspect of literacy development and as such has occupied an important position in academic work. However, the poor performance of students in English Language Examination has raised suspicion that reading is not well taught in schools. Subsequently the poor performance has been blamed largely on students' inability to comprehend what they have read. Scholars have adopted the use of several intervention strategies, however only a few have approached the teaching using inquiry reading strategy with information and communication technology tools to meet the 21st century learning skills. Studies have shown evidence of technology in reading comprehension achievement. There are also evidence of integration of technology into inquiry-based pedagogy. Thus, this paper explains the effectiveness of the use of inquiry reading strategy with ICT incorporation based on theoretical and empirical evidence. The writer posits that if well supported with ICT tools, the use of inquiry reading will alleviate students' comprehension underachievement. It was recommended among other things that teachers of English Language should attend seminars and workshops to prepare them very well for the classroom tasks.
Keywords: *Inquiry reading, ICT integration, Students comprehension achievement*

Introduction

Reading is an essential language skill needed for success in any academic work be it at the primary, secondary and tertiary level of education. It is one of the most fundamental components of the primary and secondary school curriculum in Nigeria. It has occupied an important position in academic work due to its usefulness in developing holistically, an educated and literate person. Reading is the first of the two literacy skills, and it is also use in so many ways. Reading has been given different definitions. Ibitoye (2011), citing Macmillan intimated that reading is the process of recognizing written and printed words and understanding their meaning. Kolawole and Bateye (2017) defined reading as identification of symbols and association of appropriate meaning with them. An efficient and successful reader is one who comprehends what he or she has read. As such, many scholars viewed comprehension synonymous to reading.

Comprehension has been referred to as a process of demonstrating an understanding of a text or a reading material (Snow, 2002). To Kolawole and Bateye (2017) comprehension simply means the laying hold of the meaning underlying a text or passage. Reading comprehension on the other hand as a compound term was referred to by Lawal and Adebileje (2000) as a process of deciphering the author's intention through the strategic use of thinking, questioning, anticipating, evaluating, and interpreting skills. writers noted that inability to possess and apply the above skills is inimical to proper understanding of the passage read.
In recognition of the importance of reading comprehension as one of the major components of the English Language curriculum, it is examined at the primary, secondary and tertiary levels of education in Nigeria. The component is examined in Senior School Certificate Examination in English Language by West African Examination Council (WAEC) and National Examination Council (NECO). Despite the importance attachment to reading comprehension in academic work, the results obtained by the students from the West African Examination Council (WAEC) statistics between 2012 - 2015, revealed the poor performance in English. Ezeokoli and Fasan (2013) noted that many of the students cannot read and understand any given passage well. Adetunji and Olagunju (2014) informed that the poor performance of Nigerian students in English language public examinations has been located partially in their lack of competence in reading comprehension.

The West African Examination Council (WAEC), Chief Examiner's Reports from the statistics of results obtained between 2012 - 2018 showed that the percentage of credit passes fall below 50% for the period. The persistent below average performance of the students has been linked partly to students' inability to answer comprehension questions correctly and also inability to read and answer summary questions correctly. WAEC Chief Examiners' Reports of

2015 and 2016 indicated that students' failure in English is mainly due to their inability to perform effectively in reading comprehension and summary aspects of English. According to Okebukola and Apari (2021), comprehension skills is needed either to answering comprehension questions or summarizing a reading passage or text.
Over the years, language educators and researchers have been so much concerned with the task of improving the effectiveness of teaching reading in the classroom. However, only a few have focused on addressing the problem through effective use of comprehension strategies, and the use of eclectic approach to teaching reading in the classroom (Olagunju, 2019). According to Isiugo-Abanihe (2002), the whole literacy in English especially in a second language environment such as the Nigeria classroom can be promoted through a well-designed reading programme. Most of the approaches used by the teachers in secondary schools have been largely teacher – centred, traditional method. Solid evidence is found that the use of combination of strategies improves reading comprehension compared to traditional approaches (National Reading Panel, 2000).

The review of relevant literature on reading comprehension instruction has revealed that reading is a complex process that requires the use of cognitive, meta-cognitive and affective /social strategies (NRP, 2000, Murnane, Sawhill and Snow, 2012 and Olagunju, 2019). Also, the bulk of instruction on reading comprehension in the last three decades is guided by cognitive view of reading and constructivist conceptualization of comprehension. To alleviate the problem of comprehension underachievement, researchers have suggested the use of instructional strategies which are student – centred and eclectic in nature. Thus, a student-centred, holistic meaning-oriented reading instruction that facilitates readers' ability to process meaning actively from text, is the focus of this paper.

A student-centred constructivist approach to the teaching of reading in school involves the use of inquiry-based reading strategy. Araromi (2002) listed seven reading strategies that can be used to promote reading in schools. One of the strategies is inquiry reading strategy. According to Araromi (2002) the strategy promotes deeper understanding of the text through a longer concentration and practice. IRS has the potential to enhance students' understanding of reading material through thinking skills, questioning skills, and communication skills.

Inquiry Reading and Students' Comprehension Achievement

Inquiry reading strategy from the available resources is the most solidly supported to improve comprehension. Diego-Medrano, Coneway and Williams (2016) reported that the International Literacy Association (ILA) and the National Council of Teachers of English (NCTE) considered literature and inquiry circles as best practices in teaching reading. Moreillon (2014) explained that inquiry strategy and reading comprehension instruction are processes that go hand in hand. In a study conducted to improve reading comprehension of students, using a classroom action research (CAR) Burhanuddin (2012) reported that there is improvement in students' literal comprehension and interpretative comprehension using an inquiry method. Al-Jadili (2018) result showed that using inquiry learning strategy has high impact on developing reading comprehension and self-regulation among ninth grades in Gaza.
In another related study, Olagunju (2019) investigated the effectiveness of inquiry-based strategies on literacy skills of senior secondary school students in Oyo, Nigeria. The result of the quasi-experimental study showed that there is a statistical difference between the mean score of students using inquiry strategies and the control groups on reading comprehension and composition writing. The result collaborates Burhanuddin (2002) study which emphasized that teaching reading through inquiry method is a good way to improving the students' reading comprehension. It is in accordance with Al-Jadili (2018) who observed a remarkable effect of inquiry learning strategy on developing reading comprehension and self-regulation among students.

Theoretical Framework

Lee Vygotsky (1978), social constructivist theory (SCT) provided the framework for the use of inquiry reading and ICT integration in promoting students' comprehension achievement. Vygotsky is a pro-constructivist theorist whose work focused more on social interaction as primary source of cognition and behaviour. It is Vygotsky that brought the concept of social learning into constructivism when the notion of zone of proximal development (ZPD) was given global acceptance.

Reading strategy approaches are rooted in theories about the importance of active involvement, self-regulation, explicit knowledge, and the use of mental strategies (Guthrie and Klauda, 2014). The available literature on inquiry

practices in recent time (e.g., Byker, Coffey, Harden, Good, Heater, Brown, and Holzberg, 2017) explained specific practices, like technology integration, collaboration learning that educators use to support inquiry related tasks.

Effectiveness of Interactive Technology on Reading Comprehension

Today's world is interacted with ICT integration and scholars have drawn special attention to today's digital age and the implications of digital/ICT literacy on educational development in general and for literacy learning. In the words of Obanya (2019), "The digital age has been making a firm entry into teaching and its already getting hold of language teaching and learning, building on the age-long audio-visual methods. Various audio-visual aids have been used in the past to promote the teaching of reading comprehension. Lawal and Adebileje (2000) explored the use of advance organizers in comprehension lessons. The organizers helped to improve students reading, comprehension and learning. Iyare, James and Amonde (2018) noted that one of the salient trends for more than a decade has been the rising importance of integrating technology into the classroom and its effects on the performance of students in reading comprehension. The researchers provided empirical support to show the positive effects of technology-based approaches for addressing reading comprehension skills of K-12 school students in Jamaica. The researchers found a significant difference between the reading comprehension outcomes of students who were taught using interactive technology and those who were taught by the traditional chalk and talk method.

The use of ICT tools promotes multiple paths to knowledge and skill acquisition. It is also a step forward to meet the twenty-first century learning skills which according to Orelus (2019) include creativity, critical thinking, communication, and collaboration (CCCC). These learning skills are linked to effective teaching of reading comprehension. Reading comprehension according to Snow and Sweet (2003), is widely seen as a key to understanding written communication which is especially important to students in the later elementary grades. The writers noted further that reading comprehension shapes students' ability to understand what is read and provides the skills necessary to participate in the 21st century workforce. It can be deduced that the 21st century learning skills (CCCC, Orelus, 2019) are also skills to be developed through reading comprehension.

Inquiry Reading in an ICT-Rich Environment

To support inquiry pedagogy, researcher have advocated integration of inquiry process with ICT methodology. Hrast and Savec (2018) explained that apart from teachers, it is important for students to experience ICT – supported inquiry-based learning. The writers had earlier indicated that recent information and communication technology enhanced inquiry-based learning. Castro and Aleman (2011) found that technology - enriched environment has significant effect on students higher - order thinking skills. In many countries of the world, teachers use social network site tools as a means by which more learner-centred and social constructive pedagogy may be designed in an online environment. In other research, (e.g., Castro and Aleman, 2011), has indicated that ICT assist in transforming a learning environment into a learner-centered one. Fu (2013) indicated that multiple resources are abundant on the internet and that knowledge can be acquired through video clips, audio-sounds, visual presentation and so on. Students can also learn how to apply and use higher order thinking skills while reading with the help of the tools. Lawal and Adegbileje (2000) had earlier emphasized the importance of advance organizers in teaching reading comprehension.

To meet the learners, need for 21st century learning with application of ICT knowledge and skills, instructional media tools (such as video, tapes, hand phone, tablets etc.) can be used to aid students' acquisition of comprehension skills. Students at all levels of education are already hooked to different social media to communication to parents and peers. The tools can be designed as support tools for effective scaffolding of comprehension instruction using inquiry methods. Examples of the support strategies include videos, charts, advance organizers, and so on. Alibi and Afumadu (2021) noted that technology for instruction have cut across software programmes, video disks, compact disks, video and video tapes and data bases.

However, successful integration of ICT into the learning environment will depend on the ability of teachers to structure learning in a new way to merge technology appropriately with pedagogy, develop socially active classrooms, and encourage cooperative interaction. It has been observed that the curriculum of the present educational system in Nigeria does not give preference to the use of information and communication technologies in the classroom (Alabi and Afumadu, 2021). One of the challenges of the use of ICT resources is that in many schools' students are not allowed to use mobile technology in the school premises and some teachers and parents believe that secondary school

students are still young to interact with social media platform. This resulted into lack of pedagogical confidence and negative attitude to the use of ICT.

Another factor is in-service and pre-service teachers' attitude, perceptions, and confidence in using ICT. For instance, in the Nigerian context, majority of the teachers with 15 and 20 years of teaching experience left teacher training colleges and universities without been adequately trained on how to use ICT. There are also other perceived typical constraints of conventional classroom setting such as lack of electricity, absence of electronic gadgets to mention just few.

Conclusion

ICT has come to stay with us and has been an integral part of teaching and learning process. Although, the use of ICT and social media platform among the adolescents is currently on the rise, the effective use of ICT with reading strategies to aid comprehension is yet to be given much attention in a typical convention classroom. Fewer studies have presented a framework for integrating ICT technology and inquiry-based learning pedagogies in the classroom and have also shown the effectiveness of the innovation in teaching reading comprehension. Considering the positive results from previous studies, the need to brace up for the challenges of the new digital age and the need to improve teaching quality in English language classroom, should be the priority for stakeholders in Education in Nigeria.

Recommendations

Based on the evidence in support of ICT integration in reading comprehension pedagogy, the following recommendations were made:

1. Based on the evidence in support of the use of IRS and ICT integration, teachers should adopt and apply digital resources to teach reading comprehension.
2. For teachers to assume new roles in this digital age, government should ensure that schools are equipped with ICT facilities to complement efforts of some old students' association and cooperates bodies.
3. Stakeholders and head of schools should ensure that secondary school students and teachers have access to ICT gadgets in school to complement those that are available for the students to use at home.
4. School management system should ensure that teachers' attend seminars and workshops in relation to the use of inquiry reading strategy and ICT integration.
5. School principals should liase with other stakeholders to make sure that school libraries are stocked with supplementary books and content area materials so as to promote reading culture in schools.

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UTILIZATION OF ICT DEVICES BY RESILIENCE SCHOOL ADMINISTRATORS IN ENHANCING QUALITY SERVICE DELIVERY IN COLLEGES OF EDUCATION, OYO STATE

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Abstract
The only thing that is permanent is change. In the time past slate and chalk was used for those in elementary schools. It has changed to paper-pencil in this era. To gain admission into tertiary institutions in the past one can apply to two or three higher institutions but nowadays examination is done jointly called Universal Tertiary Matriculation Examinations UTME. Letter of admission would be posted through post-office to successful candidates in the past, it has changed now; it is through text-message(s). Typewriter had been replaced with computers. The paper examined how administrators make use of information communication devices in facilitating their services to the recipient; students, staff, and entire community at large. it also discussed the boon and bane of ICT in quality service delivery of administrators in their institutions. Path-Goal Theory which buttress the performance of resilience school administrators was stressed while challenges hindering use of technology in the classroom was itemized and explained. The paper concluded that administrators should be encouraged to cease from using manual gadgets in the cause of service delivery while government needs to provide modern electronic gadgets for administrators to run the affairs of tertiary institutions.

Introduction

Teaching and learning in a digital society do not mean technologizing education. The human interaction, the state of being connected between students and teachers and vice-versa is an essential component of teaching-learning. The rapport between teachers and students has drastically changed because of the innovation of the new millennium. Teachers are no longer the custodians of knowledge or information in this age of technology. The technology is so versatile that it has reduced the risk of travelling to a far place to have access to information. At home, in offices, social media, communication, agriculture, health services market men and women and others make use of technology in one way of the other. Technology is so important to the extent that some people find it necessary to buy airtime on their phone and fail to eat appropriately. Kiddes at home are familiar with the ringing tones of cell phone of their parents. Children when they get to school discuss the movies they watched or advertised on television sets at home among peers. Elderly brothers and sisters narrate different stories from films they watched to younger ones, and up to students in tertiary institutions share similar stories

Some of the devices that aids teaching learning process in this 21st century include but not limited to computers, internet models, two-dimensional objects, projectors, programmed instruction, videotape recorder to mention but few. The school administrators in higher institutions of learning are the provost for colleges of education, rector for polytechnics and vice-chancellor for universities. The position of these administrators is so germane that the school management is not complete with the named position in the school management. In about last two decades, typewriters were used to type documents and prepare question papers, production of certificates were mostly done using manual by fine arts professionals. The use of technology devices had made the work easier and faster than the old methods of producing documents. Objective questions are being marked with the aid of machine by examination bodies such as WAEC and NECO, UMTE respectively. This has reduced the number of omissions in names and grades of candidates sitting for each of the examinations. However, Bolanskat and Gertsch (2010) also found that there were considerable variations in how different countries were defining and prioritizing the use of technology in the schools. In everyday use people tend to think about resilience as the ability to bounce back from an adverse event to set of circumstances.

Resilience is the process of being able to adapt well and bounce back quickly in time of stress. Academic resilience is a concept that focuses on strength and optimal functioning of learners. It is not a gainsaying that learners experience the same challenging tedious experiences academically, resilient learners can turn stressful happenings to opportunities for personal growth and benefit (Santhosh and James, 2013). This can be initiated by the school administrators which goes down to management of the school down to deans of school, directors of programmes, then to the head of departments down to the lecturers and finally to the students in general. Admission letters were sent through the school heads to candidates for examinations and conduct of interviews about two and a half decades ago

to post offices. The problem with the postal system is many in some cases, the letter would not get to the owner until after the interview had been conducted. The use of ICT devices has made it possible for administrators to text messages to candidates short-listed and reach them quickly despite short notice. There has been a tremendous improvement in collation of results within the organisation. The only standing problem is when there is power failure which can hinder quick attention to issues. The paper pencil-test had been replaced with Computer Based Test (CBT). A lot of research work had been done on information communication technology. Scholars such as Zuhaib Hassan & Muhammad Qazi Abru (2016) Lazarus Makewa, Jackson Meremo, Elizabeth Role & Jesse Role (2013) Gray, Thomas & Lewis (2010) had written on Information Communication Technology, but they had not written on how the devices could make the work of administrators of tertiary institutions easier and facilitate discharge of duties. Premise on this point, I want to fill the gap which scholars have not paid a rapt attention to.

Administrators face numerous challenges in performing daily work most importantly if there is no proper utilization of technology or in manual process. These pose a serious threat to administrative work in schools. As a result of this inadequacy, there is need to solve administrative problems of administrators to establish a productive administrative process within tertiary institutions, and with the integration of ICT devices to its maximum use can help to solve many of those challenges (Kolawole, 2012). In the opinion of Krishnaveni: Meenakuman (2010) the three major functional areas in Higher Education Institutions are students' administration, staff administration and teachers' administration. Effectiveness is a goal set by administrative leaders through their leadership strategies to help organisation reach certain achievements across the board and technology applications (Ghavifekr, 2013).
Parents and other beneficiaries of education are embittered with the outcome of the schools most importantly schools owned by government to the extent that they now seek a substitute for the education of their children even where education is free in some states (Usman Yunusa, 2016) Usman emphasized that among the inadequacies of quality service delivery are politicized employment and appointment of school heads, flawed administrative system and improper supervision among others. The integration of accountability in the education management processes helps a lot to improve service delivery, controls indiscipline and increases efficiency in the organisation. The opinion of Usman, Nakpodia and Okemute were similar when the two authors opined that administrator needs to recognize that accountability in education as an essential ingredient that is intertwined with subordinate within the organizational framework (Nakpodia and Okemute, 2011)

Boon of ICT in Enhancing Quality Service Delivery in School Setting
In the contribution of Nduati & Bowman, (2005) the use of ICT has not been extensive in school management worldwide as found in other fields such as business and engineering. In their argument, it was opined that African countries have only recently begun to show the micro economic stability needed for education development and therefore the need to integrate ICT in educational management has become real more than ever before. The application of ICT in this 21st century helps in improving efficiency in the delivery of government services, builds resilience to economic shocks, natural disasters and change in climatical conditions. In (2010) Brannigan believed in recent times, there has been a global explosion in the use of computers in schools as an instructional, communicative, and informational resource tools by use of databases, spreadsheets, multimedia, email, and networking. ICT integration and data management helps educational administrators to have basic information on student and teacher flows, school supplies, how much the organisation is spending on various inputs, to make the most basic resource allocation decisions. It has made these data more widely available to school personnel, parents, and the public at large through central school management web and in some countries through direct access to central or district databases by school personnel (Organization for Economic Cooperation and Development, 2015).

ICT have been promoted in education by positive effects for teachers and students alike. Teachers use them as a positive influence on instructional effectiveness, job satisfaction and professional challenge (Badmus, 2018). The use of ICT helps in programmed instruction, programmed learning is an educational device for effective learning and successful mechanism of feedback for the modification of student behaviour. It is a practice of breaking down a subject matter into its constituent elements and requiring the students to master one step before going to the next step (Odekunle, 2018). Making use of ICT has contributed to professional growth of teachers. This has helped them in the use of scientific methods for solving educational and administrative problems. It has also added to teaching competence of teachers. Integration of ICT was emphasized in the National Policy on Education (2014). It was stated that government shall provide infrastructure and training for integration of ICT in the school system, in recognition of the role of ICT in advancing knowledge and skills in the modern world. The government of Nigeria is interested in making the system of education of high quality comparable to what is obtainable in the world (NPE, 2014).

ICT promotes students-centre learning and appears to be speeding the rate of learning in our institutions. Observations revealed that the perceptions of our students have changed when they are continually exposed to the capabilities of ICT. Practice makes perfection, the more the students become positive towards integration of ICT use the more likely that students develop better skills on it's and be familiar with the system. (Barakabitze, 2017). ICT enhances the development of national infrastructure, providing modern telecommunication networks to supply competitive and affordable telecommunication services for citizens and appropriate channels for the purpose of successful delivery to citizen services (Dissanayake, 2011). In managing education, there is need for improvements in learning achievement, putting emphasis upon adult illiteracy, and eliminating female illiteracy upon provision of basic education and skills development programmes among individuals and their acquisition of education by the individuals and their families primarily in terms of knowledge, skills and abilities which are required for the sustenance of the living conditions (Desai, 2010).

The internet is regarded as the powerful force that has rendered a significant contribution in promoting development and innovative practices and gained much prominence that individuals are regarding it as an integral aspect that facilitates the implementation of their duties. The merits derivable from technologies can be seen and noticed in relations to individuals, organisations, communities, villages, and nation (Meenakshi, 2013). The use of ICT resources in teacher training is motivating and effective than the conventional means of preparation of teachers. Technology and the internet have been found to contribute to teaching effectiveness and learners' satisfaction in instructional procedures (Kapur, 2019). Now schools are taking to benefits of ICT to deliver knowledge and information to children, ICT has become a core in the teaching-learning process. It has replaced black boards with whiteboards and implemented the usage of a digital smartboard for teaching (Manpreet Kaur, 2021).
Afshari, Bakar and Wong (2010) assert that administrators need to be cognizant of the benefits of the new technologies. If administrators understand the value of ICT and its benefits, they can implement innovations in schools. Technology provides students more practice in reading and writing as well as online literacy to meet their future needs. In the contribution of Drew, (2013) students need to be prepared as skilled and strategic readers, writers, and communicators in online environment. He emphasized that teachers should open the "ceiling of teaching" by expanding the information resources to include wider areas outside the walls of school to connect students with reality. (Drew sally Vatentino (2013).

Bane of ICT in Education

Just like any other system or innovation ICT too comes with certain limitation but majority of specialist in education ignore the elements. Some of the disadvantages of ICT are as follows:

- Teachers require experience to handle it since there are different areas of specialization in the field of education, many find it difficult to operate without workshop/demonstration to the personnel involved.
- It is a risk to the traditional book and hard writing methods. This can be seen in the life scripts of candidates in WAEC/NECO/ examinations where candidates write jargon e.g Urs (yours) stud (student) apps (application) etc.
- It is not accessible everywhere: In some hamlet, villages, ICT is not accessible where thousands of people are still living in the conservative idea.
- Managing course online is full of unavailable challenges during virtual learning.
- Most of the time, there are a lot of misleading and misguiding information apart from risk of cyber attacks and hacks. Exam malpractice is another problem at all levels of education because of technology.

Path-Goal Theory

Within schools and districts, school leadership is critical to the success of school reform implementation (Leithwood, Harris & Strauss, 2010). However, how a school leader navigates the process of retracting depends on leadership styles. The school leader considers the nature of the task and characteristics of the teacher to provide the appropriate support for that individual (Northhouse, 2013). Path-goal theory has been used in several quantitative studies exploring the impact of school administrators' styles on teacher effectiveness at high school and college levels. Sirisookslip, Ariratana & Ngang, 2015) (Awan et.al, 2011). This goal stresses leadership behaviour regarding goal clarity, as well as employee motivation, utilize valuable lens for examining leadership behaviour in the context of innovation. The theory was propounded by Robert House, 1971 known as path-Goal theory. The main role of the leader is to be responsive to the emotional and psychological needs of followers. This behaviour is mostly needed in situations in which tasks or relationships are psychologically needs of followers. This behaviour is needed in situations in which tasks or relationships are psychologically or physically distressing. The theory emphasizes the importance of leaders'

ability to interpret followers needs accurately and to respond flexibly to the requirements of a situation. The path goal theory is directive in nature, achievement-oriented, supportive and participative (House and Mitchell (1974). Independent variables of path-goal theory are the leaders' behaviour which assumes that our people (leaders) are flexible in that they can change their behaviour depending on situation that arises. This is in conformity with research that while nature (genes) may be our internal guide, nuture (experience) is our explorer that has the final say in whatever we do as human beings (Ridney, 2003).

Challenges to Classroom Technology

Access: From the beginning / introduction/ integration of technology people focused much of their interest on increasing the availability of computers in school. Without much ado about nothing, the most basic step towards effective technology integration is the widespread access to equipment necessary to run educational computer programmes while many schools across the country are making the transition to one on one, many students do not have regular and reliable access to a computer (Warschaver, heng, Niiya, Cotton & Farkas, 2014). Inconsistent computer access makes it extremely difficult for instructors to integrate technology into existing programmes.
Training: In the opinion and reviews of Ertmer et.al one major reason for non-implementation of technology in the classroom is dearth of professional development and training. The national Education Association (NEA) includes expanding professional development in technology as one of their policy recommendations (NEA, 2008) Teachers today feel confident to say there is increase in number of people using classroom technology not aware that technology is not static; it is constantly changing, and they must undergo additional training to keep their skills up to date.
Support: In this 21st century, one cannot say for sure how the future will impact professional development. One thing that is noticeable is that teachers of today do not have optimal access to technological support. (Ert, 1999) opined that the most essential form of support to teachers can change as the technology integration natures.
Attitudes of Teacher: Attitudes of teachers are very germane in determining the role and effectiveness of technology in the classrooms. It is not a story these days that to some extent, technology is being used in schools, the most essential thing is how to best implement technology rather than whether technology will be utilized Ertmer et.al, 2012).
Feedback: Digital technology can assist in supporting feedback that will go to students. Training on the capabilities of different technologies will enhance teachers optimize their experience for students (Allen, Jacovina & McNamara, 2015).

Conclusion

Information and communication technology (ICT) plays an important role in enhancing quality service delivery of educational administrators in our tertiary institutions. Utilization of these devices in institutions of learning make the administrators effective, efficient, and up to date in discharging their statutory responsibilities. When (ICT) devices are adequately used, there would be proper accountability, proper school records, ease of conducting admission processes, student and staff records would be properly kept. The more information communication devices are utilized in tertiary institutions, the more efficient administrators are in administration of higher education. Government should provide new technological equipment for use of administrators to facilitate their efficiency at work. The use of manual gadgets is too old in this 21st century and therefore needs replacement and training of top executive officer to improve their performance at work.

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COLLEGES OF EDUCATION HAUSA LECTURERS' COMPETENCY IN ONLINE INSTRUCTION DURING AND AFTER COVID-19 PANDEMIC IN SOUTH-WEST, NIGERIA

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Abstract
All over the world today and since February 2020, the fear of Coronavirus is the beginning of wisdom. The disease is a respecter of nobody, either white or black. Even those vaccinated are not completely out of danger as it has metamorphosed and still metamorphosing into variants especially the delta variant that is currently ravaging the world especially India, Latin America, Middle East, and some African countries including Nigeria. All these has trigger lockdown and social distances that drastically affected the economic, social and education/teaching and learning activities in schools. The aim of this paper is to investigate the perception, competence and availability and accessibility of internet facilities for online instruction by Hausa lecturers during and after Covid-19 pandemic. All Hausa lecturers in Colleges of Education in South-west were the population and 20 Hausa lecturers were selected as sample. A 20 items questionnaire divided into two was the major instrument for data collection. The results were analysed using simple percentage. It was revealed that Hausa lecture perceived that online instruction is the best option for this time of pandemic, and a larger percentage of them are competent and ready for online teaching. Age, gender, and years of teaching experience has effect on their ability and competent for online teaching. Also, most of the internet in the institution under review did not connect to the various departments of the college. It therefore recommended that each department Hausa included be connected to the internet and ICT equipment be made readily available for use by staff and students.

Keywords: Colleges of Education, Lecturers, Online Instruction, Covid-19 pandemic, Perception, Competence.

Introduction

The outbreak of the novel coronavirus which emerged in December 2019 in Wuhan, China (Covid-19, formerly known as 2019-nCoV) represents a significant and urgent threat to all. The emergence of the virus has so far disrupted economic, social, political as well as educational activities. The devastating effects of the pandemic on life, health, education, and economy globally cannot be over-emphasized. It has affected more than 180 countries across the continents of Europe, Africa, Asia, North America, South America, and Australia/Oceania (McIntosh, 2020). As a result of the devastating effect on the citizens of the planet by the increasing cases of the Coronavirus around the world, the World Health Organization on March 11th, 2020, declared the Coronavirus as a global pandemic.

The implications of the coronavirus pandemic saw the abrupt shutting down of higher institutions of learning by government, and students were told to vacate campuses as one of the measures to curb further infections. Such effect curtly distorted the ongoing face-to-face classes programs of the various institutions of learning. Without an iota of doubt, the closure of these institutions would have a dramatic impact on the students, higher education sector and countries' economic development (Tamrat & Teferra, 2020). The ripple effect of such action includes disruption of student cognitive learning process, delay in student graduation, tendencies of postponing academic sessions, and likelihood of student indulging in unwholesome behavior during the lockdown known as juvenile delinquency amongst others.

To bridge the gap and ensure uninterrupted educational delivery, universities across the continent are setting up institution-wide task forces to mitigate the impact of the pandemic. Many are attempting to shift to online teaching and learning through institutional, national, continental, and international initiatives. Online learning is seen as alternate learning that its entirety is dependents on the use of internet and some other important technologies with no physical recourse to classrooms between the students and lecturers. (Tamrat & Teferra, 2020). To continually engage the students with their respective courses and programme of study, many higher institutions of learning in developed countries have quickly switched to online learning. (Awojide, 2020). In the same manner, many low- and middle-income countries are making concerted efforts at adopting the same approach; however, this has become a difficult

task due to deficient infrastructure, mixed perception and inadequate preparedness by the institutions and students. The idea behind adopting online learning during the pandemic is that it provides great flexibility in teaching methodology, content management, a synchronous and asynchronous interaction between teachers and students, organizing and structure of courses. In addition, it provides distance learning that can create new learning environments to achieve prosperous academic program as well as provides tools for students to be in contact with peers and teachers inside and outside the classroom without spreading Covid-19 (Tamta & Ansari, 2017; Rasouli, Rahbania & Attaran, 2016).

The COVID-19 is a highly infectious disease or illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), originated in Wuhan city of China, has already taken on pandemic proportions, affecting across all the continents (Remuzzi & Remuzzi, 2020), mostly spread among individuals during close contact now resulting in millions of deaths. COVID-19 is referred as pandemic due to its severity and fierceness also as the greatest global health crisis since after centuries in human civilization. The onset of the novel coronavirus made everything from world economies to social rituals (Schulten, 2020) devastated. For that reason, the International Labour Organization (ILO) estimated that 195 million jobs could be lost (UNDP, 2020). One of the most preferred ways to subdue the effect of this crisis is to enact the COVID-19 containment measures in their respective territories (De Brouwer, Raimondi & Moreau, 2020). Nowadays lockdown is a common buzzword that has been mulled over by the people during corona pandemic. In fact, lockdown is a state of the emergency protocol implemented by the competent authorities (in this case it is central and state governments) to restrict people from leaving their place of living resulting in mass quarantines and stay-at-home across the world since March 2020. The coronavirus triggered the first phase nationwide lockdown in India which began on March 25, 2020, for 21 days and subsequently repeated on April 15, 2020, for 19 days as the second phase; on May 04, 2020, for 14 days as the third phase; on May 18, 2020, for 14 days as the fourth phase and on June 01, 2020, only for containment zones taking 16 days. To get control over COVID-19 pandemic is possible to a greater extent with people's unbridled determination of the stringent precautionary measures such as maintaining social distancing, following medically instructed quarantine process, and embracing hygiene and sanitation (Khachfe et al., 2020).

Health experts believe that the new strain of coronavirus originated in bats or pangolins, but the first transmission to human beings was from a chemical laboratory in Wuhan, China. From there, and since then, the virus spread all over the continents, regions, and country to country through person-to-person contact. This is done by sneezing, coughing, handshaking and touching rough and contaminated surfaces or objects. One of the preventive measures is wearing face or nose masks, washing one’s hands with an alcohol-based sanitizers and keeping at least two metres distance from others. Crowded social gatherings must also be avoided (United Nations, 2020).
Coronavirus is a group of viruses that can cause disease in both humans and animals. According to health scientists, the severe acute respiratory syndrome known as SARS virus strain also called SARS-VOC is an example of Coronavirus, SARS spread rapidly between 2002 and 2003. The new strain of Coronavirus is called severe acute respiratory syndrome Coronavirus 2 or SARS-COV. 2). That virus again causes Coronavirus disease 19, currently called COVID-19. Covid-19 symptoms are mild flu-like symptoms, cough, and difficulty in breathing. It is however said that 80% of people with Covid-19 recover without specialist treatment while only one in six people may experience severe symptoms such as trouble in breathing. The new coronavirus has spread rapidly in many parts of the world, this prompted the World Health Organization to declare Covid-19 a pandemic on March 11, 2020. According to the World Health Organization (WHO) trusted source, a pandemic occurs when a disease that people are not immune to spreads across large regions and affects large numbers of people.

Coronavirus has drastically affected the life of people globally, forcing government to declare social distancing and then total lockdown. These measures have resulted into disruption of economic, social, political as well as educational activities. As a result of the devastating effects on the citizens throughout the planet by the increasing cases of the coronavirus around the world, the World Health Organization on March 11, 2020, declared the coronavirus as a global pandemic (UNESCO, 2020). This led to the shutting down of higher institutions of learning by government and students were told to vacate their campuses as one of the measures to curb further spread of the infections. Such effect eventually negatively put a halt to the normal and usual teaching and learning in classes of various institutions. The closure of these institutions would have a dramatic impact on students in the higher education sector and countries’ economic development (Tamrat & Teferra, 2020). The ripple effect of such action includes distruption of student cognitive learning process, delay in student graduation, tendencies of postponing academic session, and likelihood of students indulging in unwholesome behavior during the lock down known as juvenile delinquency among others. To

bridge the gap and to prepare for any unforeseen circumstance, and to ensure uninterrupted educational delivery, universities across the continents are setting up institution wide task forces to mitigate the impact of the pandemic. Many are attempting to shift to online teaching and learning through institutional, national, continental, and international initiatives (Khan, 2020) Online learning is seen as alternative learning that is entirely dependent on the use of internet and some other important technologies with no physical recourse to classrooms between the students and lecturer. Many universities across the world and privately owned universities in Nigeria have shifted to online teaching during the pandemic, some public higher institution in Nigeria is also considering the online option. Lederman (2020) justly stated that due to the COVID-19 crisis teachers and students both find themselves in the situation where they felt compelled to embrace the digital academic experience as the summum bonum of the online teaching-learning process. Through digital intelligence (DQ Institute, 2019) teachers can cater children's digital skills which are on the brink of cyber risk into the educational opportunities to get success in future ventures especially in this pandemic where children are wholly dependent on online learning. The coronavirus is upending life (EdSource, 2020) that caused an enduring threat to our educational institutions from kindergarten to tertiary level and day by day exacerbated the teaching-learning. Apart from the philanthropic efforts, some people hoped to parlay their enterprising skills into profit-making opportunities.

For any innovative changes, external and internal, both forces are held responsible as Lewin (1958) discussed the three-step process (unfreezing → changing → refreezing) in his change management theory, which delineates the inherent process of any change. Unfreezing of traditional teaching-learning occurred during unforeseen circumstances out of COVID-19, which brought to the shift into online teaching because of anticipated uncertainties in pursuing the traditional mode. As of today's scene, it is quite impossible to take classes in regular mode amid the COVID-19 outbreak in which to maintain the social distancing is of paramount importance; hence undoubtedly online teaching mode became a necessity that brought an organization and individual both in a unfreeze phase. Unfreezing step provided an opportunity for motivation and readiness among system and stakeholders (Siegal et al., 1996). However, College of education Hausa Language lecturers

Objective of the Study

The objective of the study is to investigate perception of Colleges of Education Hausa lecturers for online teaching during and after Covid-19 pandemic in Southwest, Nigeria. To determine the level of competence of Colleges of Education Hausa lecturers for online teaching. The study also investigates availability of ICT equipment as well as its accessibility and usage of internet facilities by these lecturers.

Research Questions

The following research questions addressed the objectives of this study:

1. What are the ICT resources available for Hausa lecturers in Colleges of Education in South-west?
2. What level of competence do Colleges of Education Hausa lecturers possess for the use of online teaching?

Methodology

This study was a descriptive survey research. The population of this study consisted of all Hausa lecturers in colleges of education in Southwest, Nigeria. A researcher-designed questionnaire was used to elicit the needed data for this study. The content and face validity were ascertained by experts in the field of study who scrutinized the items and made possible alteration and suggestions. Test-retest reliability method was used with a sample of 20 respondents in all colleges of education in southwest, Nigeria within three weeks interval. The score of the test were correlated with the use of Pearson Product Moment Correlation coefficient and a reliability index of 0.87 was obtained. Two research questions were raised for this study and answered with percentage, mean and standard deviation, and bar chart was used to present the results. The sample consists of twenty (20) Hausa lecturers selected through random sampling from the six public colleges of education in Southwest, Nigeria namely Federal College of Education Osiele, Abeokuta; Federal College of Education (Special), Oyo; Emmanuel Alayande College of Education, Oyo; Adeyemi College of Education, Ondo; Adeniran Ogunsanya College of Education, Oto, Ijanikin, College of Education, Ikere Ekiti.

Results

Research Question 1: What are the ICT resources available for Hausa lecturers in Colleges of Education in Southwest?

Table 1

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)
1.	Desktops	20	80	0	0
2.	Laptops	0	95	5	0
3.	Projector	0	40	60	0
4.	Video Camera	0	20	60	20
5.	Projector Screen	0	80	0	20
6.	Computers	20	40	0	40
7.	television set and mobile telephone	20	0	20	60
8.	Radio set	20	0	60	20
9.	Photocopying machine	0	40	60	0
10.	printers, scanner	0	40	60	0

The data presented in table 1 revealed that all the respondents representing 100% agreed that online teaching is the best option in this period of COVID-19 pandemic. None of the respondents disputed that, On the availability of internet facilities in their various institution 95% agree that there are internet facilities in their college, while only 5% disagree, meaning that their college does not have internet facilities. As for having access to internet facilities of the College, 40% agree, indicating that they have access and remaining 60% do not have access to internet facilities of their college. Only 20% of the respondents agree that their department relates to internet while 80% of respondents disagreed. 80% of the respondents can conduct online teaching while 20% could not teach online. On the availability of ICT resources like departmental computers, television set, radio, photocopy machine and etcetera, all the respondents agreed that there are most of these facilities in their department except photocopying machine, printers, scanner, and projector which they disagree, this is represented as 40% agreed and 60% disagreed.

Research Question 2: What level of competence do Hausa lecturers in Colleges of Education possess for the use of online teaching?

The data collected for research question 2 was answered with the use of percentage and the result was presented in Table 2.

Table 2: Colleges of education Hausa lecturers' competency in online teaching.

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)
1.	You can sign up an e-mail and use it	0	100	0	0
2.	You can do some basic searches on internet	0	100	0	0
3.	You can do some basic work on Microsoft word and conduct virtual classroom	0	40	40	20
4.	You can use generic software application	0	80	20	0
5.	You can use the network record keeping software to take attendance, submit grades and maintain students' records	0	20	60	20
6.	You can do power-point presentation and video conferencing	20	20	60	0
7.	You can handle basic works such as the use of spreadsheet, inserting charts, graphs, and formatting cells.	0	40	60	0
8.	Male lecturers can effectively use internet facilities for online teaching than female lecturers	0	40	10	0
9.	Female lecturers can use internet facilities to teach online more than their male counterpart	0	10	90	0
10.	Years of teaching experience determine lecturer's competence in using online teaching.	0	0	80	20

The table 2 revealed that 100% of lecturers can access and sign up an e-mail, 90% of the lecturers are also competent to do basic searches on the internet. 40% are competent to do some basic work on Microsoft word and conduct virtual

classroom and 60% are not competent to do some work in Microsoft and conduct virtual classroom. 80% of the respondents can use generic software application while only 20% are not competent enough to use it. 20% are competent and 80% are not competent to use network record keeping software to take attendance, submit grades and maintain students' records. 40% are competent and 60% are not competent in using power-point presentation and video conferencing. 40% of the respondents can handle works such as the use of spreadsheet, inserting charts, graphs, and formatting cells while 60% are not competent to do it. 40% agreed and 60% disagreed that male lecturers can effectively use internet facilities for online teaching than female lecturers. 10% agreed and 90% disagreed that female lecturers can use internet facilities to teach their students online more than their male counterpart. 100% of the respondents disagreed that years of teaching experience determine lecturers' competence in using online teaching.

Discussion of Findings

The findings revealed that online teaching is the best approach to teaching and learning in the period of COVID-19 pandemic. It also observed that internet facilities and basic technology equipment such as computers-laptop and desktop, mobile telephone, photocopying machine, television are available in their various Colleges of Education though not enough to cater for all the students. Also, most of the Hausa lecturers are very competent in the use of ICT resources for online teaching. The findings also showed that gender and years of teaching experience have no influence on the ability or competence of the lecturers in teaching online. The internet facilities in the various Colleges of Education should be connected to each department for the lecturers and students to have free access to it. Online instruction/teaching should be entrenched for Hausa courses in Colleges of Education to have continuity even when the normal face-to-face lecturers is not possible or hindered. The management of the various institution should intensify efforts in training and re-training of lecturers and students on the use of ICT for effective teaching and learning.

Conclusion

Based on the responses gathered, the researcher concluded that Colleges of Education Hausa lecturers perceived that online teaching is the best and therefore should be adopted for instructional delivery in all our institution of higher learning to avoid wasting the time of students and extending their years of graduation especially during the time of pandemic.

Recommendations

Based on the findings of this study, the following were recommended:

The ICT facilities for teaching and learning should be made readily available to cater for all the learners since most of the lecturers are very competent in the use of the facilities.

The researcher also, recommended that further training on online instruction should be organized for colleges of education Hausa lecturers for better instructional delivery.

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ICT THE TRIPOD STANDS THAT INTEGRATES HIGHER EDUCATION IN-SERVICE TEACHERS' DELIVERY AND PERFORMANCE ENHANCEMENT

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Abstract
Currently, hardly would you find a company or institution that does not at least rely on ICT during their day-to-day tasks; one would be handicapped without effective communication as it brings society leaps and bounds ahead of communicating and having relationship with others. Technology has changed the nature of work, communication, and our understanding of the development of knowledge. Teaching today requires the use of a variety of approaches and techniques. Every day we communicate with each other is it only by using words, actions or even expressions? Many activities take place in higher institution in form of teaching, learner's conversation, and discussions, typing of letters, memoranda, and notices. Achievement of any organization depend to a large extent on free flow of communication and the putting into practice the theoretical knowledge gathered here and there. Accuracy, timing, precision, age, gender, education, status, class, and race would have to be considered during interpreting any information. Parents Teachers Association can be used to speak with teachers and parents about what to expect in today. In this paper, three research questions were used with twenty questions in the questionnaire administered to one hundred and twenty in- service teachers in Emmanuel Alayande College of Education and Federal College of Education (Special) both in Oyo town. The research design used was a survey design and Chi-square method was used to test the hypothesis at 0.05level of significance. Integrating ICT into teacher training curriculum an unbeatable task to perform.

Keywords: *Information Communication Technology, Integration, Higher education, Quality, Nigeria*

Introduction

Information is what is conveyed or represented by a particular arrangement or sequence of things or can equally be the knowledge obtained from investigation, study or instruction (Okorie, 2012). No organization can succeed and survive without adequate dissemination of information from and to every member of that organization.
Information Technology is the study or use of computers and telecommunication to store, retrieve, transmit or send data. The term IT is commonly used as synonym for computers and their networks, but it also encompasses other information distribution technologies like television and smartphones. It is used to support basic information processing tasks, to help with decision making and to support innovation. Teaching today requires the use of computers, scanners, audiotapes, clipart, graphics, video, cameras, overhead projectors and power points, cable television and telecommunication system that can maximize curriculum content delivery.

Communication is the process of transmitting one's ideas, feelings, wishes, attitudes, and emotions to others (Okorie, 2012). No organization can succeed and survive without adequate dissemination of information, understanding among workers, cooperation and harmony in workplace, good inter-personal relations, and the realization of the organizational goals. Ideas, thoughts, feelings, emotions, attributes, values, messages, and information involve human interactions through sharing common symbols. People can communicate using words, pictures, gestures, figures, signs and symbols. Communication involves two or more persons and a two-way process that enables one to make requests, instruct, direct command, persuade, present, inform and establish relationships as well as develop understanding for delivery and performance enhancement.

Communication among people occurs in diverse ways depending on the message and its context and a number of factors such as choice of channel, medium used and style can greatly affect communication. It is used to disseminate events and purposes of information for instructional integration and performance enhancement; it is used in directing all the resources available in the organization; serves as a tool for controlling and influencing organizational participants towards goal achievement; clarifies and expresses feelings by members; and makes Certo (2000)

identified four communication types which can be used to disseminate information and they are verbal, non-verbal, written and combination of types.
Verbal or Oral Communication: Messages are sent by word of mouth, face to face conversation, telephone conversation; Non-Verbal: Message sending by signs and symbols perceived by sight and not words such as gesture, facial expression, posture, and body language; Written Communication: Messages are scribbled or penciled down. It could be through signs and symbols. The school organization cannot operate without communication between students and teachers, departments, and employees, and without communication the school or organization may cease to exist.
Technology is the right application of scientific theory in the practical way while Information Communication Technology is the term used to describe the tools and processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means and these include hardware, software and telecommunications in the forms of personal computers,scanners,digital cameras, handhelds, phones, modems,CD and DVD players and recorders, digitalized video, radio and TV and programs like database systems and multimedia applications (UNESCO,2005). ICT is an umbrella term that includes any communication device or application encompassing radio, television, cellular phones, computer and network, hardware and software, satellite systems as well as the various services and applications associated with them, such as video conferencing and distance learning (Asifat and Olanrewaju, 2015)

Channels of Communication

There are variety ways of passing information in the school and amongst such are: telephone, telex and fax, postal and telegraphic services, face to face conversation, mass communication, internet, newsletter, websites, web conferencing, text messages, Wi-Fi, Airplane mode and many others.
Telephone is the commonest means of communication and now a day's a very large group of people makes use of it in their day-to-day runs.
Postal and Telegraphic Services is the cheapest and old means of communication and lots of activities have been added to make it worth patronizing in the likes of Expedited Mail Service (EMS), Postal Banking and a whole lot
Face-to-face Conversation is the most widely used and it takes place almost everywhere in our environment except during the COVID-19 Era when rules and regulations of keeping some meter distance, shifting to virtual emergency remote teaching, Online teaching, learning, and trading.
Telex and Fax is a very fast and quick way of communication but quite expensive and not affordable to all.
Internet tried to connect the world and provide prompt access for exchange of information and for getting this facility you must be in possession of good android telephone set, computer set and all the necessary accessories for access linkage.
Mass communication can take place through mass media such as the use of newspaper, radio, television, journals, and many others.
Other channels include E-mail, satellite, courier services like UPS, EMS, and DHL.
Higher Education, its Goals and Quality

Education is regarded as an instrument par excellence in achieving national development. No level of education is more relevant than higher education. Education whether at lower or higher level is not something that can exist on its own accord, it is a vehicle that requires human and material resources to drive it and the quality of human and material resources available determines the extent the vehicle can go in achieving the purpose for its existence.
Higher education is the education received after secondary school which is called post-secondary or tertiary education. Federal Republic of Nigeria (2004) defines it as the education in Universities, Colleges of Education, Polytechnics, and Monotechnics including those institutions offering correspondence courses. United Nations Educational Scientific and Cultural Organization (UNESCO) in Peretomode (2008b) says higher education is available for people who have completed secondary education and in which the course of study lasts for not less than two years, but more generally from three to six years. According to Nasiru (2013), in any democratic society, quality education remains at the core of national sustainability, security and as an instrument for political and economic growth and development. When quality higher education is provided, achievement of service delivery and performance enhancement becomes an easy task because everybody especially its product, know their responsibilities to themselves, families, societies, and nations, and thus go about doing them as influencing others to follow suit. The goals of higher education as stipulated in the National Policy on Education by Federal Republic of Nigeria (2004) are many amongst which were: contribution to the national development through high relevant manpower training, acquisition of both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society. Peretomode (2008a) identifies

a more apt and concise purpose of higher education to include teaching people to think further, broader, and deeper than they are brought up to do, giving each student a training of mind and cultivation of independent mind to enable one to think more critically and rationally, understanding how conclusions are reached and make informed choices, developing in students a capacity and interest in serving others. The core purpose of higher education is to transform lives for the benefit of the individual and society. The education that can transform lives is the one that has meaning, well equipped, functional, has capacity to add value to human lives by making learners better and more sophisticated at the exit point than at the entrance level. Quality in education according to Nwana (2000) is the scale of inputs in form of resources such as funds, equipment, facility, teachers, learners, and the like; and to the fact that the transactions and the outputs of the institutions in the form of their products are acceptable, desirable, beneficial, efficient, or effective from the point of view of the government, society, agencies, school stakeholders and many more. It allows for the coverage of acceptable standards of excellence concerning the total environment of a school system (Tamuno, 1995).

How can One Ascertain Quality in Higher Education?

One way of ascertaining quality in higher education is by its products which are graduates who are awarded certificates through having fulfilled all stipulated requirements. Attestation is to be carried out to find out if the one under check possesses knowledge and skills with which he can impact the society. Worth of his performance determines his level in the competitive market. Comparability and international competitiveness of qualifications are therefore seen as being central features of quality education (Babalola, Adedeji and Erwat, 2007).

How can Information Communication Technology Integrate Service Delivery and Personal Enhancement?

Education is the greatest force that can be used to bring about change, integration in all spheres of human development. Tobaojo (2011) states that education has been identified as a tool for achieving natural and global development and that the teacher is the centre of focus in all plans for improvement of instruction and the implementation of educational programmes. Effectiveness is concerned with doing the right things as brought about by innovation and change Integration is the focus on the coordination of tasks, work, assignment, and group as directed towards achieving a common goal. It is communication directed at getting people to work together to achieve a common purpose. Some of the goals of higher education are to contribute to the national development through high relevant manpower training and to acquire both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society and many more. Communication is the foundation of every interpersonal relationship because if individuals do not communicate with each other effectively, problems and suspicions are bound to come up and this will work against the realization of set organizational goals, vision, and mission. Example if you need to improvise any material for teaching there will be the need for effective and valuable communication which is the key to a healthy, strong, and long-lasting relationship both between individuals and management team as well as with the equipment to be used. Expression and reciprocation of feelings through different modes of communication with the use of body movements, gestures, facial expressions, and hand movements communicate one thing or the other. There must be the need for interaction with other person regularly for the relationship to grow and reach to the next level and this can be by speaking over the phone or regular sending of Short Message Services (SMS). If you do not get the time to call, then you can drop an electronic mail.

Many read and provided answers to it that there is a positive influence of ICT on the higher education teachers' delivery around teaching and learning in those learners can work with different gadgets during study which enhances the building up of learners' self-confidence, self- reliance and independence and thus cause measurable impact on the performance enhancement. This is in line with Parton (2006) who made the conclusion that ICT is essential to improve performance. It brings us to the fact that the knowledge of the existence of ICT only cannot produce any effect the teachers and learners is looking for but the proper use of ICT instructional materials (hands –on) is the in-thing that can improve the performance of learners whenever there is any open door for them to teach others. This result is in line with Healthcote (2010) who stated that availability, usage, and teachers' competence are correlate to the use of ICT in teaching students. Learning outcomes become worthwhile when it allows learners to cope effectively and may result to increase in academic performance if ICT is properly used. Research question three equally tried to find out if there will be any significant relationship between exposure to ICT materials of higher education in-service teachers' delivery and performance enhancement. Day to day exposure, awareness, out and in-door campaign, practical teaching can lead to robust performance of both learners and teachers. The result is in line with the submission of Copeland

(2006) who found that the exposure to ICT in the discharge of service (teaching and learning) can bring about remarkable innovation and this allows for effective communication and display of basic skills that will aid teaching and learning.

Conclusion

The world today is knowledge-driven and anyone who does not follow the currency will have himself relegated to the background and expire while still alive (Akuegwu, Anijaobi-Idem and Ekanem, 2011). In this regard, the provision of ICT becomes essential. Internet connectivity should be in schools to assist teachers search for background information, content materials, bring concepts alive through multimedia, keep informed, collaborate with their colleagues elsewhere and gain new resources available online. Learners can have ample opportunities to search for information, practice what have been learnt, further explore ideas and topics, interact, and actively engage in learning. There is no iota of doubt that teachers have incredible resources available if they have access to various ICT gadgets and the integration of ICT into higher education curriculum will be a greater shift from teaching without visualizing the relevant instructional materials needed to buttress whatever is taught. Proper funding and financing of seminars, workshops and conferences by the service providers is needed as it does the following: creation of cooperation amongst the learners and teachers, bringing about noticeable improvement in the attitude of learners towards learning and enhancement of learners' interaction and involvement. Quality of instruction should be challenging to trigger critical thinking among learners through their exposure to the internet and relevant books to bring out new information and knowledge that can add value to appropriate service delivery that can enhance performance. The right quality and quality of infrastructural facilities should produce educated and responsible citizens that can bring about performance enhancement. In conclusion, teachers need to be given thorough training on ICT to be effective and efficient.

Recommendations

- Explore the use of participative or shared communication process.
- Make use of clear and valuable messages, effective listening, making commitment and providing opportunities for feedback which enables the building up of trust between staff, school and parents.
- Always focus more on students learning, needs and progress.
- Try using the wide range of communication tools and channels like websites, e-mails, web conferencing, text messages, interviews, and many others.
- Government should ensure that ICT policy statements are translated into reality through its incorporation into the system.
- School administrators should provide professional development plans and training to aid better understanding of new roles and the expectation surrounding the roles.
- ICT teachers should be motivated by the government and the school management in order to ensure the success

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