

ICT Integration in the Development of Nigerian Educational System: Challenges and Prospects

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Abstract

This paper centered on ICT integration in the development of Nigerian Educational System: Challenges and Prospects. The integration of ICT will help in the development of the Nigerian educational system. The paper discussed the Impact of ICT as well as the Roles of ICT in teaching and learning. Furthermore, the Challenges facing the integration of ICT which include irregular power supply among others, the Prospects of ICT which include individualized learning among others were x-rayed. The paper concluded that the adoption and use of ICTs in schools have a positive impact on teaching and learning. It therefore suggested among others that Government should prioritize the funding for ICT, and ensure that ICT policy statements are translated into reality in Nigerian educational system.

INTRODUCTION

Information Communication and Technology (ICT) integration in education refer to incorporating computer-based communication into the regular classroom instructional process. In education, ICT incorporation refers to a technology-based teaching and learning process directly related to the use of learning technologies in classrooms. Globally, educational systems are adopting new technologies to integrate ICT in the teaching and learning process to prepare students with the knowledge and skills they need in their different areas of study. In this way the teaching profession is evolving from teacher-centered to student-centered learning environments. In this age of innovation and productivity, most Nations are focusing on ways to improve knowledge generation and sharing, creation and flow of new technologies. In this scenario, it has

been duly recognized that implementation and adoption of ICT in a nation at all levels, would certainly contribute and enhance its productivity, efficiency and growth.

ICT involves the use of hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images) as well as related services. It is a broad term that has to do with the harnessing of process, the methods and the product of electronic communication related technologies and other related resources in today's knowledge driven society, for enhancing the productivity, the spread and efficiency of set programme activities geared towards the achievement of clearly defined goals. According to Yusuf as cited in Osakwe (2012), ICT is an eclectic application of computing, communication, telecommunication and satellite technology. Therefore, ICT can be defined as an electronic device for managing and processing information with the use of soft and hard wares to convert, store, manipulate, protect, transmit, manage, control and retrieve information for the enhancement and productivity of personal and organizational activities.

Teachers are seen as critical players in using ICT in their regular classes and training students for the new digital age. This is because of ICT's ability to create a dynamic and proactive teaching-learning environment. ICT integration in schools, especially in the classroom, is important because students are familiar with technology and perform better in technology-based environments. Technology-based tools and equipment can help students learn any subject in school and other vital fields. The importance of ICT integration in education is critical since technology allows teaching and learning to occur in the classroom, even though teachers and students are physically separated. Young as cited in Avbarefe (2021) stated that ICT integration is a continuous learning process that offers a proactive teaching-learning environment rather than a one-time learning process.

ICT is inevitable for all sectors and all segments across regions. It's role cannot be undermined keeping in view its pertinent uses. It is useful in education for digital literacy and developing all kinds of resources, in infrastructure development, in logistics management, in healthcare, for livelihood generation and empowerment of masses, in administration and finance, specialized business and industrial uses, agricultural uses, in research and development and for economic growth and poverty alleviation. It is important in schools and educational institutions as it assists in carrying out their activities and functions such as record keeping, research work, instructional uses, presentations, financial analysis, examination results management, communication, supervision, teaching-learning activities, and general school management functions.

Kent and Facer as cited in Gadzama et al (2016), in their studies stressed that schools serve to be a very crucial environment where students learn to get involved with computers in their studies. Progressively, ICT has extensively been put into practical application with great flexibility in instruction, demonstration, and the overall learning processes, including the assessment of how well the students are performing at each stage of their studies. Fu (2013), emphasized that ICT tends to enlarge the accessibility to education in Nigerian education system. With ICT, learning can take place at any given time and anywhere; that is to say that ICT has done away with the issue of time limitations and distance barriers in the present day Nigeria

education system. Online education resources, for instance, can be retrieved any time. Teleconferencing classrooms enable both students and teachers to communicate simultaneously without any hindrance. With the global application of ICT, learning and teaching no longer depend largely on printed materials. Many educational resources like e-books and video tutorials on almost all school subjects are available on the Internet.

However, the use of ICT in teaching and learning is still far from encouraging because of the challenges faced by teachers and students. A cursory look at the educational system in Nigeria shows that many teachers in the system still rely much on the traditional “chalk and talk” method of teaching rather than embracing the use of ICT. It has been observed that the computer is not part of classroom technology in most schools, hence, the chalkboard and textbooks continue to dominate classroom activities. The various ICT facilities used in the teaching and learning process in schools unfortunately, are not sufficiently provided for teaching–learning process in the Nigerian education system. Also, most teachers lack the required skills in the use of ICT in teaching and learning in Nigeria Education System. This might account for why teachers are not making use of them in their teaching, therefore posing a challenge in the development of Nigerian educational system.

THEORETICAL FRAMEWORK

Two theories of Diffusion of Innovations by Rogers and Technology Acceptance Model (TAM) by Davis as cited in Avbarefe (2021), have been described and adapted to the research setting as the conceptual basis for this study in light of ICT incorporation to improve a quality teaching and learning experience in schools.

Rogers' theory as cited in Avbarefe (2021), explains how innovation is transmitted among social system participants across specific networks and over time. The process will start with the "knowledge" of the first channel that represents characteristics of the ICT users' decision-making unit to integrate the technology. Moreover, it ends with "confirmation" by the users to accept the technology and integrate it accordingly. Also the Technology Acceptance Model (TAM) theory by Davis as cited in Avbarefe (2021), has many components that reflect user acceptance of ICT, such as behavioral intention, perceived utility, and ease of use. Perceived utility refers to a person's belief that using a specific technology can help them perform better at work. Perceived ease of use refers to how important it is for technology to be user-friendly. TAM theory was created to assess the effectiveness or performance of the technology in assessing a particular method's utility and efficacy. It is also referred to as the most prominent theory in information management research today. Over time, however, the theory has expanded to include more complex variables that illustrate how a consumer will adopt a technology.

ICT in Nigerian Education

It is necessary to use ICTs to make education more relevant, responsible and effective not only for the school setting but also for lifelong learning. To compete successfully in a competitive global economic environment, a 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 21st 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 very much on knowledge economy and skills. Stakeholders in education in Nigeria should be concerned about how best to take advantage of the knowledge economy. 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 fast paced, technology-prone and globalized world. E-learning is becoming one of the most common means of using ICT to provide education to students both on and off campus by means of teaching online offered via web based systems. Looking at the role of education in nation building and the population explosion in the education system today, the use of ICT in the teaching-learning process becomes imperative. Such issues like good course organization, effective class management, content creation, self-assessment, self-study, collaborative learning, task-oriented activities, and effective communication between the actors of teaching-learning process and research activities will be enhanced by the use of ICT-based technology. Indeed, the process of teaching and learning has gone beyond the teacher standing in front of a group of pupils and disseminating information to them without the students' adequate participation. With the aid of ICT, teachers can take students beyond traditional limits, ensure their adequate participation in teaching and learning process and create vital environments for learners to experiment and explore.

Impact of ICT on Teaching and Learning

Anikweze and Kanu (2018), stated that ICT affects teaching and learning in the following specific ways:

- i. It provides a more scientific basis for designing instruction in a sequential manner and utilizing adequate instructional materials and other reinforcement strategies.
- ii. 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, e.g. use of films, slides, photographs and filmstrips.
- iii. It simplifies the task of the teacher in communicating abstract concepts to learners by helping to bridge the gap between theory and practice. Learners can study reality through computer simulation and the use of various media that are capable of bringing the world into the classroom.
- iv. ICT has further led to individualized instruction thereby enabling learners to proceed at their own rates through the use of programmed instruction, learning packages and computer terminals.
- v. Besides improved 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 and T.V. broadcasts and through the internet. Even the handicapped and children with special learning problems could be provided with diversified learning

environment employing appropriate technological devices that enable them to develop their potentials.

Roles of ICT in Educational System

Some of the roles of ICT in teaching and learning include;

- i. **Boasts the Teaching Profession:** Teachers in contemporary knowledge society require large, rich, and easily accessible-knowledge base which can be provided through ICT technologies that support teacher professional development. Teachers need to be life-long learners to keep abreast of new knowledge, pedagogical ideas, and technology relevant to successful implementation of Nigerian educational reforms. Through the digital libraries, virtual institutions, and other internet resources, teachers can easily have access to relevant and current resources in their areas. Thus, they must be competent in the use of ICT to husband its potentials.
- ii. **Enhances the Quality of Students' Education:** The quality of students' learning will be enhanced through their access to the needed content through ICT facilities especially the internet. Information and communication technology can enhance learning by doing, and increasing the information available to learners, thereby engendering collaborative learning. Information and communication technology can also empower the learners with information technology awareness and skills which are essential for success in the contemporary knowledge economy.
- iii. **Provides basic education for disabled/disadvantaged children:** ICT provides access to basic education for disadvantaged children and youths excluded from the formal school system. As modern ICTs are attractive to children and youths, they provide unmatched learning opportunities for them to learn within and outside the formal school system. They are powerful motivational tools for learning through games, exploration, collaboration, and learning work-related skills which provides opportunities for these individuals with disabilities to have access to quality education. Thus, ICTs are opening new doors for people with disability to have enhanced access to education in conventional and distance education settings.

The Need for ICT Integration in the Education System

1. **Assist students in accessing and retrieving information digitally with utmost efficiency:** - ICTs can alleviate research in any given discipline as they tend to provide faster and easier entry to a broader range of information via digital libraries that offer many quality digitized educational resources to students, Yusuf and Onasanya as cited in Gadzama et al (2016). This is one of the major uses of ICT to which students can apply the knowledge of ICT in their studies. For example, students can browse the internet with the aid of the computer and other IT technologies to find the answer to their take home works from school. According to Fu (2013), ICT serves as an effective tool that aid students to learn new topics, solve the problems arising from their studies, and provide solutions to the problems in the subject of learning. ICT

makes the process of acquiring skill or knowledge readily accessible, when students are actively engaged in the practical application of ICT.

2. **Helps to equip the teachers to better train and teach their students:** - The proper application of ICT resources made school teachers to be informed and be able to offer reliable and authentic information needed by their students. According to Torruam and Abur (2013), it can effectively be used to ultimately select only the required information from varying sources purposely to compare and contrast ideas. It aids students to perceive and retain information or knowledge. This also empowers the teachers to overcome the problem of incompetence that usually brings the move for a smooth integration of ICT into the educational system to its knees.

3. **Provides a support for student-centered and self-directed learning:** - When the use of computers were first introduced into the Nigerian educational systems, the general assumption was that computers would by itself teach students, Mevarech and Light as cited in Gadzama et al (2016). Today, many students have learnt a lot about their fields of study by making a very good use of ICT in their studies. When engaged into meaningful application by students, computers tend to increase the productivity of students as seen in Olokoba et al (2014). They constitute new knowledge that students gain by accessing and utilizing information that are related to their fields of study. As a result of learning through ICT, students are better equipped to perform very good in their studies by critically using the knowledge obtained from the information and communication technology (ICT).

4. **Application and use of computers for administrative purposes:** - A study by Felton as Cited in Ocharo et al (2015), indicates that ICT teachers in secondary schools and other Administrative officers should be well qualified physically and intellectually on the use of computers. This enables them to monitor administrative activities in the school. Computer training is therefore crucial if teachers will utilize ICT appropriately in their work. Also, Han as Cited in Ocharo et al (2015), on the practice and application of ICT by school administrators in Iran established and discovered that teachers that develop good mindset towards technology were found to be effective and proficient in the inclusion of the ICT technologies into their school curriculum. They achieve this by encouraging their colleagues to undergo ICT training, provide their schools with a reasonable number of computers while ensuring that relevant technology are accessible to teachers. Furthermore, Ocharo et al (2015), found that computers in public secondary schools are only found in the principals' offices and at the secretariat desks. These showed computers were mainly used for initially administrative purposes in public secondary schools.

5. **Helps in library management:** - The library is the main centre of interest in the school system. Administrators use computers in the library to manage and improve lending of books, support curriculum and access to information and facilitate collaboration and promote equity. This leads to an improved circulation of resources, extensive reporting, efficient book issue

system and increased access to resource collection. Maki as cited in Ocharo et al (2015) observed that ICT technology for administration and management of schools could help librarians to build data base in relation to books available in library and information regarding them. The use of ICT in education can have an unending list due to its universal application in all facet of life and all the areas of human endeavor.

Challenges Facing the Integration of ICT in The Nigerian Educational System

Some factors generally frustrate the inclusion of ICT as a teaching-aid and learner-assisted tool in the Educational System. These frustrating factors are known as challenges or barriers. A challenge can be defined as something that impedes progress or achievement. It can also be referred to as anything immaterial that interferes with or delays action or progress of set objectives. The challenges or barriers of a successful integration of ICT into the educational system includes;

1. **Irregular power supply:** According to Osakwe (2012), the problem of electricity or power supply is a major challenge to the successfully integration of ICT into the educational system. Electricity supply is irregular and several Nigerian territories lack electric power. Inadequate power supply affects the efforts made for a successful integration of ICT into the educational system. Another challenge associated with the inadequate power supply is that most of the ICT infrastructures and computers that are available in most of the schools are desk top computers that consume a lot of power and depends largely on electricity in order to operate them.
2. **Administrative Barriers:** Non-availability of software and hardware infrastructures are major factors challenging the utilization and integration of computers and ICT into educational system. These software includes all the programs that help users to work comfortably with their computer systems to carry out all the task that they want to perform. Examples of a software includes the Microsoft office, Corel draw etc while the hardware include all the physical components of computer systems that users may make use of like the printers, keyboards, mouse scanner, etc. If computers or ICT training is insufficient, the school administrators, and teachers cannot confidently put ICT into full practical application. According to a study by Ocharo et al (2015), lack of teacher training in use of computer technology, inadequate computer facilities, software, and policy regarding the use of computers in teaching has contributed to non-computer use in Nigerian schools. This has limited the practical application of computers and ICT to teaching and learning.
3. **Lack of skills:** Nigeria does not only lack information infrastructures, it also lacks the human skills and knowledge to fully integrate ICT into the education system. To integrate information and communication technology (ICT) in schools in Nigeria, there is need for locally trained personnel in application software, operating systems, network administration and local technicians to service and repair computer facilities. In Nigeria

also, most school teachers lack the skills to fully utilize technology in curriculum implementation hence the traditional chalk and duster approach still dominates in school pedagogy. Teachers in Nigeria schools need to be trained on educational technologies and the integration of computers into classroom teaching to raise the level of teaching in required subjects and improve student learning.

4. **Cost:** The price of computer hardware and software prohibits liberal access to Possession of personal computers. Apart from the costs of basic computers themselves, there are associated costs of the peripherals such as printers, monitors, paper, modem and extra disk drives which are beyond the reach of most students in school. Also many students would find it hard to pay the exorbitant Internet connection fees.
5. **Limited Access to the Internet:** The greatest technological challenge in Nigeria is how to establish reliable cost-effective Internet connectivity. The few available Internet providers consist of Nigerians in partnership with foreign information and communication companies. Many of these companies provide poor services to customers who are often exploited and defrauded. The few reputable companies, which render reliable services, charged high fees thus limiting access to the use of the Internet.

Prospects

There are numerous and good prospects for the use of ICT in teaching and learning in Nigeria educational system. The following are the major areas of applications that computer can serve in Nigerian education system:

1. **Computers can be used for individualized learning in the schools:** Due to large classes and differences in individual learning style and pace, microcomputers will enable the students to progress at their own pace and receive continual evaluation feedback and corrections for errors made. In this way, computers allow the development of partner-like interactive and individualized learning.
2. **Computers can serve administrative functions:** They can replace the exercise of filing papers in filing cabinets and shelves where records accumulate dust over a long period of time. Another administrative application of the computers is their use for writing correspondences and reports, assigning student classes, reporting students' progress and scoring tests which help to reduce paper work.
3. **Computer can enhance educational efficiency:** The efficiency in teaching various subjects can be improved. It is possible to use carefully prepared computer programs to ensure that learners are accurately and systematically instructed. Also, the computer can enhance problem-solving skills of the learners by focusing on thinking skills especially in some of the core subjects. Computers can change current pedagogical practices in educational system which depended heavily on the traditional lecture method. It is

universally accepted that computers allow more independent exploration, more personally tailored activities, more team work and more significantly, less didactic instruction. The role of the teacher, therefore, changes from information dispenser to that of information manager, from authoritative source of information to a guide of self-propelled explorative. Computers will offer the Nigerian teacher improvement in the techniques of research. The cumbersome exercise of searching by hand through the library's card catalog or periodical indexes can be made easier by typing into a computer and the researcher can receive extensive list of related sources of articles in books and journals in just a matter of minutes. Increased Job Opportunities is another potential ICTs would bring in hope of achieving digital growth and National Development in Nigeria. One of the biggest advantages of moving towards digital economy is that it gives an empowerment to the citizens. According to Ajah and Chigozie-Okwum (2019), the digital economy has a lot of potentials to enhance job opportunities in new markets as well as increasing employment opportunities in some of the existing occupations in the government. This way, the unemployment rate in the country is bound to decrease. The emerging digital economy Nigeria is hoping to achieve has the potential to generate new scientific research and breakthroughs, fuelling job opportunities, economic growth, and improving how people live their lives.

CONCLUSION

The integration, adoption and use of ICTs in schools have a positive impact on teaching, learning, and research. Despite the roles ICTs can play in education, Nigeria educational system is yet to extensively adopt them for teaching and learning. Efforts geared towards integration of ICTs into the school system, have not had much impact. Challenges such as irregular power supply, lack of skills among others militate against these efforts. However, prospects abound among others; considering the use of computer to enhance educational efficiency, to serve administrative functions and also be used for individualized learning in schools in Nigeria.

SUGGESTIONS

1. Adequate funding is necessary for the integration of ICT into the Nigerian educational system and the general development of ICT. In this regard, The Federal Government should prioritize the funding for ICT and computer education.
2. Every State Government should ensure that ICT policy statements are translated into reality and seminars in conjunction with ICT training institute within and outside the state be organized regularly for teachers. This will help the teachers to develop more interest and acquire basic ICT skills that will aid them in carrying out their basic responsibilities in teaching their students.
3. The Management of the various schools in collaboration with the State Government should plan and organize an annual ICT and computer quiz that will enable the students

that performed well to receive some prizes that will boost their morale thereby promoting the campaign for the smooth integration of ICT into the educational system.

4. School heads should insist on using computers for administrative functions such as replacing the exercise of filing papers in filing cabinets and shelves, writing correspondences and reports, assigning students to classes, reporting students' progress etc which will help to reduce paper work.
5. Collages of Education and Faculties of Education in various Universities should endeavor to introduce student-teachers to how computers could play the role of the tutor and present the learner with a variety of contents and symbolic modes. Thus, ICTs can be utilized for individualized learning in the educational system.

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