

CONSTRAINTS TO THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN NIGERIAN SECONDARY SCHOOLS IN THE 21ST CENTURY

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ABSTRACT

To be abreast with modern trends in this digital age, Nigeria should be able to boast of a viable and functional Information and Communication Technology (ICT) driven secondary education, especially in the fast changing world where globalization is the order of the day. Consequently, this paper examined the constraints of information and communication technology (ICT) in Nigerian secondary schools, assessed the uses of ICT in Nigerian secondary schools, ascertained the contributions of ICT to teaching and learning in Nigerian secondary schools, identified the benefits of ICT usage in the Nigerian secondary school system, and highlighted the constraints to using ICT in Nigerian secondary schools in the 21st century. The study further made some suggestions for a way forward and concluded that Nigerian secondary schools need ICT education, especially at this period where greater emphasis is being placed on industrial and technological development. The possession of knowledge and competence in ICT is imperative in the teaching-learning process in our educational system.

Keywords: Information and Communication Technology (ICT), Uses of ICT, Contributions of ICT, Benefits of ICT, Constraints to the Use of ICT, Nigerian Secondary Schools, 21st Century.

INTRODUCTION

Nigerian secondary schools are social institutions primarily established and used for the education of young people within the confines of the society. They occupy specific geographical locations clearly demarcated from the general environment by a name reflecting the level of the type of education they provide. The provision of secondary school education in the 21st century has gone through some remarkable changes in Nigeria. Apart from those that are publicly provided, there are others that are privately provided. The rapid emergence of private providers in response to rapid enrolment, have proliferated private secondary schools over the years in Nigeria (Abali & Asodike, 2012). In the contemporary period, the issue of an efficient based secondary schools' education in Nigeria appears to be one of the focus of the citizenry. As a link to higher education, the secondary school is reckoned as a bases for national development and enhancement to Nigeria's quest for technological advancement (Dike, 2021).

Taking a view of events in the world today shows that there are lots of changes in secondary education from what it used to be in the past. The specific actions that Nigeria as a country has taken to address these changes are the provision of information and communication technology (ICT) infrastructure and equipment in all schools, introduction of e-learning to expand access to quality education and the implementation of the provisions of the National Technological Education framework (Federal Republic of Nigeria in Abali & Dike, 2019). It, therefore, becomes imperative that ICT plays significant role in secondary school education, especially now that the world is currently passing through an era of technological advancement which is powered by ICT (Egu, Ememe & Njoku,

2011). Digital literacy should be an integral part of the educational pursuits of Nigerians as it will no doubt help them access information and be enlightened through available digital means (Abdulrahman-Yusuf, 2015).

Consequent upon the facts therefore, this paper examines the concept of information and communication technology, the uses of information and communication technology in Nigerian secondary schools, ascertained the contributions of information and communication technology and learning in Nigerian secondary schools, and highlights the constraints to using information and communication technology in Nigerian secondary schools in the 21st century.

Concept of Information and Communication Technology (ICT)

Information and communication technology (ICT) as a concept has been defined in varied perspectives. De Watteville & Gilbert in Wonbah as cited in Sulaiman (2020) defined ICT as the acquisition, analysis, manipulation, storage and distribution of information, and the design and provision of equipment and software for these purposes. They further stated that ICT refers to the different infrastructures used in the processes, their applications, and the numerous services these infrastructures render. Chux-Nyeche (2014) defined ICT as the combination of computers, communication equipment such as telephone, video-conferencing and other technologies associated with automation in the processing and transmission of information. That is, the application of computers and telecommunication equipment for automatic processing of information.

Kundishora (n.d) perceived ICT as technologies that are used for collecting, storing, editing, and passing on information in diverse forms. Alawode & John (2011) defined ICT as the automation of processes, controls and information production using computers, telecommunication, software, and ancillary equipment. Sakar (2012) averred that ICT is the varied collection of technological gears and resources, which are made use of to communicate. Bema and Uwaezuoke (2011), Wosowie (2014) and Camilus (2015) posited that ICT is an electronic technology used for accessing, processing, communicating, storing, and retrieving of information.

The above facts reveal that ICTs are tools and processes to retrieve, store, organize, manipulate, produce, present and exchange information through electronic and other automated means. These tools include hardware, software, and telecommunications in the forms of personal computers, laptops, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digital video, radio, and TV programmes. Okoro & Akaraonye (2012) saw ICT as computer based resources which include hardware and software currently available as teaching and learning resources. Ugoduhunma & Adekey in Okoro & Akaraonye (2012) asserted that ICT includes multimedia teaching packages and information resources such as the internet and data management.

Abifarin in Osaat (2013) posited that ICT is the application of computers, telecommunication equipment to process, store, retrieve and send information of all kinds in whatever form. Okonwo & Iwunnor in Igwe & Ebete (2015) opined that ICT encompasses computer and telecommunication. Taruam & Abur in Okai (2021) considered ICT as an electronic-based arrangement of data transmission, gathering, handling and recovery that has affected our instructive framework and has changed the way we live on earth. Babson in Okai (2021) concluded that ICT is utilized to portray new techniques for putting away, handling, and transmitting data achieved by quick advancements in hardware, registering and media communications.

Uses of Information and Communication Technology (ICT) in Nigerian Secondary Schools

For a country to be abreast with modern trends in this digital age, it should be able to boast of a viable and functional ICT driven secondary education, especially in this fast changing world where globalization is the order of the day. Globalization has made it necessary for the use of ICTs such as e-mail, cellular telephone and teleconferencing which enable people to share knowledge without having to be in the same place. Thus, any discussion about the use of ICT in schools is built upon an understanding of the link between schools, learning and computer technology. Mevarech & Light in Wosowie (2014) averred that when the potential use of computers in schools was first mooted, the predominant conception was that students would be taught by computers. However, the major argument used to support the introduction of greater amount of computer hardware into schools concerned the perceived need to increase the level of computer literacy of students.

There are so many ways that schools use ICT for modernizing the secondary school system. It is used to store vital student and staff data that assists in self-evaluation and improvement in addition to contributing to improved learning, teaching and management. It also helps to enhance social, computer related and literature skills (Wosowie, 2014). Through simultaneous use of audio, text, multi-colour images, graphics, motion and others, ICT provides various opportunities to students to enable them develop capacities for high quality learning (Ejesu, 2015). Therefore, computer assisted instructions (CAI) systems should be used to impart knowledge in a self-directed and constructive way in schools (Mahmood & Hussain, 2012).

The use of ICT in secondary schools cannot be possible without the availability of computers and the necessary tools that disseminate and manage information (Okai, 2021). Educational ICT tools can be divided into three categories namely input source, output source and others as shown below.

Figure 1: Categories of Educational Tools

INPUT SOURCES			OUTPUT SOURCES		OTHERS	
Visualizer	PC	State/Tablet	Projector	Interactive Whiteboard	Digital Camera	Switcher
Student Response System		Application Software	Display: Monitor, TV etc.		Digital Recorder	Other Technology

Source: Adopted from Wosowie (2014). Information and communication Technology in Schools

The use of ICT in secondary schools assume a noteworthy job in improving teacher capacity in exercise conveyance, research, and college organization. Most teachers use hotspot for data through the internet, distribute their scholarly materials through the internet, use PCs in composing and printing question papers, for record keeping, administrative and authoritative work. According to Okai (2021), the utilization of ICT apparatuses in the organization of colleges have incredibly improved correspondence in the educational system. It has likewise helped in the administration of examinations and capacity of examination scores.

ICT advantages & Disadvantages (2011) averred that ICT as transformational tools which, when used appropriately, can promote the shift to a learner-centred environment as is evident in the under listed parameters.

Motivating the Learner: ICTs such as videos, television and multimedia computer software that combine text, sound, and colourful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become involved in the lessons being delivered.

Facilitating the Acquisition of Basic Skills: The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drills and practices. Educational television programmes such as Sesame Street use repetition and reinforcement to teach the alphabet, numbers, colours, shapes and other basic concepts. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement.

Enhancing of Teacher Training: ICTs have been used to improve access to and the quality of teacher training. The teachers interacted with lecturers by telephone and fax.

Finding out Information: Students can use ICT to find out information and to gain new knowledge in several ways. They may find information on the internet or by using an ICT-based encyclopedia such as Microsoft Encarta. They may find information by extracting it from a document created using Microsoft Word or a Microsoft PowerPoint Slideshow. They may find out information by communicating with people elsewhere using email, such as students in a different school or even in a different country.

Processing Knowledge: Students can use ICT as part of a creative process where they must consider more carefully the information which they have about a given subject. They may need to carry our calculations (e.g., by using Microsoft Excel), or they may need to re-sequence a series of events.

Sharing Knowledge: Students can use ICT to present their work in a highly professional format. They can create documents and slideshows to demonstrate what they have learned, and then share this with other students, with their teacher, and even via email with people all around the world. The need for the use of ICT at the secondary educational level, especially in teaching and administrative duties cannot be overemphasized. Liverpool & Jacinta (2013) enumerated the following:

The organization of information: School administrators need to have basic information on students and teacher inflows. For example, categorization of data on student and staff by sex, level, state of origin, performance in schools, etc. they could use Microsoft Access or Excel to organize data into an easily accessible format and can be easily stored and retrieved from the computer.

Computation and processing of paperwork: ICTs are used to map out different activities of the academic session such as the number of weeks for teaching, conducting of continues assessment tests, examination periods and when the result could be released to students. The school administrator could use Microsoft Access, Excel, or other simple applications to collect and keep records of events, enhancement of effective happenings in the school, issues out notices of meeting for staff, students, and parents.

Enhancement of effective communication: With the installation of computers and internet communication made it easier for the school administrator to use the telephone, fax, and other communication facilities for transforming thoughts, sharing, and imparting of information, giving, and receiving and understanding of messages within a network of independent relationship across international frontiers.

Enhancement of planning: School administrators could use ICT to plan and make decisions based on accurate and readily available facts. ICT could be used to plan the budgets of the school expenditure and plans for the replacement of both obsolete and repairs of broken-down equipment or school facilities.

Improvement of monitoring: School administrators can as well use microcomputers in monitoring various areas in the school system, such as the use of continues monitoring and assessment of students learning and achievement in the school.

Managed instruction: School administrators can use the computer in scheduling subjects, space, installation, inventory, and personnel control, recording and reporting attendance, school accounting, storage and retrieval of students' information, marks, and management. This can generate the demographic data of students and staff, production of results online, retrieving of timetable online.

Contributions of ICT to Teaching and Learning in Nigeria Secondary Schools

The contributions of ICT to teaching and learning in secondary schools are numerous. As a medium of instruction ICT has become a powerful instructional tool in our schools and is becoming almost indispensable. It has structured the learning situation such that students can learn with or without the teachers, through computer assisted learning, students can learn as individuals or as a team, or as a whole class (Wosowei, 2014). Mevarech & Light in Wosowei (2014) posited that ICT promotes interaction among students; however, when used with groups of students it encourages interaction between students about what they are learning and is a valuable intellectual work as it leads understanding and thus growth of conceptualization of the world and its process. They added that ICT offers the learning of an additional learning strategy. This is because the greater the range of available strategies, the more successfully a learner can deal with the diversities and learning styles in a group of students.

Ruth in Mecarech & Light as cited in Wosowei (2014) averred that lesson can be programmed and stored in the computer or in software packages as tutorials, drills, practice, and simulation. Students will have access to the lessons that have been taught in the class as such slow learners can go through for better understanding. According to Dogra (2010), ICT contributes to the following in a classroom situation.

Active participation: When students are learning through information technology, they are themselves looking for information on the internet, they make their own decisions regarding information i.e., whether it is relevant or not. They have control over how to use or present the information.

In-depth knowledge: Students can acquire in-depth knowledge on any subject using the internet. The internet is a kind of library which is at the disposal of a student with just a click.

Increased motivation: When students are taught through slide show, or by showing films, it makes the lesson very easy and interesting for them to attend school every day.

Benefits of Information and Communication technology (ICT) usage in the Nigerian Secondary School System: Elmo (2014) and ICT Advantages & Disadvantages (2011) have enumerated the following as the benefits which ICT usage brings to the secondary school system:

General Benefits

- a) Greater efficiency through the school.
- b) Communication channels are increased through email, discussion groups and chat rooms.
- c) Regular use of ICT across different curriculum subjects can have a beneficial motivational influence on students' learning.

Benefits for Teachers

- a) ICT facilitates sharing of resources, expertise and advise.
- b) Greater flexibility in when and where tasks are carried out.
- c) Gains in ICT literacy skills, confidence, and enthusiasn.
- d) Easier planning and preparation of lessons and designing materials.
- e) Access to up-to-date pupil and school data, anytime and anywhere.

f) Enhancement of professional image projected to colleagues.

Benefits to Students

- a) Students are generally more (on task) and express more positive feelings when they use computers than when they are given other tasks to do.
- b) Computer use during lessons motivated students to continue using learning outside school hours.
- c) Higher quality lessons through greater collaboration between teachers in planning and preparing resources.
- d) More focused teaching, tailored to students' strengths and weaknesses, through better analysis of attainment data.
- e) Improved pastoral care and behaviour management through better tracking of students.
- f) Gains in understanding and analytical skills, including improvements in reading.
- g) Comprehension.
- h) Development of writing skills (Including spelling, grammar, punctuation, editing and re-drafting) also fluency, originality, and elaboration).
- i) Encouragement of independent and active learning, and self-responsibility for learning.
- j) Flexibility of 'anytime, anywhere' access.
- k) Development of higher level learning styles.
- l) Students who used educational technology in school felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem.
- m) Students found learning in a technology-enhanced setting are more stimulating and student-centred than in a traditional classroom.
- n) Broadband technology supports the reliable and uninterrupted downloading of web-hosted educational multimedia resources.
- o) Opportunities to address their work to an external audience.
- p) Opportunities to collaborate on assignments with people outside or inside school.

Benefits to Parents

- a) Easier communication with teachers.
- b) Higher quality student reports-more legible, more detailed, better presented.
- c) Greater access to more accurate attendance and attainment information.
- d) Increased involvement in education for parents and, in some cases, improved self-esteem.
- e) Increased knowledge of children's learning and capabilities owing to increase in learning activity being situated in the home.
- f) Parents are more likely to be engaged in the school community.
- g) ICT has impact across a very wide range of aspects of school life.

Constraints to the use of ICT in Nigerian Secondary Schools in the 21st Century

Secondary school education which aims at preparing students for useful living and for higher education (Federal Republic of Nigeria, 2014), is faced with numerous challenges in its usage, Chigozie-Okwum(2018) asserted that

the most common challenges/problems associated with the effective use and integration of ICT in education in Nigeria are:

- i) Lack of qualified ICT personnel.
- ii) Cost of equipment.
- iii) Management's attitude.
- iv) Erratic electric power-supply in most parts of the country.
- v) Inadequate telephone lines particularly in the rural areas.
- vi) Non-inclusion of ICT programmes in teachers training.

Chux-Nyeche (2014) posited that despite the enormous ICT role in advancing the economy, there are hinderances in the use of it in bringing about advancement in the economy. Some of the inhibiting factors according to Chux-Nyeche include common phenomenon in Nigeria such as:

- i) Unstable power supply and high cost of ICT facilities.
- ii) Lack of infrastructure like telephone lines, PCs, internet access, local content, satellite system, etc.
- iii) Untrained manpower in the ICT sector.
- iv) lack of fund for ICT education.
- v) Internet fraud or cybercrime.
- vi) Inadequate software industries.

Okai (2021) outlined the following as limitations to the use of ICT in schools:

- i) Poor management on the part of administrators and government.
- ii) Lack of maintenance culture.
- iii) lack of interest in ICT application and its usage.
- iv) Limited ICT skills on the part of the teachers.
- v) Poor ICT policy, programme and project implementation.

Okai further enumerated the following as factors that are inhibiting the effective use of ICT in schools:

Inadequate funds: Many schools are underfunded and therefore lack fund to procure the necessary ICT tools that will aid the teachers and students in the acquisition of skills and knowledge that are needed. Wosowei (2014) posited that an important drawback to using ICT in schools is the fact that computers are expensive. Setting up the devices can be too expensive to afford.

Attitudes of people towards ICT facilities: one of the major barriers for the cause of ICT not reaching its full potential in the foundation stage is teachers' attitude Wosowei (2014). Nigerians lack maintenance culture in the use of the equipment and school plants. The computer tools and the environment demand regular maintenance but unfortunately, Nigerians have poor attitudes towards the maintenance of equipment. According to Ogbuechi & Olawolu (2011), poor perceptions of ICT among teachers and administrators influence the application of ICT and use in schools. Ighoroje & Ajayi (n.d) observed that widespread ignorance and misconception about ICTs amongst Nigerians inhibit the application of ICTs.

Lack of ICT infrastructure: The basic ICT infrastructure that will aid the use of ICT in schools is lacking. The unavailability of some ICT components in the schools hampered teacher' use of ICT. Frequent electricity interruption has been a persistent problem militating against ICT application and use in Nigeria.

Poor ICT policy implementation: The government introduced computer education in secondary schools and distributed computers to federal government colleges, which were never used for computer education for the students. No efforts were made to distribute computers to state government or private schools. Concerted efforts have not been made to provide facilities and trained personnel.

Suggestions for a Way Forward

To overcome the constraints and ensure effective ICT usage in Nigerian secondary schools, the following efforts should be taken:

1. Government should ensure that ICT policy statements are translated into reality. An ICT policy implementation commission should be created. This commission should be funded and given the power to provide ICT facilities in the schools and monitor their use.
2. All secondary schools should be made beneficiaries of ICT projects.
3. Computer/ICT education should be made compulsory for all secondary school students. At present, the Federal Government of Nigeria has made computer in elective course in high schools.
4. Effort should be made by the ministry of education (at federal and state levels) to post teachers skilled in ICTs to teach each secondary school to impart ICT skills to the students.
5. The Federal Ministry of Mines and Power should work towards stabilizing electricity supply in Nigeria.

Conclusion

Nigerian secondary schools in the 21st century need ICT education, especially at this period where greater emphasis is being placed on industrial and technological development. The possession of knowledge and competence in ICT is imperative in the teaching-learning process in our educational system. ICT is a powerful tool for enhancing practical and functional education in schools. Learners should be taught to utilize electronic tools (computers, internet connection and other ICT equipment) and other ICT associated facilities. Therefore, if schools can overcome the constraints to ICT usage and view the acquisition of ICT skills as worthwhile, the teaching-learning process will be more effective, and this will promote objectives of our educational system. the achievement of the goals and

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