# IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON ADVANCEMENT IN SECONDARY SCHOOLS EDUCATION IN OYO STATE

**ADEYEMI, OLANIYI ADEGBOYEGA**
Mass Communication Department, Federal Polytechnic, Ilaro
Tel: 08038340524: Email: olaniyinadeyemi10@gmail.com

**Abstract**

*The extraordinary transformation in information and communication technology era, processing, storage, and dissemination experienced in the twenty-first century has opened a whole new transformation globally in an unparalleled history when it comes to interconnectivity, interactive content, multiplicity and ease of access. The deployment of an ICT system causes organizational and individual modification, and thus user involvement and use of ICT systems has created significant challenge in organizations and institutions. The emergence of the digital revolution—the advancement of the Internet, the advent of new media technologies and the advent of online social networks has brought about change in every area of life. This study examines the impact of information and communication technology on advancement in educational sector. Survey Design was used for this study and 120 school administrators were selected randomly and administered questionnaire from various secondary schools in Ibadan metropolis in Oyo State. The findings showed a positive impact on the educational sector (r = 0.635, p<.05) which implies that ICT significantly influences educational sector. The study recommends that government and various stake holders in education should invest more in ICT and various ICT tools required for advancement in educational sector.*

**Keywords***: Information, ICT, advancement, education and Technology*

## Introduction

The role of Information and Communication Technologies (ICTs) in the 21st century education system has been described as vital to keeping abreast with rapidly changing technologies. The development of information and communication technology into the Nigerian educational system has come to stay; its importance has been translated into huge potentials in terms of positive outcomes, although investments in ICTs in Nigerian's education system have not yielded much when compared to similar investments made in communication (Atureta, 2011).

The field of education has certainly been affected by the penetrating influence of ICT worldwide. ICT has made impact on the quality and quantity of teaching, learning and research in the institutions using it (Kwacha, 2007). According to Ololube, Ubogu and Ossai (2007), the introduction of ICT usage, integration and diffusion has initiated a new age in educational methodologies, thus has radically changed traditional method of information delivery and usage patterns in the domain as well as offering contemporary learning experience for both instructors and learners. ICT has the potential to accelerate, enrich and deepen skills, motivate and engage students in learning; helps to relate school experiences to work places, helps to create economic viability for tomorrow's workers, contribute to radical changes in school, strengthens teaching, and provides opportunities for connection between the school and the world (Davis & Tearle, 1999; Lemke & Coughlin, 1998; cited by Yusuf, 2005).

Adomi & Kpangban (2010) described Information and communication technology (ICT) as electronic technologies used for information storage and retrieval. According to the Online Oxford Dictionary, Information and communications technology or information and communication technology, usually abbreviated as ICT, is often used as an extended synonym for information technology (IT), but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers, middleware as well as necessary software, storage- and audio-visual systems, which enable users to create, access, store, transmit, and manipulate information. In other words, ICT consists of IT as well as telecommunication, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions.

ICT as described by Scott (2002) encompasses a range of applications, communications and technologies which aid information retrieval and research communication and administration. These include online databases, library services and online services and fax machine. It has become a global phenomenon of great importance and concerns in all aspects of human endeavor, spanning across education, governance, business, labour, market, shares, productivity, trade, agriculture, commerce and others.

Nigeria as a nation has recognized the potential of ICT in her educational system. The national policy on computer education emphasized the need for the integration of ICT into the Nigerian educational system (Adeoye, 2020). This dates back to the National Policy on Computer Education (FME, 1988) which emphasized the need for primary school pupils to be introduced to the basic computer skills, the use of the computer to facilitate learning and rudimentary use for text writing, computation and data entry. For secondary school, they have related goals which were to be achieved at higher level. The tertiary institutions were also required to teach computer science as a discipline and to integrate it in school administration and instruction. However, the implementation was not effective.

The National Policy on Education (FRN) as revised in 1988 and 2004, re – emphasized the need for the integration of ICT in the Nigerian educational system. This is an acceptance of the need to go beyond computer to the level of ICT also the need for infrastructure. Three major objectives, among others were emphasized in the Nigerian National policy for Information Technology (FRN, 2001).

Today, technology has brought about revolution in every sector of the society including education. With the introduction of ICT, students and teachers have access to a large volume of academic and educative materials online. Yet most secondary school teachers are not euphoric about the technology revolution. Hence, this study examines impact of information and communication technology on advancement in educational sector.

**Objectives of the Study**

The primary aim of this study is to examine the impact of information and communication technology on advancement in educational sector. The specific objectives are as follows:

i. To determine the various ICT that could be used to advance education
ii. To determine the significant effect of ICT on educational advancement.

**Education in Nigeria**

Education is universally recognized as the answer to socio-economic problem of the world, Nations and individuals look up to education to provide a cure for poverty, ignorance, climatic change, metal deficiency, Joblessness, hunger, inadequate shelter, poor governance, poor communication system and among others (Elujekwute, 2019). The important of commodity by any standard to any community is knowledge which in general is called education, which is the cornerstone for sustainable development. The major essential tool for achieving sustainable development goals should include; improving the quality of basic education; re-orientation existing education programme to address sustainable development; developing public awareness and understanding and Providing training for all sectors of private and civil society (Oguejiofor, & Ezeabasili, 2014). Over the years, Nigeria government has taken a number of steps and made some rapid progress before now and of which everybody including non-Nigerians identified that such development is hanging on pseudo legs and so could never be achieved. For example, in the late 70s and early 80s Nigeria educational system depended heavily on expatriates for virtually everything including teachers in secondary and tertiary institutions which certainly could be not sustained either due to insufficient funds and political reasons. However as result of the windfall from sudden rise in oil price due to war and conflicts in certain parts of the globe that is enjoyed sometimes is something that cannot imagine it being sustained. The need for quality assurances in Nigeria educational system is highly desired in order to ensure quality of teaching and learning in schools.

**Technological Innovation**

Technological innovation is a driving force bringing in change in Nigeria. Technology is now very useful in workplaces, homes and for the girl child. Thus, technology is necessary in girl child learning environment. This is because it is better to organize educational system in a way that the girl child will obtain additional skills to meet up with the demand of the environment one belongs. The technologies that can be useful in adult learning centres are as follows: computers, cassettes, radios, broadcasting TV, telecasting, video, discs, satellite, Projectors and slides, microwave, conferencing, telephones, CD-ROM, CD, DVD, modern, flash and so on. The roles of this technologies in learning centers are as follows according to Banjoko (2018) :

- Computers are used in adult learning centers to demonstrate how to type and write messages.
- Slide and projectors are also used in the class for every learner to see because the screen is big and high enough for every learner to see.
- The use of video and multimedia plays a very good role in adult learning classes in that learners always concentrate on the full screen trying to understand what the instructor is explaining to them.

**E-Learning**

Electronic learning (E-learning) is teaching and learning that is delivered, supported, and enhanced via the use of digital technologies and media (Vikoo, 2013, p.489). It is a system of learning where electronic media is used, typically over the internet. In other words, e-learning could be referred to as a learning process which utilizes electronic teaching technologies to access and deliver educational information based on a given curriculum. E-learning is mainly computer network enabled transfer of skills and knowledge which can be operated in a classroom, seminar, conference as well as distance learning programme.

In an educational setting, e-learning is used for facilitation, instruction, course delivery and interaction. E-learning applications and processes comprise web-based learning, computer-based learning, virtual learning and digital collaboration (Onyido, 2016, p.145). The content of e-learning is delivered through the internet, intranet/extranet, audio and video tapes, satellite television and compact disk read only memory (CD-ROM). It can either be self-spaced or instructor led and encompasses media in the way of text, streaming video and audio, animations as well as images (Onyido, 2016).

Naturally, e-learning is more appropriate for distance learning. However, it can be used together with face-to-face teaching hence referred to as Blended Learning. Apart from the above, screen casting emerges as another trend in e-learning. The Web-based screen casting tools allow to create screen casts directly from their browser and make the video available online for viewers to view them directly. The one-on-one feature of the classroom shown via the combination of video and audio makes the expert to deliver clear and complete instructions. A big advantage of this screen casting over the conventional classroom is that from the learner's point of view, this technology provides the ability to pause and rewind as well as to move at his own pace. This is quite spectacular. E- learning is both a liberal system of education and student centered. Considering that e-learning is a programme available anytime and anywhere, it creates room for interested students to be acquiring education along with engaging in other activities (Ayorinde, 2014).

**The Need for ICT in Education**

ICT application and use will prove beneficial in improving Nigeria's educational system and gives student a better education. A technologically-advanced workforce will lead to ICT growth in Nigeria, with the potential to improve military technology and telecommunications, media communications, and skilled ICT professionals who will be well-equipped to solve IT problems in Nigeria and other parts of the world. New instructional techniques that use ICTs provide a different modality of instruments. For the student, ICT use allows for increased individualization of learning. In schools where new technologies are used, students have access to tools that adjust to their attention span and provide valuable and immediate feedback for literacy enhancement which is currently not fully implemented in the Nigerian school system (Ayorinde, 2014).. The ability to use computers effectively has become an essential part of everyone's education. Skills such as bookkeeping, clerical and administrative work, stocktaking, and so forth, now constitute a set of computerized practices that form the core IT skills package: spreadsheets, word processors, and database (Reffell and Whitworth, 2010). The demand for computer/ICT literacy is increasing in Nigeria, because employees realize that computers and other ICT facilities can enhance efficiency. On the other hand, employees have also realized that computers can be a threat to their jobs, and the only way to enhance job security is to become computer literate. With the high demand for computer literacy, the teaching and learning of these skills is a concern among professionals. This is also true of other ICT components (Onyido, 2016)..

**Issues in ICT Application in Nigerian Educational System**

There are developments in the Nigerian education sector which indicate some level of ICT application in the Nigerian schools. The Federal Government of Nigeria, in the National Policy on Education (Federal Republic of Nigeria, 2010), recognizes the prominent role of ICTs in the modern world, and has integrated ICTs into education in Nigeria. To actualize this goal, the document states that government will provide basic infrastructure and training at the

primary school. At the basic school, computer education has been made a pre-vocational elective, and is a vocational infrastructure and training for the integration of ICTs in the school system.

It should be noted that 2004 was not the first attempt the Nigerian government made to introduce computer education in schools. In 1988, the Nigerian government enacted a policy on computer education. The plan was to establish pilot schools and diffuse computer education innovation first to all secondary and tertiary schools, and then to primary schools. Unfortunately, the project did not really take off beyond the distribution and installation of personal computers (Okebukola, 2007; cited by Aduwa-Ogiegbaen and Iyamu, 2008).

Okebukola (2007), cited by Aduwa-Ogiegbaen and Iyamu (2008), concludes that the computer is not part of classroom technology in more than 90 percent of Nigerian public schools. This implies that the chalkboard and textbook continue to dominate classroom activities in most Nigerian schools. The Federal Ministry of Education has launched an ICT-driven project know as School Net (Federal Republic of Nigeria, 2010), which was intended to equip all schools in Nigeria with computers and communications technologies. In June 2003, at the African Summit of the World Economic Forum held in Durban, South Africa, the New Partnership for African Development (NEPAD) launched the e-Schools elective at the senior secondary school. It is also the intention of government to provide necessary

Initiative, intended to equip all African high schools with ICT equipment including computers, radio and television sets, phones and fax machines, communication equipment, scanners, digital cameras, and copiers, among other things. It is also meant to connect African students to the Internet. The NEPAD capacity-building initiative will be executed over a ten-year period, with the high school component being completed in the first five years. Three phases are envisaged, with fifteen to twenty countries in each phase.

**Theoretical Framework**

This theory is linked to the Constructivist Learning Theory. This theory originates from the work of cognitive scientists like Jean Piaget, John Dewey, Jerome Bruner, Vygotsky among others and Van Hiele theory of geometric thought. Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction as opposed to passively receiving information. Through interaction with the physical situations, or concrete objects, a child's physical experience accumulates and he is able to conceptualize, think creatively and logically. The child therefore develops skills to abstract problems. According to this theory, learners are the makers of knowledge and meaning. Constructivists' teaching fosters critical thinking, and creates motivated and independent learners. Constructivists suggest that learning is more effective when a student is engaged in the learning process rather than attempting to receive knowledge passively. Children learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences. According to Lev Vygotsky (1962), learning always occurs and cannot be separated from a social context. He affirms that knowledge construction occurs within social context that involves student- student, student-expert collaboration on real world problems or tasks that build on each person's language, skills and experience shaped by individual's culture. In the classroom, constructivist view on learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging students to use active techniques (experiments, real world problems) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing.

**Methodology**

This study made use of a survey research design. Survey research refers to a particular type of research design where the primary method of data collection is by survey. In this study design, surveys are used as a tool by researchers to gain a greater understanding about individual or group perspectives relative to a particular concept or topic of interest. The Population of this study are secondary school administrators who are proprietors, principals, Admin Staff, bursars. The Sampling Technique used in this study is simple random sampling. Simple random sampling is a sampling technique where every item in the population has an even chance and likelihood of being selected in the sample. The main attribute of this sampling method is that every sample has the same probability of being chosen.
A total sample of 120 secondary school administrators from Three (3) Public Secondary Schools in Ibadan Metropolis were used in this study were selected randomly for this study. The data collection instrument used in gathering information for this research study is a questionnaire

Data analysis was done after the data gathered were coded and managed using the Statistical Package for Social Sciences (SPSS). Data analysis was done using Inferential and Descriptive statistics. The descriptive statistics was

used such as simple percentages, frequencies, bars for analyzing demographic variables of the respondents Also, hypotheses was tested using Pearson Correlation and Multiple Regression Analysis.

**Data Analysis**

**Table 2: Demographic Characteristics of Students**

| **Gender** | **Frequency** | **Percent** |
|---|---|---|
| Male | 62 | 51.7 |
| Female | 58 | 48.3 |
| **Age (Years)** | | |
| 35- 45 years | 23 | 19.2 |
| 46-55 years | 55 | 45.8 |
| Above 55 years | 42 | 35.0 |
| Education | | |
| BSC/HND | 73 | 60.8 |
| Postgraduate | 47 | 39.2 |
| **Total** | **120** | **100.0** |

Table 1 shows that 62 (51.7%) of the respondents are male while 58 (48.3%) are female, 55 (45.8%) are within the age category of 46-55 years, 42 (35.0%) are above 55 years while 23 (19.2%) are within the age category of 35-45 years. Also, 73 (60.8%) had First degree while 47 (39.2%) had Postgraduate degree.

**Analysis of Research Questions**

**Research Question One: What are the various ICT tools that can be used to advance education?**

**Table 2: Various ICT tools**

| **Statement** | SA | A | D | SD |
|---|---|---|---|---|
| Zoom can be used as an effective ICT tool to advance education | 60 (50.0%) | 56 (46.7%) | - | 4 (3.3%) |
| Google Classroom can be used as an effective ICT tool to advance education | 48 (40.0%) | 68 (56.7%) | 4 (3.3%) | - |
| WhatsApp can be used as an effective ICT tool to advance education | 32 (26.7%) | 57 (47.5%) | 29 (24.2%) | 2 (1.7%) |
| LMS Canvas can be used as an effective ICT tool to advance education | 18 (15.0%) | 85 (70.8%) | 17 (14.2%) | - |

Table 2 shows that 56 (46.7%) and 60 (50.0%) of the respondents agree and strongly agree respectively that Zoom can be used as an effective ICT tool to advance education, 68 (56.7%) and 48 (40.0%) of the respondents agree and strongly agree respectively that Google Classroom can be used as an effective ICT tool to advance education, 57 (47.5%) of the respondents agree that WhatsApp can be used as an effective ICT tool to advance education while 85 (70.8%) of the respondents agree that LMS Canvas can be used as an effective ICT tool to advance education.

**What is the effect of ICT on educational advancement?**

**Pearson Correlation of the relationship between ICT and educational advancement**

| | | ICT | Educational advancement |
|---|---|---|---|
| ICT | Pearson Correlation | 1 | .635** |
| | Sig. (2-tailed) | | .002 |
| | N | 120 | 120 |
| Educational advancement | Pearson Correlation | .635** | 1 |
| | Sig. (2-tailed) | .002 | |
| | N | 120 | 120 |

**. Correlation is significant at the 0.01 level (2-tailed).

This result showed that ICT has a significant positive correlation with educational advancement ( r = .635, p<.05) which indicates that the more investment in ICT, the higher the advancement in educational sector

**Hypothesis**

$H_{01}$: There is no significant impact of ICT tools on advancement in education

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .782[a] | .612 | .602 | 1.14603 |

a. Predictors: (Constant), Zoom, Google Class room and WhatsApp

**ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 239.971 | 3 | 79.990 | 60.903 | .000[b] |
| | Residual | 152.354 | 116 | 1.313 | | |
| | Total | 392.325 | 119 | | | |

a. Dependent Variable: Advancement in Education
b. Predictors: (Constant), Zoom, Google Class room and WhatsApp

**Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3.051 | .438 | | 6.969 | .000 |
| | Zoom | 1.548 | .206 | .483 | 7.511 | .000 |
| | Google | .868 | .105 | .481 | 8.296 | .000 |
| | WhatsApp | .948 | .114 | .432 | 8.287 | .000 |

a. Dependent Variable: Advancement in Education

The result of the hypothesis shows that ICT tools (GoogleClassroom, WhatsApp and Zoom) significantly influenced advancement in Education [($R^2$ = .612; F (3,119) = 60.903; p < .05)]. This infers that ICT tools (GoogleClassroom, WhatsApp and Zoom) accounted for about 30.6% of the variance observable in advancement in Education.

In addition, the result of the coefficients of multiple determination for the model shows that the independent contribution of Google Classroom and Zoom were positively statistically significant ((β = .483; t = 7.511; p< .000), (β = .481; t = 8.296; p< .000). In terms of magnitude, Zoom had the highest magnitude with (β = .483) followed by Google Classroom with (β = .481).

**Conclusion**

This study examined the impact of ICT on advancement in educational sector. A survey research design was adopted with a total sample of 120 school administrators from Ibadan Metropolis were selected randomly for this study. The data collection instrument used in gathering information for this research study is a questionnaire. The result of the findings showed that ICT has a significant positive correlation on educational advancement ( r = .635, p<.05). Also, ICT tools (Google Classroom, WhatsApp and Zoom) significantly influenced advancement in Education [($R^2$ = .612; F (3,119) = 60.903; p < .05)]. This infers that ICT tools (Google Classroom, WhatsApp and Zoom). The result of the hypothesis showed that virtual ICT tools (Google Classroom, WhatsApp and Zoom) significantly influenced advancement in educational sector.

Furthermore, the independent contribution of Google Classroom, WhatsApp and Zoom were positively statistically significant. This finding agrees with the study of Adeoye, Oluwole and Loto (2013) who reported that ICT has impacted on the quality and quantity of educational institutions in Nigeria.

**Recommendations**

- Government and relevant authorities should try and equip public secondary schools with ICT and virtual learning platforms that will facilitate learning and girl child's education.

- Government should try and integrate ICT learning into public secondary school curriculums so as to facilitate e-learning.

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