
Information, Communication and Technology in Teaching and Learning: Enhances Curriculum Content and Implementation

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Abstract

The study focused on the role of information communication technology (ICT) in the school, with regards to curriculum content and implementation. The paper examined the concept, nature and use of ICT and its relationship with the school curriculum content and implementation. In the course of study, the researchers noted that several attempts made by government at ensuring effective application of ICT at all level success, hence suggested strategies for incorporating ICT into the instructional procedure. They therefore, recommended among others, that members of the Nigeria Union of Teachers (NUT), irrespective of age, qualification and location, should be given opportunities to become ICT literate. In addition, the government should make computer education compulsory at all levels of education and take necessary steps to ensure that students have practical knowledge of computer application.

Keywords: Information, Communication and Technology, Curriculum implementation, Instructional procedure.

In recent years, advancement in science and technology and their application in the educational system have yielded dividends in almost all disciplines related to the management and organization of education which make teaching and learning more enjoyable through information and communication technology (ICT) tools. Today, such provide both students and teachers with more opportunities in adapting learning and teaching to individual needs and the society at large, (Salihu and Umar)(2018: 2). This applied aspect of technology in the educational discipline has tremendous capability to provide the best possible output for both the teachers and students. It is now not a matter

of secrecy that the use of technology for improving the process and products of education depending upon the type of excellence by the members of the society and community all over the globe in terms of scientific, philosophical, psychological and technology process especially in tertiary and secondary education, (Ibe 2017:25).

ICT in education is the wholesome integration of modern telecommunication and particularly the internet on to the education system. ICT is used as an introduction tool to explore, investigate, solve problems, interact, reflect and learn concepts in the classroom. It permits alternative types of educational patterns for facilitating learning especially as it can be adapted and adopted to several types of educational institutions and interests. It provides a common ground for all professionals to contribute towards effective and productive learning/ teaching environment. It gives room for independent and individual study. With ICT in schools, education is made productive by making instructions more powerful and more scientific (Uche 2009:16).

There is a great link between the curriculum and information and communication technology Uche (2009) identified three major areas technology can influence learning across curriculum as;

1. Presentation, demonstration, and the implementation of data using productive tools.
2. Use of curriculum specific, application types as educational games; drills and practice, stimulations, tutorials, virtual laboratory, virtualizations and graphics representation of abstract concepts, musical composition and expert systems;
3. Use of information and resources on CD-ROM or online such as encyclopedia, interactive maps and atlases, electronic journals and other references.

The coming of ICT into operation has brought a great transformation in the curriculum. School curriculum has been modified specifically to reflect the ICT content in order to equip the teacher and the learner with the basic knowledge of ICT. Also, ICT has become a vehicle through which curriculum is implemented effectively especially in enhancing effective instructional process. Uche (2009) posits that ICT in curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies and the impact on ICT on self and society. ICT offers the learner the opportunity to know that although technology is often complex, it is simply a way of doing things; it helps them use and apply a variety of information and communication technologies in problem solving, decision making, inquiry and research; and helps them determine which processes, tools and technologies to use and when to use them.

The open and distance learning in education have been enhanced greatly due to e-learning (electronic learning). E-learning is both in informal and non-formal education settings for facilitations, instruction, interaction and more particularly for courses delivery. This form of ICT not only enhances the implementation of the curriculum, it influences how the curriculum is structured for proper implementation.

Concept and Nature of ICT

A great transformation is emerging in the formal education system and other sectors of the economy. Ndom-Uchendu and Maritha, (2017), noted that knowledge, ideas and techniques grow and change so rapidly that they become obsolete. Recently these transformation and communication technology (ICT) has greatly impacted the educational system. The introduction of ICT in the education system is to bring a

positive change in education system in order to prepare students for the information age and accelerate national development efforts, (Amadi, Okoli, and Maryann and Michael 2016).

ICT is an acronym that stands for Information Communication Technology. One objective of the Nigerian National Policy on education is to create and educate and inform nation, using amongst other means, modern information and communication technology (ICT) and to provide access and increase the quality and relevance to secondary and tertiary education in a growing global information era (FGN, 2013). Information and Communication Technology (ICT) consists of the hardware, software, network and media for the collection, storage, processing transmission and presentation of information (Voice Data text, images) as well as related services. Ndom-Uchendu and Maritha (2017; 2) quoting Wikipedia (2006) view it as communication facilities and features that variously support teaching and a wide range of activities in education. They are those electronic gadgets used for accessing, gathering and manipulating of information. Etejere (2007) defines it as a new communication and computer technology available for creating, storing, selecting, changing, developing, receiving and displaying different kinds of information. Basically ICT is any electronic system of information that transmits processes and retrieves information. Terhemb and Abubakar (2015:54) sees it as an application of micro computer and telecommunication technology used to improve on the learning process. In education, ICT can be understood as the application of digital equipment to all aspects of teaching and learning process. Terhemb and Abubakar described information communication as an enabler of many different types of educational opportunities.

Uses/ Application of ICT in Teaching and Learning

The use of information communication technology (ICT) has spread across the world as it has been embraced by every sector such as health, economy, and agriculture including education. ICT has the potential to transform learning and beyond the classroom when it is available and in use. Nigeria has gone through diverse stages of educational reforms for the purpose of providing its citizens with appropriate skills and knowledge necessary for the 21st century work place among others, (Eric-Mawuenyegah&Julianah 2017:124-125). The federal government of Nigeria realized the need for the citizens to acquire computer knowledge, hence set up a national committee on computer education which was handed by Alhaji Hafiz Wali in 1987, (Eric-Mawuenyegah&Julianah 2017). The following cardinal objectives of computer education in Nigeria were also highlighted:

- (a) To bring about a computer literate society in Nigeria with a short space of time.
- (b) To enable the present generation of school children at all levels appreciate the potentials of computer.
- (c) To enable them use computer in various works of life and later education.

In education, ICT can be understood as the application of digital equipment to all aspects of teaching and learning. Hence, Ndom-Uchendu&Maritha (2017:2) described information communication technology as enabler for needed in utilization of ICT in education. There facilities include: (a) radio set (b) television (c) telephone (d) computer.

Uses of ICT

(1) ICT as Instructional Aid: ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability. ICT helps in the both successfully apply the existing knowledge and produce new knowledge. Computers are used by students to learn, reading mathematics, music, art, simulation and health practices. ICT provides productive teaching and learning in order to create people's creative intellectual resources especially in today's information society. The simultaneous use of audio, text, multicolor image, graphics and motion made possible by ICT gives ample and exceptional opportunities to the student to develop capabilities for high quality learning and to increase their ability to innovate, (Eziahigala, Nnamdi, Justine and Okeh 2017).

(2) ICT as a course of study: today's employers of labor are in search of graduates with requisite knowledge and training that would help to solve problems that do not yet exist today, (Uche,2009), (Unanbia et al 2017 and Ndom-Uchendu and Maritha 2017). Nigerian graduates need properly trained for the new positions that are opening up in industries. The demand for high skilled and technologically trained workers is on the increase. In order to revolutionize the Nigeria education system, the country needs ICT not only as a tool for skilled workers with basic knowledge in algorithm, flowchart design, complex programming and web design. The country also needs technicians and engineers.

(3) ICT as a tool for educational administration and management: many schools in Nigeria still go through laborious exercise of manually registering students, maintaining students and staff records, keeping inventory of school property and supplies and other such activities. These are chores that the expectation therefore is that as schools deploy more computers to carry on these chores, teachers will be freed and thus again more instructional time.

(4) ICT as a tool for higher technological development: Technology is the primary means of reaching others in far and near places. Technology is progressively effacing the two previous environments- nature and society. The environment referred to here is that which enables us to live, set us in danger and is immediate to us and immediately all else. The modern man cannot live without gadgets and is therefore subservient to technology rather than technology being subservient to our social life, business and education. Nigeria introduction to cellular technology has revolutionized the communication industry. There is therefore an urgent need for the education system to re-strategize to be able to benefit from the gains of cellular technology.

(5) ICT as a tool for economic development: As a result of globalization, industrial competition is on the increase and companies must not only come up with innovation products and services to the global market but must do so with unprecedented speed. For companies to survive, they need intelligent and creative employers whose novel ideas are to a certain extent a guarantee of the companies' existence, (Idogo and Ainabor, 2011).

Concept of Curriculum

The concept of curriculum has been defined variously by different individuals. There definitions are dependent on their conception of the functions of schools and their

interpretations of the changing needs of society. The society is dynamic and the changes are integrated into the curriculum of schools for effective dissemination of the required knowledge, skills, values and attitudes (Josephine & Ameachi, 2011). The origin of the word curriculum as given in Latin language is “currus”, which means a race course. This implies that a child start running academically and otherwise, immediately he/she is enrolled in school. This is in formal education, because the child has been exposed to formal curriculum before he/she arrived at school. This is why curriculum is explained as the experience of the child which the school uses in the process of educating the child. So the experiences can be harnessed by the school for effective implementation of the planned curriculum, (Grace, 2014:7).

Curriculum can also be seen as a plan, blue print or road map applied in teaching and learning as to bring about positive change of behavior in the learner. It is through curriculum that a society translate its hopes into concrete realities Agina-Obu, (2016:23) sees curriculum as a document containing the subjects and subject matter to be taught by teachers and learned by students. The document includes the objectives, the methods, activities, resources and evaluation procedures appropriate for assuring the curriculum at the end of implementation.

Another definition by Oteh and Akuma (2016:2), curriculum is a structure series of learning experiences intended for the education of learners. Learning experiences are the interactions of the learners with the learning environment. There are three major classroom interactions; learner-learner, learner-teacher and learner-material resources. Learner experiences are embedded in courses taught to the learners to create interactions and make the learners to participate in the class activities, (Agina-Obu, 2016).

Curriculum is a course of studies offered in the school for the education of the learners and which students pursue in order to get a degree, a certificate, a diploma or any other form of academic awards. Curriculum has three major components: programme of studies, programme of activities and programme of guidance. These components reflect the three classification of educational objective: cognitive, psychomotor and affective behaviours respectively. This essence of education is the ability to transfer the knowledge, facts, values and attitudes learned from one situation to solve problems in another situation, and this is done through a well-planned curriculum. One the function of curriculum is to provide a template or design which enables learning to take place.

Content in Curriculum and Implementation

Content or subject matter is what learners are to be taught in order to realize the goals, objectives and aims of education as stated in the curriculum. Curriculum content therefore is a body of facts, ideas, concepts and skills that are presented, discussed in the course of imparting knowledge to learners. The content selected should reflect the predetermined curriculum objectives and experiences needed by the learner, (Oteh and Akuma, 2016).

According to Agina-Obu (2016), curriculum implementation is the various steps in producing a functional data. Curriculum implementation therefore refers to the various steps involved in achieving the described objectives. It is the delivery in the curriculum process. At this stage all relevant curriculum inputs are brought in direct contact with the target audience in such a way that through a variety of activities, learning experiences

and mastery can be maximally achieved at minimal cost. Curriculum implementation occupies a strategic position as it links the design with evaluation stages that is, that materials and methods are put together to produce desirable learning activities and experiences for the learners. Akpo, (2009:181) asserts that, curriculum implementation is the task of translating the curriculum document into the operating curriculum by the combined efforts of the students, teachers, and others concerned.

The Need for ICT Application in Nigeria School

Improved education at all levels is essential to the creation of effective human capital in any country. The need for ICT in Nigeria schools cannot be overemphasized. In this technology driven age, everyone requires ICT competence to survive. Organizations are finding it very necessary to train and re-train their employees to establish or increase knowledge of computers and other ICT facilities. This calls for early acquisition of ICT skills by skills by students, (Lawrence 2014:30). The demand for ICT literacy is increasing in Nigeria because employees realize that computers and other ICT facilities can enhance efficiency. On the other hand, employees have realized that their ability to operate on computers can serve as job security. With high demand for computer literacy, the teaching and learning these skills are a concern among professionals.

ICT application and use will prove beneficial in improving Nigeria's education at all levels. Also, new instructional techniques that use ICTs provide a different modality of instruments. For students, ICT use allows for increased individualization of learning, (Juliet, 2011). 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 in the Nigerian school system. The ability to use ICT application effectively has become essential such as book keeping, clerical and administrative works and so on, now constitutes a set of computerized practices that form the core IT skills package spread sheet, word processor, and data bases, (Refell and White work, 2002; Adomi&Kpangban 2010).

ICT Application in Nigeria Schools

There are developments in the Nigeria education sector which indicates some level of ICT application in primary and secondary schools. The federal government of Nigeria in the National Policy on Education, FRN (2004) recognized the prominent role of ICTs into education in Nigeria. To actualize this goal, the documents states that government will provide basic infrastructure and training at the primary school. At the junior secondary school, computer education has been made a prevocational elective, and is a vocational elective at the senior secondary school. It is also the affection of the government to provide necessary infrastructure and training for the integration of ICTs in the secondary school system (Adomi&Kpangban 2010). It should be noted that 2004 was not the first attempt the Nigerian government made to introduce computer education into schools. A policy on computer education was enacted in 1988 with a plan to establish pilot schools and diffuse computer education first to all secondary schools, and then to primary schools. Unfortunately, the project did not succeed, (Falade, 2015:31).

Besides, the Federal Ministry of Education has launched an ICT-driven school project, known as School Net (www.snnng.org) (Federal Republic of Nigeria, 2006),

which was intended to equip all schools in Nigeria with computers and communication 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-school 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, among other things. It is also meant to connect African students to the internet, (Terhemba&Abubakar, 2015). Three phases were envisaged with fifteen to twenty countries in each phase spanning over ten years; about 600,100 schools are expected to benefit. Although, efforts have been made to ensure that ICTs are available and used in Nigerian schools, the level and uptake is still very low. It has been observed by Goshit (2006) that most schools, both private and public (government), do not offer ICT training programme, (Omenu, 2013).

Falade (2015) observed that the availability of some ICT components in schools hampers teacher's use of ICT. Lack of adequate search skills and access points in schools were reported as factors inhabiting the use of the internet by the secondary school teachers. The absence of ICT equipments in most Nigerian secondary schools leads students to resort to cyber cafes for internet access. Most cyber café clients in Nigeria are students, (Omenu, 2013).

Strategies for Incorporating ICT into Instructional Procedures

Many strategies can be developed to use ICT to enhance instructional strategies. Central to the application of ICT in teaching and learning is the role of the computer. The diverse roles computers play in teaching and learning has aptly being grouped into five by (Suleiman,2015). These are:

- (a) Virtual teaching: this is a situation in which the teachers and learners interact through the video conferencing technique. Distance is thus not a barrier to the student getting information from the teacher giving directives, instruction and guidance to the learner approximates that in a face to face session.
- (b) Multi-trading: This is a feature of the web that enables different parts of a course material to be connected in any other that makes sense to student. The use of cross indexing and the ability to navigate forward and backwards while studying course content enhances a student's engagement with the materials.
- (c) Web-based instruction: The web-based instruction uses the internet and the worldwide web (www) as the main component of learning materials and resources for teaching/ learning a course. Course information is gathered from the internet through browsing. The internet can be regarded as the linking of millions of computers with each other through the telephone systems, like spider's web, to achieve instant global communication. Through the internet, large amount of educational information can be accessed
- (d) Instructional slides and tutorials (Audio): These are teaching and learning aids made and written into compact disks with graphics response. Audio system for listening and responding are also present to enhance learning.

Conclusions

Human conduct in recent times has been reshaped from traditional life to a technological interactive society. The language of every human activity now is technology. Technology has dominated every aspect of human life. The use of

information and communication technology (ICT) becomes more inevitable, especially in education, as the younger generation grows up into rapidly developed technological – oriented society, which makes the knowledge of technology, not only necessary but absolutely required. Teachers, being in the centre of nurturing the younger generation, need not only the theoretical knowledge of ICT facilities but the practical usage ability so as to use it to teach their students effectively in the teaching/ learning situation. Education systems around the world are under increasing pressure to use the new technology to teach students the knowledge and skill they need in the 21st century. Many countries are engaged in a number of efforts to affect changes in the teaching/ learning process, to prepare students for information and technology based society. ICT facilities provides an array of powerful tools that may help in transforming the present isolated, teacher-centered and text-bound classroom into rich, student-focused interactive knowledge environments. Hence, there is need for schools to embrace new technology approach for learning and move toward the goals transforming the traditional way of learning. Teacher institution must therefore assure to leadership role in transformation of education or be left behind in the wind of rapid technological change, (Abidoye, and Fatoki 2016:319).

Successful and effective integration of ICT into school’s curriculum and delivery requires changes in the school organization and pedagogy. Efforts to integrate ICT into traditional classrooms end up in frustration and inadequate use of valuable resources. Attempts to change the school culture and practice may be difficult, thus the school leaders are faced with teachers as “a difficult to accomplish task”. In schools where administration and curriculum leaders value model and support ICT integration, students are presented with greater opportunities to learn ICT (Lawrence, 2014).

Recommendations

From the discussions, the following recommendations are given:

1. Teachers irrespective of their age, qualification and location should be given opportunities to become ICT literate.
2. Federal Government should make computer education compulsory at all levels of education.
3. There should be regular power supply because the tools encoding property needs constant electricity as the source of power.
4. There should be trained personnel in application software, operating systems, network administration and technicians to carry out the routine maintenance and minor repairs.
5. The government and teachers should make it possible for every student to have a pass in computer education.

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