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## **ICT Education for Teachers and ICT Supported Instruction: Problems and Prospects in the Nigerian Education System**

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### **Abstract**

*Education is perceived in this piece as a process of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training and research. ICT has a very significant place in the education process that involves teachers and instruction. This paper therefore, focuses on: ICT education for teachers and ICT supported instruction: problems and prospects in the Nigeria education system. The paper posits that information and communication technology is today navigating both the processes and actions in industries, organizations and especially the education system. Information communication technologies used in education were therefore pointed out in this*

*paper. The essence or relevance of ICT education for teachers was explicitly discussed. Equally, the various strategies information and communication technologies are used to support instructional delivery, as well as the associated problems of ICT applications in education were also reviewed. To dress this piece further, the prospects of ICT application in Nigeria education system was equally covered. The paper concludes that the major challenge of knowledge-base economy is that the system is driven by electronics. Thus, if education could be used to achieve any meaningful development with regards to the challenge of the knowledge based economy, the provision of ICT education for teachers and for instructional delivery needs to be pursued vigorously through the education system.*

## **Introduction**

Education has been variously defined by scholars in the discipline. All the definitions were meant to serve the purpose and the intent of the scholars. In this piece therefore, education could be perceived as a formal training that is given in schools and institutions. This implies that education involves the acquisition of the ability to read, write and calculate. Education is a way of making people fit to live and fit to live with; it is a desirable change in human behavior as well as a process that change the learner (Oduma, 2012). The process of education therefore, occurs whenever any influence produces a change or changes in the physical or mental behavior of the recipient. Abhimanyi (2007) noted that education contributes to the individuals' personal development, increases his/her productivity and income at work; and facilitates participation on economic and social life.

Dewey cited in Kayode (2010) stressed that education in its general sense is a process of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training or research. The above concepts point to the fact that education embodies both the processes of assimilating some theoretical knowledge as well as ethical behaviours acceptable in the society. This implies that a person who has a good education

has acquired relevant sets of theoretical knowledge as well as a certain degree of changes in behavior. Often, it is believed by many that the responsibility of education is borne by the school only. Precisely, the school equips one with theoretical knowledge, transmits information in an ordered and structured manner, but can never replace the home or the parents either (Kings, 2006). In this regard, one could obviously say that education starts with the parents in the home. Thus, education is first formed in the warmth and trust of the family. Here the child learns to tell the truth, to be honest, to appreciate beauty, to respect work and to fulfil his duties (Kings, 2006).

The various meaning and connotations in the definitions of education has been summed up in Collins English Dictionary (2009) meaning of education thus:

- a. The process or act of imparting or acquiring general knowledge, developing the power of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life.
- b. The act or process of imparting or acquiring particular knowledge or skills as for a profession.
- c. A degree, level or kind of schooling e.g. A University Education
- d. The result produced by instruction, training or study e.g. To show ones education.
- e. The science or art of teaching i.e. pedagogic.

It is imperative to underscore the fact that the processes and actions involved in the definitions above often take place under the dictates and guidance of the teacher. Interestingly, due to challenges in instruction, occasioned by advances on technology these processes and actions have gradually turned autodidactic (Hawkins, 2002). Information and communication Technology (ICT) is today navigating both the processes and actions in industries, organizations,

and human activities etc, in our society (Blurton, 2002). Thus, ICT has immensely imparted on education and education processes all over the world. There is virtually no process in education that the ICT has not influenced. Basically, it has aided the processes in teaching as well as the processes in learning, thus, giving rise to nascent areas of interest and study in the field of education (Fouts, 2010). As the processes keep changing in the face of advances in ICT, the human resources involved in the processes of teaching and learning are therefore, challenged to re-skill their abilities and competences in order to keep pace with the new trend and the penetration of ICT into education (Potashnik and Copper, 2009).

### **Information and communication technology (ICT) and education**

The marriage of two technologies gave birth to the Information and Communication Technology. These technologies are the communication and the computer technology (Edward, 2007). The communication technology includes the radio, the television and the telephone technology, while the computer technology includes the computer, satellite, the wireless and the internet technology (Edward, 2007). The communication technology provided the means by which information is being transmitted and the computer technology provided the structure for transmitting, receiving and processing of data. It also provided the means of storing and retrieving the information. Thus, the information and communication technology is the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information (Stevenson, 1997). ICT therefore, includes the 'old ICTs of radio, television and telephone, and the 'new' ICTs of computers, satellite and wireless technology and the internet (Potashnik and Copper, 2009). The combination of these two technologies is what has networked the whole world today into a global village. ICT has not just networked the whole world, it has influenced virtually all human endeavours especially education. ICT has changed so many aspects of learning, it

has influenced the aspects it cannot change, enhanced the structures that it could and restructured those that it has to. In this direction, it could be said that ICT is widely used in all aspects of education. Information and communication technology (ICT) are advance in technologies that provide a rich global resources and collaborative environment for dissemination of ICT literacy, materials, interactive and educative discussions, and research information (Bates, 2011). ICT also enhances international exchange of ideas which are critical for advancing meaningful educational initiatives, training high skilled labour force, and understanding issues related to both education and economic development (Ololube, Ubogu and Ossai, 2011). Many tertiary institutions in Nigeria today are struggling to adopt the ICT as teaching and learning technologies. This is in an effort to create an enabling environment for both students and their lecturers to engage in collaborative learning environment and gain access to information (Ifinedo, 2006). Access to information through ICT is the amount of information accessible to individuals to support them in trying new strategies, thinking and creativity that are reflective in practice aimed at engaging them to new innovations through the use of ICTs (Ololube, Ubogu and Ossai, 2011).

ICT are indispensable especially in education and have been accepted as part of the contemporary world especially in the industrialized societies (Hannafin and Savenye, 1993). In fact, culture and societies are adjusted to meet the challenges of the ICT knowledge world. Ololube and others further noted that every nation invests heavily in education because it can produce unquantifiable benefits for individuals, organizations and the society as a whole. In this regard, the ICT have been conveniently used to provide education both in the formal conventional face-to-face classroom interaction and in distant education offered with separation in terms of physical location of instructors and students.

Jones and Knezek (1993) noted that ICT originally is applied to serve as a means of improving efficiency in the educational process. The use of ICT in education can help to improve memory retention,

increase motivation and generally deepen understanding. ICT can also be used to promote collaborative learning, including role playing, group problem solving activities and articulated project (Fathi, Shelda and Nahid, 2010). The authors further opined that ICT is a diverse set of technological tools and resources used for creating, storing, managing and communicating information. For educational purposes, the ICTs can be used to support teaching and learning as well as research activities, including collaborative learning and inquiry. One of the main applications of ICT in education is teaching and learning based on new technologies.

### **ICT education for teachers**

One of the challenges in the application of ICT in Nigeria education system is the poor knowledge of the teachers and instructors in using the systems gadgets. Although ICT in Nigeria education systems is gradually capturing the attention of the government, institutions, teachers and learners, teachers' knowledge of application of system does not match the ovation. This is a critical handicap in the use of ICT in Nigeria education system. Richmond (2002) noted that ICT education implies learning about computer and the internet, and designed to popularize ICT literally among beneficiaries. ICT education also refers to the creation of human resources to meet the IT needs of the knowledge economy. This involves training of teachers and other teaching staff on the knowledge of the tools and machines of ICT that is used in education. The essence of ICT education for teachers is to technically avoid the frustration of poor knowledge of the use of ICT among teachers. In Nigeria for instance, there are not enough manpower to handle and utilize the ICT systems in both the secondary and tertiary levels of our education system (Olorube, Ubogu and Ossai, 2011).

The teachers need to be re-skilled and re-branded in line with the technological skill and competencies required for effective use of ICT in teaching and learning. This strategic approach will definitely help educational institutions to have a pool of manpower to address

educational needs and job opportunities in computer hardware and software. Nigeria is today among the many countries progressing towards the goal of education for all, but still struggling to achieve teacher quality for all especially in remote areas of the country (Kayode, 2010). Teachers therefore, should be properly groomed in the use of ICT in order to stress their relevance in the face of growing advances in Information Communication Technology. Interestingly, the federal and state ministries of education have in recent times been acquiring new and outstanding instructional technologies that impact human life. The most important of them is information technology (Kayode, 2010). Since the education system of Nigeria is gradually giving priority to ICT literacy, it is imperative therefore, that the teachers be viewed as the prime engine for this priority. In this regard, all concern should be to re-skill and re-tool the teachers to be able to propel this priority effectively. In other words, ICT learning and utilization should be one of the major concern of educational authorities both at federal, state and local levels. Thus, ICT training and development agenda for teachers which may be tagged Information Technology Literacy (ITL) for teachers be established by the Education Ministry – stemming from the federal, state and down to the local education authorities (Fouts, 2010).

The challenge of ICT education for teachers in the Nigeria education system is obvious. The increased number of pupil and students' enrolment, increase in the amount of educational activities being carried out easily through information and communication technologies, changes in the nature of teaching and learning becoming gradually web based, electronic journals, on-line sources of material are among the few challenges for Nigerian teachers (Blurton, 2002). Above all, the role and responsibilities of the education system especially at the tertiary level include teaching, research and service to humanity and society.

The teaching role of the education system reflects their centrality in addressing the primary education mission. Teachers are expected to provide instruction and students advising. Precisely, the main aspect

of education responsibilities through the teachers include: classroom teaching, academic advisement, course development, counselling, academic programme review, etc. In all these activities, the ICT has a very vital role to perform either by influencing their content and structure or by providing important information to enrich the process and content (Blurton, 2002). If ICT tools are to enrich or improve educational institutions effectiveness and efficiency, it is obvious that ICT literacy for teachers in Nigeria education system be urgently given a priority attention. However, investment and attention in this regard should always be carefully balanced against other ways in which education functions of research and services may be improved and strengthened for the well being of the system and the society in general.

### **ICT supported education**

ICT supported education implies all levels or strategies of the application of ICT in the field of education. It implies also the use of ICT equipments to guide education processes especially the actions and processes of teaching and learning. The use of ICT in the field of education has continued to pose serious challenges to educators and all those who facilitate the teaching and learning processes in the Nigeria education system (Edward, 2007). ICT supported instruction defines all ICT gadgets used as instructional media to deliver lesson contents as prepared by the instructor. Examples of this type of ICT include the broadcast audio and video which could come inform of radio and television broadcast, audio and video tapes delivered to students as part of learning kit. Perraton and Creed (2002) noted that there are three general approaches, for instance to the use of radio and television broadcasting in education:

- *Direct class teaching*: that is, where broadcast programming substitutes for teachers on a temporary basis;
- *School Broadcasting*: that is, where broadcast programming provides complementary teaching and learning resources not otherwise available and



- *General Educational Programming over Community:* that is, national and international stations which provide general and informal educational opportunities.

Hadded and Drexler (2002) noted that the five minimum use of ICT in instruction include the following:

- Presentation:* ICT gadgets play important role in teacher's lesson presentation. Often teacher's lesson may be customized in slides ranging from the point of set induction through instruction objectives and content to evaluation. When instruction is cut to slides, it is usually copied to flash or CD plates and with the aid of the projector and projecting slides; the lesson can be presented to the students. When lessons are cut into slides and presented to students, it makes the entire process interesting and reduces the teacher's tasks of chalk board illustrations. On the other hand, the students' interest are captured and sustained as the lesson lasts (Kings, 2006).
- Demonstration:* Miller (2000) noted that process demonstration is the aspect of instruction that focuses the recipients on the directives, stages, or steps involved on carrying out operations or actions. To capture students' interest and add value to the demonstration, teachers are often challenged to code such processes in CD plates or templates and shoot same for classroom presentation and consumption. Process or teachers demonstrations aided by ICT adds colour to presentation and can spur students to be creative and innovative in their thoughts (Ifinedo, 2006).
- Drill and Practice:* Drill and practice as an aspect of instruction involves repetition of a particular process or action in order to improve one's skill or competence in the actions defining the process. ICT supported instruction can aid drills and practice. With ICT drill equipments like the video cameras, computers etc. students can record and practice a particular skill involved in an action. With the computer for instance, the students can practice and capture the skills involved in power point presentation,

spreadsheet, and coral draw, including graphics. The use of ICT gadgets for students practice and drills no doubt can sustain their interest and spur their motivation to gain new knowledge in the absence of the teacher. It is equally pertinent to point out here that ICT gadgets like the audio CD, the video cassette and the television could be used for drills and practice especially in oral English or French studies.

- d. *Interaction:* ICT powered instruction is usually in form of teleconferencing. Teleconferencing therefore refers to interactive electronic communication among people located at two or more different places. Through this electronic driven interaction, lessons could be delivered by the teacher and students as well can learn new things.
- e. *Tele-collaboration:* This is an online learning involving students logging in to formal courses (classes) online. It is perhaps the most commonly thought of ICT (internet) application in education, especially in distance learning scenario.

### **Problems of ICT application in Nigeria education system**

The Nigerian education system is quite a robust one with many challenges facing the operations. Nigeria embraces with determination the agenda to introduce ICT and its working tools into her education system. Like such other determinations agenda and proposal, the ICT agenda have no smooth run way into the education system. Like other developing countries of the world, the effort to accomplish this is challenged by many constraints in our system. Such challenges may be viewed and discussed from the following perspectives:

- a. *The embarrassment of white paper policy:* Nigeria is a country blessed and endowed with creme of intellectuals who at any time may be pooled by the government to formulate pretty policies to serve as frame work guide to the government

or public bodies in achieving collective goals. Very many policies in the education system have been formulated but the embarrassment of allowing our good policies to kiss the earth is almost a culture in Nigeria education system. In Nigeria policy making, the spirit and determination to run after the agenda of each policy made, dies soon after its conception. The ICT agenda may not be too different from others.

- b. Lack of financial backing;* This is one of the dry challenges in developing countries. Fund in Nigeria is so scarce such that they have to be spent mostly on legislative maintenance before considering basic supplies such as infrastructure, - roads, housings, electricity, health etc. Thus, investing in ICT in the education sector might be seen as a long term Issue and as such does not require urgency.
- c. General attitude of Nigeria administration to education:* It is pertinent to point (without condemning any government past or present) that the general attitude of Nigeria government towards education is never encouraging. Unfortunately the first priority of each government is how to cling-on to power continuously. Thus, spending greater percentage of the fund on maintenance and up-keep of administration. It is almost a culture in Nigeria that before the government can think of improving the system, there must be a show-down battle between the government and any of the union bodies in our education system. There is virtually no programme, policy, agenda or projects in the education system that does not suffer from one disability or the other, each resulting from abject negligence by the administration.
- d. Limited internet access:* Low infrastructural development especially electricity is a major problem in Nigeria. There are absolutely no access facilities of the internet in the remote parts of the country. All these make it difficult for the

introduction of the ICT in all arms of the education system as well as in rural areas almost extremely difficult.

- e. *Lack of trained staff:* The most common challenge in our country, especially in the effort to adopt ICT in the education system is the lack of trained teachers. Most of the teachers in all levels of our education system are both deaf and dumb in ICT literacy. Thus, when the challenge comes to practically apply ICT, which is totally new to traditional teachers, many of the teachers may not know how to handle it and sometimes may be reluctant to embrace the application of nascent development in the classroom.

### **Prospect of ICT application in Nigeria education system**

ICTs hold good promises for our education system. It could be both a lever and catalyst in enhancing the education sector. As a lever, the ICT will serve as a means of exerting effective power into the education system. As a catalyst, the ICT is capable of bringing about fast positive changes in the education system. There is no doubt that students exposure to ICT will exert a significant and positive impact on students' achievement, especially in terms of knowledge, comprehension, practical skills, and presentation skills in various subject areas such as science, mathematics, social studies and business related subjects. Through ICT in education, images can easily be used in teaching and improving the retentive memories of students. Through education ICT, teachers can easily explain complex instructions and ensure students' comprehension and through education ICT, teachers are able to create interactive classes and make the lessons more enjoyable, which could improve students' attendance and concentration. Specifically, the prospects of ICT application in Nigeria education system may be discussed under the following sub-heads;

*Enhance the administration and management of schools:* there is no doubt that school administration and management requires lot of paper works, documentation, records, data and information. Often, manual approach in handling these processes are tedious, time consuming and costly. With the efficiency of the ICT in education, these rigors may tremendously be reduced. For instance, management schedules of activities, paper works, school records and documentation including data and information can easily be captured with ICT. With efficient ICT software tool kits these documents and processes can be retrieved as and when management requires them (Richmon, 2002).

*ICT in Education can Enhance Teaching and Learning:* The task of teaching and learning may at best be described as the primary concern of every educational institution. In fact teaching and learning is considered the hallmark as well as the fulcrum of the essence of education. All educational activities especially in the school system are geared towards ensuring effective and efficient teaching and learning. The impact of ICT therefore, in teaching and learning cannot be over stretched. In teaching specifically, ICT in education can enhance teacher's presentation and demonstration. Students drills and practice can equally be spurred through the use of ICT in education, teachers lesson could be prepared in electronic disk plate (EDP) in slides, and with good knowledge of the power point tool, the teacher can effectively present his/her lessons to the students (Fouts, 2010). On the other hand, students' drills and practices are better achieved through the use of ICT. Students' learning requiring stages and steps of operation (e.g. Laboratory experimentation) can best be coded in a disk plate and replayed over and over again to ensure students' understanding of the vital steps and process. With ICT in education, students may not so often need the presence of the teacher or the instructor especially during their practice hours (Fouts, 2010).

*ICT in Education can Facilitate Large Scale Students Assessment:* In some public schools, students' populations are highly tremendous. Each time they organize exams, the processing as well as the marking

posses a lot of challenges to administration and the teachers concerned. Above all, the education system is also characterized by public examinations like JAMB, WAEC, NECO, and such other related public examinations. The manual processing of these types of public examinations most often has been challenged with many setbacks. Nonetheless, ICT in education can facilitate the smooth conduct of such large scale students' assessment. Ideally, students data and records can easily be captured despite the geographical distance, and location, such data are collated at the central exam data Bank and further codified based on location, (state) and name (i.e., of schools). Again, the question paper and exam questions may be structured and configured using appropriate ICT tool kit to enhance both students' response and the marking and processing tasks. With ICT in education, these tedious and strenuous processes are handled with less time and cost (Hawkins, 2002).

*ICT can Increase Access to Education:* In developed world, many education programmes exist to serve the convenience of the recipients or beneficiaries. In such environment, access to education can easily be gained despite your geographical location. In Nigeria, the same may be possible if the education system is adequately garnished and networked with ICT. With ICT in education, people in remote part of the country can gain access to education with special ICT enable teleconferencing and telecollaborative teaching and learning. The basic requirement here is that both facilitators and resources persons, including beneficiaries need to be computer literate. Above all, ICT like the Radio and the Television could equally be used by many to gain access to education if these gadgets are properly married to the education system. To be effective and properly serve the purpose, ICTs in education require functional networking or strong inter-connectivity.

*ICT can Enable Education Delivery to Overcome Geographical and Social Barrier:* Distance, remoteness and poor road infrastructure have all joined to deepen inequality in education access in Nigeria.

Collectively these describe the geographical challenges in education. Again, the issues of several barriers also constitute a challenge in education. With the use of ICT in education, these problems may gradually be solved in our education system. Thus, the distance in geographical locations can easily be bridged using the ICT.

The promises here show that the use of ICT in education has the potential to distribute opportunities for learning more widely and equitably across the country. It can also improve the quality and variety of the resources and support available to teachers, opening up new avenue to professional development of education officials especially the teachers. ICT in education have the capacity for a large scale delivery over a wider distance.

### **Conclusion**

ICT education for teachers and ICT supported instruction can best be achieved through strong leadership commitment at various levels on adopting functional ICT in the education system. The knowledge-based economy, for example sets a new scene and new challenges for the education sector. In the first place, education is a pre-requisite of the knowledge-based economy and the production and use of new knowledge both require a more educated population and workforce. ICTs therefore are very powerful tool for diffusing knowledge and information.

### **Recommendations**

If education for all is to be achieved, that is, in terms of equity of educational opportunity, and services; the provision of ICT in education in Nigeria, need to be planned in ways that will make it available, accessible, acceptable and adoptable in our education system. Specifically:

- a. ICT resources centres for teachers should be established in every local education authority.

- b. Private partnership should be encouraged in the provision of ICT literacy for teachers in remote areas.
- c. Students should equally be trained to use and appreciate the relevance of ICT in teaching and learning.
- d. Education administrators as well as (staff and employees) in education departments and ministries should be trained alongside teachers to be ICT literate.
- e. Road infrastructures should be improved upon to enhance the penetration of ICT in education in remote areas.
- f. Functional networking and inter connectivity of the system should be properly configured and structured to serve the purpose.
- g. Education software, programmes and tool kits should be well designed to enhance teachers' training within the shortest possible time.

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