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### **ICT ENABLED EDUCATION AND ICT DRIVEN E-LEARNING STRATEGIES: BENEFITS AND SETBACKS IN NIGERIA EDUCATION SYSTEM**

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#### **Abstract**

*Education is perceived here as schooling as well as the processes involved in gaining new knowledge, skills and attitude for the positive development of the beneficiary and that of the society. The use of technology that enables communication and the electronic capture, processing and transmission of information in education is an innovation that many nations across the globe struggle to achieve. This paper centres on ICT enabled education and ICT driven e-*

*learning strategies: benefits and setbacks in Nigeria education system. It is in fact among the academic struggle to bring to the lime-light, the knowledge of ICT to scholars especially in the domain of education. The paper captured interesting discussion on the concept of information and communication technology including the various approaches in ICT enabled education. To further extend the knowledge of the audience, ICT driven teaching and learning strategies and the benefits of ICT applications in education were also covered. Specifically, ICT benefits to students and parents as well as setbacks of ICT use in education were explicitly highlighted. The paper concludes that the use of ICT in education is gradually taking shape in some tertiary institutions in Nigeria. On the other hand, ICT use is sparingly observed in the secondary and primary schools. The paper recommends amongst other measures that the federal republic of Nigeria should come up with strong policy on ICT use in the education system.*

### **Introduction**

Education means many things to many people. It could be perceived as a process, institution or even as a product or a discipline. As a process, education may be seen as involving teaching and learning as well as the activities that characterize the actions of the teacher and the students (Nwaji, 2000). As an institution, education is viewed as a school or place where people could attend to in order to gain or learn new knowledge or skills. In fact, education here is seen as schooling. As a product, education is viewed from the point of the view of the level of school or degree of knowledge one has acquired (Nwaji, 2000). The usage here goes on to describe whether one is a product of primary, secondary or tertiary education level. Lastly as a discipline, education is seen as a subject offered in an institution of higher learning. Here education is seen as a course of study just like any other subject that could be studied in the school. Discourse in this place will view education from any of the above angles or perspective. Thus, Ukeje cited in Oduma (2012), noted that education is the key agent in the development of human personality, human potentials, the

human talent, human skills and human attitudes. It is the key to modernization and civilization and it is the teacher who holds this key. The above definition implies that education is an instrument for social development and social reform through individual development.

Thus, education is a vital instrument of change in any society. Alumode (2005) also viewed education as an instrument for nation building. The development of a country's natural resources is dependent on the quality of its human resources and the quality of human resources in turn depends on education. Education in Nigeria is an instrument per excellence for affecting national development (FRN, 2004), to this end, the formation of ideas, the integration for national development and the interaction of person and ideas are all aspects of education. Education fosters the worth and development of the individual, for each individuals' sake, and for the general development of the society. Omo-Amen (2005) stressed that education facilitates personal development of critical and creative thinking and the awakening of intellectual curiosity. It also ensures self realization, human relationships, economic efficiency and civic responsibility.

Accordingly, O'Conner cited in Adams and Smith (2006) noted that for education to worth its place in the society, it must provide the recipients with the minimum of skills necessary for them to take their place in the society and to seek for further knowledge; it must also provide beneficiaries with vocational training that would enable them to be self supporting in life. Education should also help make people critical and creative as well as awaken an interest in a taste for knowledge. It is imperative to point out that the processes and actions involved in the definitions above often take place under the dictates and directives of the teacher. Interestingly, due to challenges in instruction, occasioned by Information and Communication Technology (ICT), some of these process can be carefully handled by electronic gadgets as the case may be. Information and communication technology today is gradually penetrating the education system and it is clearly impacting on the system positively.

Basically, attention to ICT use in education is a global scenario as well as a nascent area of interest and study in the field of education.

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

ICTs imply Information and Communication Technologies. The concept may best be defined as diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information. These technologies include computer, the internet, broadcasting technologies (i.e. Radio and television), and telephone. Reddi (2009) opined that information and communication technologies are often associated with the most sophisticated and expensive computer-based technologies. ICT also encompass the more conventional technologies such as Radio, television and telephone technology (Reddi, 2009). Of all the activities of the ICTs, the most encompassing and most acceptable definition is that given by the United Nations Development Programme (UNDP). This body views ICTs basically as information handling tools, a varied set of electronic gadgets, applications and services that are used to produce, store, process, distribute and exchange information (UNDP, 2008). They include old ICTs of radio, television and telephone and the new ICTs of computers, satellite and wireless technology and internet. These different tools are now able to work together and combine to form our network world. The networked world describes a massive infrastructure of interconnected telephone services, standardized computing hardware, the internet, radio and television, which reaches into every corner of the globe (Reddi, 2009).

Rao (2011) noted that people in this modern society are becoming more and more familiar with information and communication technology (ICT). ICT refers to the technology that enables communication and the electronic capture, processing and transmission of information. ICT is a formidable tool for developing countries to leap up to the economic level of developed nations (Rao, 2011). ICT in developing countries (like Nigeria) is suggested as an effective way of improving the population's life and well being. In

particular, ICT applications on the education system might change the future of the under-developed world fundamentally through the connections to the flat world (Friedman, 2005). However, there are some challenges which the developing world faces when they adopt ICT in the education sector. These challenges are limitations on cost, internet access, trained staff and adequate policy. Perraton (2002) noted that technology enhanced education is generally perceived as a way of relieving poverty, social division and improve living standards due to the fact that technologies can deliver educational programmes at a lower cost than traditional education system. Thus, ICT enabled education system is cost effective (Perraton, 2002). Ololube (2006) noted that ICT in the education sector generates innovative efforts, partnership and promote ICT literacy, and facilitates interaction between all sectors of a national economy including external spheres. The author further noted that higher education institutions across the world have been adopting ICT teaching and learning technologies in an effort to create an environment for both students and their instructors to engage in collaborative learning.

### **ICT enabled education**

This involves delivering education purely through ICT or through ICT serving as the backbone. In simple words, this form of education requires ICT access and requires that the learner use ICTs as a primary or basic medium of instruction. ICT education can be treated under the following headings (Bosch, 2001):

- a. Learning with computers and the internet
- b. Learning through the computers and the internet.
- c. Using computers and the internet in teaching and learning.
- d. Teleconferencing and its educational uses.
- e. Telecollaboration (Merisotis, 2010)

(1) *Learning with Computers and the Internet:*

According to Rao (2011) learning with computer and learning with the internet includes the following:

- (a) Presentation, demonstration, and the manipulation of data using productivity tools. Some of this productivity tools are;
- *Word processor*; these include, Microsoft word, Note pad etc. these are packages used for word processing.
  - *Database*; these are software that are used for record and data storage.
  - *Spreadsheet*; these includes Excel, Lotus etc. that are used also for data keeping accounting and graphical presentation.
  - *Graphics* (both Paint and Draw); these software are used specifically for drawing.
  - *Graphing* (of data and functions); using both computers and graphing calculators (Potashnik & Capper, 1986).
  - *Desktop publication system*; this implies the performance of all that is involved in the art of publication using just a desktop computer.
  - *Desktop presentation systems* involve the use of computer to do presentation in seminars, workshops even in the classroom for lectures.
  - *Multimedia and hypermedia systems*; this implies the using of many in the computer at the same time. You can be working on a processor and be playing music on the same computer while you are at the same time online.
  - Connectivity, including email, the Web, and groupware help in telecollaborations.
  - Calculators (the full range, from low-end 4-function calculators to high-end calculators that can solve

equations, graph functions, and may be programmable) (Blurton, 2001).

- (b) Use of curriculum-specific applications types such as educational games, drill and practice, simulations, tutorials, virtual laboratories, visualizations and graphical representations of abstract concepts, musical composition, and expert system.
- (c) Use of information and resources on CD-ROM or online such as encyclopaedia, interactive maps and atlases, electronic journals and other references.

The challenge here is that the teacher and the taught must first learn how to use the technologies.

*(2) Learning through the Computer and the Internet:*

This implies learning about the computer and the internet and also learning with the computer and the internet. For instance a final year student of a Nigeria university is expected to carry out a final year project. The student will have to research and access information from the internet. She/he should be capable of using the search engine and other internet software to get required information. To be able to do this effectively, she/he has to learn how to access and use the internet to get the required information, this is learning about the computer and the internet. When the student has gotten the required information, she/he has to do some analysis, present the work and document it. Store, retrieve and send the information out. All these are done using the computer. It then implies that the education gotten from doing the project was done through learning with the computer and the internet.

*(3) Using Computers and the internet in Teaching and Learning:*

Haddad (2002) further noted that, there are three general approaches to the instructional use of computers and the internet, namely:

- Learning about computers and the internet, in which technological literacy is the end goal.
- Learning with computers and the internet, in which the technology facilitates learning across the curriculum; and
- Learning through computers and the internet, integrating technological skills development with curriculum applications.

### **ICT driven teaching and learning strategies or activities in education**

Toghioff (2009) noted that in recent years there has been a groundswell of interest on how computers and the internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal education settings. The impacts of the ICT on education are multiple. Above all, in the education system, the ICT has generated many teaching and learning activities that never existed for long. Thus, the ICT technologies are often used in combination rather than as the sole delivery mechanism. In so doing, ICT driven learning activities in the education sector may at best be collectively described as:

*a. E-learning or Online learning:*

This encompasses learning at all levels of the education both formal and non-formal, that uses an information network i.e. the internet for course delivery, interaction, evaluation and facilitation (Iwamaga, 2008). Other e-learning strategies that could be discussed here include:

- i. Web-based Learning:* As a sub-set of the online learning activity driven by ICT, the web-based learning refers to learning using an internet mainly using a web-browser such as internet explorer (Dirrh, 2010).
- ii. Blended Learning:* One of the most popular ICT driven activity in the education system today is the blended learning.

Blended learning refers to learning strategies that combines traditional classroom practice with e-learning solutions. For example, students in a traditional class can be assigned both print-based and online materials, have online mentoring sessions with their teacher through e-chat, and are subscribed to a class e-mail list. Through blended learning, a web-based training course (class) can be enhanced by periodic face-to-face students' teachers' interaction (Moe and Blodget, 2013). "Blended" was prompted by the recognition that not all learning is best achieved in an electronically-mediated environment, particularly one that dispenses with a live instructor altogether. Instead, consideration must be given to the subject matter, the learning objectives and outcomes, the characteristics of the learners and the learning context in order to arrive at the optimum mix of instructional and delivery methods (Potashnik, 2010).

- iii. *Open and Distance Learning*: This learning strategy have been defined by commonwealth of learning as a way of providing learning opportunities that is characterized by the separation of the teacher and the learner in time or place, or both time or place. It is a learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic; with the possibility of occasional face-to-face meetings; and a specialized division of labour in the production and delivery of courses. Ololube, Ubogu and Ossai (2012) asserted that distance education also called open or distance learning is a form of education in which there is normally a separation between students and teachers. Thus, it includes one which others may refer to as a means of the printed and written words, the telephone, computer conferencing or teleconferencing used to bridge the physical gap between the instructor and the learner. Distant education or learning equally involves the provision of whatever educational opportunities that are needed by anyone,

anywhere, at any time for those who otherwise would have been denied.

- iv. *Learner-centered Environment*: Newsome (1996) noted that ICT emphasizes much on learner center environment. Thus, he defines learner centered environment as those that pay careful attention to the knowledge, skills, attitudes and beliefs that learners bring with them to the classroom. Hernes (2012) further stressed that the impetus for learner centeredness derives from a theory of learning called constructivism. Constructivism views learning as a process in which individuals “construct” meanings based on prior knowledge and experience. With constant interaction in surfing the web and collaborative chats, learners can gain experiences that can enable them build mental modals or schemas, which in turn provide meaning and organization to subsequent experience (Harris, 2011).
- v. *Teleconferencing*: This refers to interactive electronic communication among people located at two or more different places. Teleconferencing is used in both formal and non-formal learning contexts to facilitate teacher-learner and learner-learner discussions, as well as to access experts and other resources persons remotely Bates, 2011. In open and distance learning, teleconferencing is a useful tool for providing direct instruction and learner support. Teleconferencing as an ICT driven teaching and learning strategies or activities can take any of the following shapes:
  - (b) *Audio-conferencing*: This involves the live (real time) exchange of voice messages over a telephone network.
  - (c) *Audio-graphic conferencing*: This involves situations where low-bandwidth text and still messages such as graphs, diagrams or pictures can be exchanges along with voice messages (Web-based edu, 2008).

- (d) Video conferencing: This allows the exchange not just voice and graphics but also of moving image. Video conferencing does not use telephone lines but either a satellite link or television network (broadcast/cable).
- (e) Web-based conferencing: As the name implies, this involves the transmission of text, and graphics, audio and visual media via the internet. It requires the use of a computer with a browser. These various ICT driven actions strategies and activities obtains in teaching and learning especially in ICT driven environment (schools) (Harris, 2011).
- vi. The Telecollaborative Interaction: Online learning involving students logging in to formal courses online is perhaps the most commonly thought of application of the internet in education (Harris, 2011). However, it is by no means the only application. Web-based collaboration tools, such as e-mail, (list serves), message boards, real-time chat and web-based conferencing, connect learners to other learners, teachers, educators, scholars and researchers, scientists and artists, industry leaders and politicians – in shot, to any individual with access to the internet who can enrich the learning process.

Telecollaboration is the organized use of web resources and collaboration tools for curriculum appropriate purposes (Blurton, 2000). It is an educational endeavour that involves people in different locations using internet tools and resources to work together. Much educational collaboration is curriculum based, teacher-designed and teacher-coordinated. The best telecollaborative learning are those that are fully integrated into the curriculum and not just extra-curricular activities.

### **Benefits of ICT application in education**

ICT provides to education the freedom of information and the ease of getting it. ICT in education makes it possible today for people to

create things that 20 years ago would have been a dream in an engineer's mind. Twenty years ago, an idea would remain an idea and or a theory. But today such ideas and theories have platforms to make them either a reality, a simulation or more presentable (Hernes, 2012).

ICT has taken education out of the four walls of a school to the street even to the comfort of our homes. Access to information and knowledge is critical to development learning. ICT quickly reaches a larger numbers of people across a wide geographical space. The radio and television reach into both urban concentrations and remote areas. The internet is unrivalled in communication for its power, speed and ability to reach a vast number of users world-wide. Video conferences allow people to see each other and to exchange information and ideas in real time. The mobile phone and the E-mail is an ICT product that allows large number of people to communicate directly, cheaply and fast. ICT makes information and knowledge gaining a continuous and life-long process. ICT encourages self paced learning through the on and off line mode. Other benefits of the ICT include:

- Greater efficiency throughout the school.
- Communication channels are increased through e-mail, discussion groups and chat rooms, 2go, dace book, etc.
- Regular use of ICT across different curriculum subjects can have a beneficial motivational influence on students' learning since there will be interdisciplinary insight between students in different discipline.

ICT has some specific benefits which may clearly be spelt out as follows:

- Easier planning and preparation of lessons and designing material.
- Access to up-to-date pupil and school data, any time and anywhere.
- Enhancement of professional image projected to colleagues.

- Computer use during lesson motivated students to continue using learning outside school hours (Bates, 2011).

### **Benefits for students**

- Higher quality lesson through greater collaboration between teachers in planning and preparing resources.
- More focused teaching, tailored to students' strengths and weaknesses, through better analysis of attainment data.
- Improved pastoral care and behavior management through better tracking of students
- Gains in understanding and analytical skills, including improvements in reading comprehension.
- Development of writing skills (including spelling, grammar, punctuation, editing and re-drafting), also fluency, originality and elaboration.
- Encouragement of independent and active learning, and self-responsibility for learning.
- Flexibility of “anytime, anywhere” access (Jacobsen and Kremer, 2000).
- Development of higher level learning styles.
- Opportunities to address their work to an external audience.
- Opportunities to collaborate on assignment with people outside or inside school (Perraton and Creed, 2011).

### **Benefits for parents**

- Easier communication with teachers
- Higher quality student reports – more legible, more detailed, better presented

- Greater access to more accurate attendance and attainment information
- Increased involvement in education for parents and, in some cases, improved self-esteem.
- Increased knowledge of children's learning and capabilities, owing to increase in learning activity being situated in the home.
- Parents are more likely to be engaged in the school community.

### **Setbacks of ICT use in education**

The primary problem of ICT in education is cost and adaptation. The cost of obtaining the ICT facilities is high. The cost of buying and maintaining the ICT services are high. On daily bases, there is always new development in the ICT world which implies that for one to be up to date there must be constant laying off, upgrading in terms of ICT equipment and training. All these have their cost implications.

Some people are still at a non welcoming position to the ICT technology. Some old hands in the profession are not disposed to the technology and some just fill it is not of their generation. Some people find it difficult to learn and adapt to the ICT technology and this is a big hindrance. Some family and teachers believe that it is only evil that is learnt from the ICT technology and so do not encourage it. Other barriers to the application of ICT in teaching and learning include:

1. Inadequate familiarity of academia with computers hardware and the supplementary equipment.
2. The lack of orientation/training programme on computer literacy or low rate of academic participation in computer literacy training.

3. The teachers/lecturers increasing average of age and their reluctance to use computers in education.
4. Unfamiliarity of academia with software which can be used in their teaching.
5. Unfamiliarity of academics with World Wide Web environment and the way of using it.
6. Inadequate access of faculty members to personal computers (PC) in their homes or offices.
7. Inadequate access of academics to enough budgets.
8. The common belief among academics that new ICTs possibilities have no effect on improving the quality of higher education.
9. Missing of a proper working place and labs or equipped classes with PCs, video projectors and other equipments.
10. The lack of budget in faculty of education to equip the classes and preparing equipments of hardware.
11. The absence of moods, cooperative motivations and enough coordination in faculties of education staff for entering into new atmosphere.
12. The absence of digitalized copy equipments like CD copier in departments and faculties.
13. The budgets weakness and lack of financial possibility for students.
14. The absence of students' access to personal computers (PCs).
15. The students illiteracy in computer knowledge

### **Conclusion**

Education in Nigeria is seen as the prime engine for national development. Institutions of higher learning are doing everything

possible to draw the attention of all and sundry to the system. The varied groups or sets of administration in the country, each came with choir voice to uplift the education system but each in turn end up with white paper policies. ICT use in education is one of the pretty policies Nigeria have tried to imbibe and to project in her education system. ICT use in education is gradually taking shape in some tertiary institutions in Nigeria but sparingly observed in the secondary or primary schools. The global challenge in information technology underscores the fact that human and national developments are all tied to the powers of information. Thus, information and communication technologies remain the hob and the hall mark of every development effort globally. The worry in Nigeria is that the pace at which ICT use in education is going is never encouraging. If Nigeria should pause her effort in ICT use in education, we should be worried that our education systems are today not properly furnished with information and communication technologies. Much as the worry extends is the fact that majority of the education personnel, executive and rank and file inclusive, as well as the students are no better than illiterates in ICT use. It is therefore, hoped that if the struggle to build strong ICT use in Nigeria education system will not commit the national suicide of having a nose0dive, the government of the country should take education serious and in fact ICT use in education a priority.

### **Recommendations**

The federal republic of Nigeria through the federal ministry of education should come up with strong policy for ICT use in the education system. The policy should be properly funded with every sense of commitment. Local, state and federal education authorities should partner with private organizations to ensure that the education sector effectively imbibe the use of ICT. This may be achieved through effective legislation to involve private participation in the provision of ICT equipments in schools as well as in the training of educational resource persons in ICT skills. Other good measures include:

- a. To set a time bound for all teachers to be ICT literate
- b. To set up ICT resource centres for teacher in every local education authority.
- c. To set a time bound for full swing operation in the use of ICT in education.
- d. To make ICT a necessary condition for admission into tertiary institution.
- e. Every new and old student in tertiary institutions to have at least a laptop computer for personal use.
- f. Government should endeavour to ensure that there exists good ICT network system especially within and between institutions operating within one state.
- g. ICT skills to be made compulsory for all students in the secondary school.
- h. To set a time bound for the commencement of the use of ICT in public examinations (e.g.) JAMB, WEAC, NECO, etc.

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