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The Impact of Information and Communication Technology in Educational Reforms

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Abstract

Information and Communication Technology (ICT) has become a driving force of educational reforms and in many countries, they are becoming integral parts of national policies and programs. This paper examines influence of ICT on teaching and learning. It is observed that both teachers and learners have access to education information through ICT in form of internet services. The numerous roles of ICT with regard to teaching and learning are discussed including the challenges facing ICT in developing countries like Nigeria.

According to Chukwuebuka (2006), Information Technology (IT) is a technology that integrates two main technologies; telecommunication and computer technology. It is a technology that deals with acquiring, storing, processing and distributing information by electronic means. Souala (2001) remarked that

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“information” refers to facts and opinions provided and received during the course of daily life either from man, mass media, electronic data banks and other sources.

CASTME (1988) asserted that information can be transmitted and received almost instantly to and from any part of the world using a combination of telephone, electronic coding, telegraphy satellite and computers. Communication is the process of information exchange between two or more individuals or organizations. In other words, it is process through which information, knowledge, ideas or messages are conveyed or transmitted from one source to another, (Adewoyin 1991).

Alhassan (2001) opined that information technology is a broad technology that supports the creations, storage, manipulation and communication of information. Ahmadu and Dogaro (2003), referred to ICT as electronics and/or computerized devices and associated human interactive materials that enable the user to employ them for a wider range of teaching and learning process. According to Oyedokun (2006), ICT includes the use of communication satellites, radio, television, videos, tape recorders, compact discs, floppy discs and the personal computers.

The Relationship between Internet and ICT

“Internet” stands for “International Network”. According to Chukwuebuka (2006), internet is the world’s largest computer networks that enable the computers interact with one another all over the globe irrespective of geographical distance, Chijioke (2004) notes that “Internet” is a system in which computers are networked (connected) together, so that they can share information, thus creating a virtual area called “cyberspace”.

Internet, as remarked by Chukwuebuka (2006) is closely associated with Information Technology (IT), and that internet facilitates communication using electronic mail (E-mail). E-mail is a store-and-forward managed data network that electronically allocates mailboxes in computer system to subscriber terminal E-mail. E-mail provides a fast means of sending messages to and receiving messages from people at little cost across the globe.

Internet as Resource for Acquisition of Knowledge

Chukwuebuka (2006) stated that internet has provide to be very important resource for human development and hence, socio-economic development by acting as a resource for acquisition of education. In other words, internet services are greatly used in education sub-sector. Internet through electronic learning (E-learning), provides the avenues and multimedia for promoting appropriate learning process in the 21st century. For instance, a computerized library has important advantages over the conventional library for easy accessibility, richer in content and cheaper. Students can become more serious and enthusiastic in learning using the internet.

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Internet provides multimedia that facilitate acquisition of knowledge and skill in a manner that enables learners (Students) learn and grasp much more easily, even when the subjects are considered difficult using conventional techniques, (Inyama, 2004). Electronic learning enhances distance education as pointed out by Anigbogu and Umeh (2003), that E-learning is a technology that makes information available to learners, researchers etc, irrespective of the distance.

According Chukwuebuka (2006), the E-learning takes over substantial portions of teachers' roles efficiently, leading to cost reduction in instructional delivery.

The Use of ICT in Teaching and Learning of Mathematics

According to Achimugu (2009), this age of computer technology with its vast solution to the human problems of communication and information management science has its rudimentary genesis in Mathematics. The new technology (ICT) challenges the traditional process of teaching and learning of Mathematics at all levels. ICT has a major impact on teaching and learning Mathematics. Achimugu remarked that while science uses computer with sensors for logging and handling data, Mathematics uses ICT in modeling geometry and algebra; in design and technology.

Information Technology

Information Technology (IT) is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications. IT is the area of managing technology and spans wide variety of areas such as processes, computer software, information systems, computer hardware, programming languages, and data base construct. In short, anything that renders data, information or perceived knowledge in any visual format whatsoever, via any multimedia distribution mechanisms, is considered part of the domain space known as information technology (IT).

IT professionals perform a variety of functions that range from installing applications to designing complex computer networks and information data bases. A few of the duties that IT professionals perform may include data management, networking, engineering computer hardware, data base and software design.

In recent time, information technology has spread further than the conventional personal computer and network technology, and more into integration of other technologies such as the use of cell phones, televisions, automobiles etc.

Information and communication technology (ICT) enhances individual learning of Mathematics. Individual students can learn at their pace.

Avis (2002) was of the opinion that in area of the Mathematics curriculum that are structured and transferable to electronic format, students will work at different

levels and on different content. By removing the burden of individualized learning from schools and colleges, time will be freed for the teachers to concentrate on the many other learning activities requiring a teacher as catalyst.

ICT and Distance Learning

Usiade (2009) defined distance education as a means of study directed by a parent institution but without normal college attendance requirement. It is a system where all or some of the normal high school classroom lectures and tutorials are taken over by other methods of imparting knowledge that align with the conventional high college classroom study.

Learning materials are provided by the parent institution. These materials come in different form such as computer learning aid and programs, TV and radio programs, audio and video tapes, CD Roms etc. all these materials are part information and communication technology (ICT). The distance learning also makes use of On-line teaching which enables learners to have more control over educational content and activities. On-line environment, according to Nnajiotor (2007) put the learners at the centre of the educational experience whereas in traditional teaching, repetitions are used frequently by presenting similar information in different forms. The internet encourages the learners to search for information and practical examples by themselves. Wealth of teaching resources are posted daily on the internet that helps both teachers and learners handle in topic of their choice in detail. This makes it possible for students who have registered as distant learners to benefit as though they were in the parent institution.

ICT can be used to promote greater access to education and information of good quality and thus, ultimately help in bridging the digital divide. Recent survey records X-rayed the present situation in some countries as regards the use of ICT in education and it was observed that countries like Australia, New Zealand, China, South Korea, Japan, India, Malaysia and Thailand have all launched school internets at the primary, secondary and tertiary levels. Within these countries, education has really been improved tremendously.

ICT based curricula, teaching materials and educational software should maximize the learning potentials of open-ended environments and put the locus of control on the learners side, enabling them to engage more in the construction of content and the solution of problems related to local values and environments. Generally, full integration of ICT in education in most developing countries hence interactive multimedia or hypermedia, are not yet widely used. On line activities involving Intra net or Internet are used for information and communication purposes rather than tools for interactive education. With ICT, new mixed modes of learning are emerging. In this instance, face-to-face and online learning activities, lectures, videos,

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multimedia and telecommunication tools support the various learning processes sometimes in a hybrid manner and sometimes, in a more integrated manner.

Through ICT, distance education is now being delivered in two different ways namely in a synchronous mod where participants are using ICT's to communicate at the same time and in an asynchronous mode where participants are learning or communicating independently i.e. at different times wherever they are online (UNESCO. 2003).

ICTs have become a driving force of educational reforms and in some countries, they are fast becoming an integral part of national education policies and plans. These polices and plans when fully implemented in the educational systems, will eventually churn out highly skilled, well informed and fortified manpower force needed for a sustainable socio-economic development of the country.

UNESCO (2003) again rightly observed that experience has shown that the introduction of technology in schools undergoes three phases namely, the substitution phase where traditional practices still occur, but new technologies are used, a transition phase where new practices begin to appear and well-established practices are being questioned and a transformational phase where technologies enable new practices and some old ones become obsolete.

In many countries where the practice has begun, the introduction of ICTs in schools has brought about a more positive attitude to school among learners. Since ICTs and web-based learning offers greater diversity of learning goals, projects, activities and exercises than traditional classroom offerings, students interest and motivation have also increased substantially.

ICT as an Instrument to Promote Greater Access to Quality Information

Ajayi (2002) opined that knowledge is now the most valuable commodity. Anyoka (2003) remarked that knowledge is generated at an alarming accelerated pace and distributed globally within seconds through Information Technology (IT). According to Nnakiofor (2007) knowledge is therefore, becoming increasingly obsolete and lack of it presently is perceived as poverty. Information technology therefore replaces the old methods of acquiring information through keeping people abreast with new knowledge and emerging global issues.

Evidence from various studies according Nnajiiofor (2007) suggest that the use of Information Communication Technology (ICT) especially computer technology has resulted in positive academic outcomes including higher test scores, better attitudes towards schooling and better understanding of abstract concepts.

Limitations of Information Communication Technology

Despite the numerous advantages of ICT, Ferber and Trkman (2003) opined that ICT cannot replace the humans. According to Achimugu (2007), although some advances were made in recent years in the field of artificial intelligence, one cannot reasonably expect that computerly replace humans in this area.

Another consideration is that ICT tools change quickly and improve quicker than the possible ways to use it (Moore and Zaskis, 2000). There is therefore no guarantee today by a majority of the students that mainly programs included in Microsoft office will still be in use in ten years time; through Mathematics laws and equations will remain the same in the future.

A further limitation to full utilization of ICT in Mathematics education can be teacher inexperience in using computer and the internet and limited support for teacher to learn how to use technologies for students.

Challenges of ICT

According to UNESCO (2003), the following are some of the major challenges facing information communication technology in Nigeria and other developing countries:

- i. Preparing all sectors of the education system to understand the value of technology.
- ii. Preparing schools to accept the technology (i.e. ICT).
- iii. Procuring and installing the ICT facilities.
- iv. Training teachers to use the ICT.
- v. Developing and managing ICT content.
- vi. Planning for continuous evaluation and research.
- vii. Integrating ICT in the curriculum for educational programs.
- viii. Providing ongoing curriculum support.
- ix. Developing partnership.

In order to have a smooth adventure in running ICT system, all the factors listed above must be put into consideration in planning educational policies.

Conclusion

From the discussion so far, it can be seen that Information Communication Technology (ICT) despite its numerous challenges especially in the developing countries, ICT has great value to educational system. ICT provides support to the learning, teaching and management/administration processes. It serves as a resource centre for educational research. Both teachers and learners could benefit greatly from the use of ICT.

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References

- Achimugu, D.H. “The importance of ICT in Teaching and Learning Mathematics” *A multidisciplinary Journal*. 19,(5)129-135.
- Adewoyin, J.A. (1991): *Introduction to Educational Technology*. Lagos: J.P L 55-69.
- Alhassan, M.N. (2001): Current Hardware and software trends in Information Technology. In Kabiru, I, Anikweze, C.M, Maiyanga, A. A. & Olokun, M. (Eds.), *Teacher Education in the Information Technology _Age*. Abuja: NCCE Pubs, 23-32.
- Anigbogu, S.O & Umeh, M.O. (2003): *Information Technology: The Panacea for a Sustainable Development*. Paper Presented at Annual National Conference Organized by Federal Polytechnic, Oko Held from 6th – 10th May.
- Antill, L. (1987): *Information system education-recommendations & implementation* Cambridge Edition Pg 239-256.
- Avis, P. (2002): *Information technology in education. Microsoft Encarta Encyclopedia 2002* (c) 1999-2001, Microsoft corporation.
- CASTME (1988): *Information Technology and Science, technology and mathematics. Pacific Regional Workshop*.
- Chukwuebuka, N.F. (2006): “Using the internet for the attainment of a great and Oynamic economy” *Journal of Qualitative Education 2*, (2) 117-120.
- Ferber, L. & Trkman, P. (2003): Impact of information Technology on mathematics education – a solvenian experience. *Information Science*, 343-352.
- Inyama, H.C. (2004): Science and Technology Education in the 3rd Millennium. In H.C.U. Ezema (Ed.) *Effective Science and Computer Education Programme in the New Millenium*. Abuja: Famray Digital Prints.
- Naidoo, Vis (2003): *ICT in Education Policy-Reflecting on Key Issues*. A paper presented at ICTs in African Schools: A Pan-African Workshop focusing on using ICT to Support Education System in Africa held in Bostwana April-2003.
- Nnajoifor, F.N. (2007): “ICT as Vital Tool for capacity Building and Socioeconomic Development in Nigeria”. *Journal for Professional Growth*, 3 (1)185-192.

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Oyedokun, M.R. (2006): "ICT in Science, Technology and Mathematics Education: Challenges and strategies" *Nigerian Journal of Teachers Education and Teaching* 2(2) 23-30.

Sambo, A.A (2002): *Information technology and its implication on the mathematical sciences in the Nigeria Education system*. A paper presented at the mathematic science summit at National Mathematics Centre, Abuja, 26-27 September.

UNESCO (2003): Bulletin on Projects in ICT Policy Teaching and Learning, Training Indicators, Technologies etc.

Usiade, R.E. (2009): "Distance Learning and Education for Computer Professionals" *Knowledge Review: A multidisciplinary Journal*. 19, (5) 116-121.