
Challenges of Information and Communication Technology in Science Education: Issues and Challenges

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Abstract

Information communication technology (ICT) has become the great strategic resources of the society in its search for direction, meaningful social changes, self determination and sustainable development. ICT has affected every aspect of human endeavour, be it education, economy, politics and socio-economic development. The paper views the nature of ICT science education, ICT and the teaching of science education, issues and challenges. The paper also recommended that government should evaluate her economic policies generally, particularly those affecting ICT to ease the effective teaching and learning of science education to enhance the country socio-economic development.

Introduction

The application of Information and Communication Technology to science education has become a wide spread phenomenon not only in the developed nations but also among the developing nations (Furfuri and Modibbo, 1998). This is because Information and Communication Technology (ICT) is recognized to have offered alternative solutions to the problems of information generation, handling and management. A great number of typical science research activities that could be done manually has now been replaced by ICT with much efficiency. Therefore, the impact of ICT in all spheres of life cannot be over emphasized. The advent of ICT turned the world into a global village. The result is that the ways and means of packaging and delivering information changed. Information users desire a wave of service different from the traditional paper based service. Liverpool (2001) noted that this new wave of

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ICT has affected library greatly as an information provider in an institution. Adung, Muoneke and Ani (2008) contended that international organizations, such as UNESCO, International Federation of Library Associations and Institutes (IFLA), the International Development Research Centre (DRC) have consistently extolled the role and impact of information and communication technology in socio-economic and political growth of any society. The McBride Round table conference on new world information and communication order has also given impetus to the agitation for unrestricted and balanced flow of information between countries (Hamid and Roach, 1991).

Concept of ICT

The ICT revolution is a by-product of the digitization era. It implies processing, storage and retrieval of information in coded form, and its transportation and/or exchange between sources/terminals electronically (Ige, 2001). Ayodele (2001:2) maintained that ICT has both the supply and the demand or user side. The supply side comprises computer hardware and software, while the demand or user side consists of information applications on all economic and social sectors and its application to management, electronic publishing, information services industry etc.

Wilson (1987) described information communication technology as a term which embraces computers, telecommunication system, new means of storing information such as compact discs and of communicating information such as teletex and viewdata systems. Furfuri and Modibbo (1998) described Information and Communication Technology as a generic term describing such information processing devices like computer automated machines, word processors, data transmitting system and so on. Ukebor (2006) noted that Information and Communication Technology (ICT) is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro electronics-based combination of computing and telecommunications.

Abayai (2004) contended that information vast web of high speed digital communication networks, delivering information, education and entertainment services to schools, offices, homes and so on. The networks are world wide or national in cope and accessibility by the general public. These ICT has a strong impact on economic, education and social life of the citizens of a nation.

The Nature of Science Education

Science is the knowledge of facts concerning the physical aspects of the universe usually through observations, hypothesizing, experimentation, theorizing (Onem, 2002). Science became a forceful input in the establishment of the industrial era. Science have in modern times become a critical factor in the determination of the economic wellbeing of any nation as in building machines, factories, airplanes, cars, railways etc. Their adoption makes the difference between development and under-development, growth with development or growth without development. Country after country throughout the world are providing a headstand for their children in science because in tomorrow's super-technology world, science will be essential for success. It

is this realization that led to a number of developing countries to invest heavily in science which have made breakthrough in improving their economic fortunes.

The impact of science education on the society is so great that it has become indispensable to man. Science has permeated the lives and activities of man to the extent that man by its application to current social needs has led to the growth of a nation. It is common knowledge that most of our schools are without the basic operational materials for effective teaching and learning of science. Most science educators are now making their living in the social science because our industrialists do not even utilize the services of natural/physical scientists. It becomes apparent therefore that our youths do not go into schools to study science and science related courses.

In the past, the goal of science education appeared to be that of making students pass their external examinations without necessarily acquiring the understanding of nature as well as appreciate science as a field of disciplined inquiry (Barui, 1992: 25). Science education in a democratic Nigeria requires more than teaching facts and imparting information, it must change people's attitude.

ICT and the Teaching of Science Education

The success of any teaching and learning process depends on the effectiveness of communication (Utubaku and Okon-Enoh (2009). Information and communication technology can play the role of patient teacher – it consistently works at the learners space, assisting him to acquire sets of information, skills, facts etc. (Ojo, 2005). A teacher conveys his thoughts, states his facts, poses problems and evaluates his students by means of communication (Airiwa, 2003).

The teacher can take advantage of the dynamism of ICT to demonstrate sound difficult concepts, theories and principles. This will give meaning to his classroom instruction and thus enhance his teaching and makes his class presentation an exciting one. Some programme instruction software are capable of feeding back very accurate information to teachers about the individual progress of all students in the class. In this setting, the computer reinforces the correct answers to the numerous questions posed.

Today, the development of Information and Communication Technology has brought about evolution of information and communication technology, which is ever-growing and continuously affecting every aspect of human endeavour be it education, economy, politics etc (Abifarina, 2003). Thus, the teacher using ICT in his class will be able to present a well-planned set of lessons and the students will experience these lessons in an exciting environment. Ojo (2005) noted that the misconception that the computer will replace the teacher and thus render him redundant does not arise; all the computer does is to reinforce and enhance the teachers' lessons. ICT can help students to become independent learners capable of developing critical thinking and problem-solving, strategies collaborative works and inquiry. It allows for information searches, computer modeling, team-work, brain-storming and revision. Teachers can use computer to make learning experiences more effective and to offer students access to a variety of learning tools, expert opinions and alternative viewpoints.

Idahosa and Ero (2005) and Iji (2003) stated that in computer assisted

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instruction, lessons production is guided by the learners' knowledge, skills, understanding, expectations as well as motivation. It is the learners' educational needs, not the available computer hardware or software that determines the nature of the lesson. This implies that a computer is not an instructor in itself but rather a mere vehicle of instruction. It is a clear secret that the computer offers powerful features for facilitating learning.

Utor and Agbi (2005) has the following to say: computer which is a major focal point in information and communication technology can be used to drill and practice.

Issues and Challenges

The damaging consequences of uncontrolled flow of information in Nigeria have been recognized by professional associations, private and public agencies with internet in information generation, dissemination and utilization. They have mounted vigorous campaigns to articulate information for the country. The federal ministry of communication even organized a conference in this regard some years back. The laissez-faire attitude of Nigerians in respect of information makes it more imperative for the call for a national information policy for Nigeria. Ingaryi's (1993) comment regarding impediment against ICT flow.

i. The Unstable Nature of Nigeria's Economic and Political Environment: -

Since independent more than 49 years ago, Nigeria has witnessed many change of government with its attendant, political and economic instability. The various governments, military and civil, have not had congenial political and economic environment to articulate policies towards information. Every new regime comes in with completely new policies.

ii. Inadequate Funding: Inadequate funding by the government as pointed out by Ochai (2000), has continued to militate against the effective implementation of information communication technology in our educational system. Idowu and Maboworiku (1999) identify the problem of ICT facilities in Nigeria libraries. Ola (1997) on the same subject matter is the unwillingness of library management of integrating the new information and communication technologies in the service of libraries in Nigeria.

Abua (2009) discovered inadequate preparation and planning by Library Association and Government in the management and low level of computer literacy in Nigeria was also seen as working against the success of the adoption of the new technology.

iii. Ineffective Communication: Ola (1997) identified one of the problems of ICT as utilization and unqualified personnel. He attributed lack of personnel to be due to inadequate training and experience among researchers. This suggests that literacy level in the field of computerization is still at a low ebb in Nigeria.

Oketunyi (2002) also identified some problems that came through the use of

information communication technology as follows: -

- i. General inadequacy in the level of relevant infrastructure, particularly telecommunications and electricity facilities as well as electricity supply
- ii. A large exploitative local computer market and unsatisfactory sales maintenance and support
- iii. Inadequate relevant staff and problems of recruiting and training
- iv. The problem of user's reluctance to adapt to the use of online information
- v. Database conversation problems
- vi. Frequent changes in technology. According to Malamal – Thomas (2001) libraries in the West African sub-region are faced with difficult challenges in terms of the tremendous access and delivery and the attendant constraints.

ICT in Nigeria lacks the infrastructure for taking advantage of numerous opportunities.

Malamal – Thomas (2001) observed that the use of ICT is also limited by insufficient access to trained personnel, technical know-how, equipment, service and infrastructure.

Feather and Sturges (2003) maintained that ICT implementation in Nigeria has the following obstacles

- i. Maintenance practices and technology. The country like Nigeria is yet to have competent computer technologies to service these machines in the event of developing fault.
- ii. Accidental/malicious drainage: that accident might occur in the use of computers also malicious damage might be carried out to destroy unwanted records whose evidence might be implicative to the staff of information unit.
- iii. Honesty: having honest employees to handle computer operation is not easy. Dishonesty employees can cause problem to a computer system, if not checked daily. Feather and Sturges (2003) proposed that employees of such sensitive area should be thoroughly screened before being employed
- iv. Electricity Interruption: Alabi (1985) observed in the case of Ahmadu Bello University, Zaria that erratic power supply resulted in the ignition of fire which burn some computers that could not be replaced easily

Conclusion

Information and Communication Technology (ICT) is an all-pervading revolution affecting all aspect of human life. The success of any teaching and learning process depends on the effectiveness of communication. ICT has played the role of a teacher's to the learners' space to acquire sets of information. The ICT serves to remove physical boundaries that restrict learning to any specific location and permits the science education to access new information sources, thus enhancing his knowledge.

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Recommendations

1. The information professional associations should become more active. They should help to keep up the pressure through aggressive campaigns and enlightenment
2. Government should re-evaluate her economic policies generally, particularly those affecting information and communication technologies
3. Utilization of ICT requires special management skills. Researchers, science educators and those involved in management information scientist should be exposed to workshop/seminars and training geared towards acquisition of skills and knowledge in computer application
4. More computers and information communication and technology facilities should be acquired to ease the job of information search within information centre.
5. The management of institution and schools should make provision for relevance training in human capacity building programmes for sustainable ICT application in their information centres.
6. The unit should have a standby source of power supply to ensure hitch-free services.

References

- Abayai T. (2004). *Vision and mission of ICT education for sustainable development*. Minna: Niger State COE
- Abua D. A (2009). *Computerization of academic libraries in Nigeria (A case study of the university of Calabar) unpublished degree project uncial*.
- Alabi G.A (1985). Computerization of services Nigeria university libraries: The state of the Art: *Nigerian library and information science Review* 3 (1) 2-5
- Ani, O. E (2008). Adoption of ICT. Nigeria polytechnique libraries. State of the Art. *Journal of the Nigerian library association* 2(1)12-20
- Asiriwa M. S (2003). Information and development of distance education programme in Nigeria in the 21st century. *Nigeria Journal of educational studies* 1 (1) 1-11
- Feather & Sturges P (2003). *International encyclopedia of information and library science* 2nd Ed. London: Rutledge
- Furfuri I. M.M & Modibbo H. U (1998). Information technology and the challenging role of Nigerian library for vision 2010. *GUSAU Journal of education* 2 (1) 60 – 68

Challenges Of Information And Communication Technology In Science Education: Issues And Challenges- **Mary N. Muoneke & Emmanuel Nkoro Asagha**

Liverpool L.S O (2001) Information and communication Technology (ICT) and University administration. Paper presented at the Annual General Meeting of the committee of the Association of Nigeria University professional

Malamali – Thomas, A (2001). Information technology as Access tool to the information super – highway; the development of the library infrastructure for take off: proceeding of 2001 West African Library Association (WALA) conference Ghana 12th – 14th September

Ochai A (2000). Academic and research libraries (private) information Agenda (for transforming its libraries for use) in the new millennium. Compendium of paper presented at the 2000 NLA annual national conference and AGM Abuja 25th – 30th, 15 – 16

Oketunji I (2000). Application of information and communication technology (ICT) in libraries and documentation centre. Paper presented at the Nigerian Libraries Association, University of Agriculture, Abeokuta 24 – 26 PP 12

Ola C. O (1997). *Constraints to modernization in Nigeria Libraries*. Lecture delivered at the one week training course on computer application University of Ibadan 16th – 20th P 1-9

Ukpebor N.J (2006). The use of ICT as instructional materials in schools mathematics. Implication for secondary schools. *ABACUS of Nigeria* 31 (1) 80

Utor J. K (2006) *Libraries education and national development*. Makurdi: Onaivi Pub.

Utubaku R. U & Okon-Enoh E.E (2009). Challenges of ICT for science and mathematics: Implication for sustainable development. A paper presented at the third international conference on scientific and industrial research. The bedrock of sustainable development held at faculty of engineering University of Benin, Nigeria from 11th – 12th February

Wilson V.L (1983). A meta-analysis of the relationship between science achievement and science attitudes: Kindergarten through College. *Journal of research in science teaching* 20 (19) 839 - 850

Oketunji, I (2001). Education of librarians in an electronically oriented society. *A paper presented at the cataloguing, Classification and indexing Section of the Nigerian Librarian association seminar/ Workshop, Akure. October, 22 – 27.*

The Coconut

- Rahman, I. (2002). Strengthening information technology infrastructure. In M. Okale (Ed) *science technology and mathematics education for sustainable development in Africa*. Ibadan: STAN Publication.
- Star, S.S. (1994). Evaluating physical science reference sources on the internet: *reference librarian 41 (42) 262 – 273*.
- UNESCO Intergovernmental conference on the planning of national documentation. archives and library instruction Paris, 23 – 27 Sept.
- Ukpebor, N.Z. (2006). The use of information communication technology as instructional material in school mathematics implication for secondary Schools. *Abacus: The Journal of the mathematics association of Nigerian 31 (1) 80*.
- Utubaku, R.U. & Okon-Enoh, E.E. (2009). Challenges of information and communication technology (ICT) for science and mathematics: Implications for sustainable development. A paper presented at the third international research: the Bedrock of Sustainable Development, held at Faculty of Engineering, University of Benin, Nigeria from 11th – 12th February.