
Technology Integration in Education: A Catalyst for Sustainable National Development in Nigeria Education System

Okoro, Sunday Nyeche, Iseh, Utibe John & Ugwulebo Jeremiah Emeka

Department of Educational Technology and Library Science,

University of Uyo, Uyo

Nigeria.

realsunday75@gmail.com

Abstract

The paper is aimed at investigating modern technology such as ICT imperativeness in teaching and learning as the chief catalyst in disseminating knowledge and information to the reach and the unreached. The study sees ICT as momentumous driver of academic, economic, political and social development per excellence, not bound with time, space, gender and ages. The paper further discussed the concept of ICT and challenges rocking ICT integration in education which includes; corruption, politics, funding, infrastructure, inadequate man-power, user's perception and characteristics, epileptic nature of power supply, Community clashes/rivalries, lack of support from agencies and inadequate security. The paper also projected eight solutions to bridge the problems among which include: Government as well as non-governmental organizations should endeavor to make facilities in terms of classrooms buildings and computer laboratory available in order to stock all ICT gadgets and Government and individual schools should always organize computer conference for teachers. Attendance of these training, workshop, seminar and conference should be made compulsory for all teachers both in public and private schools. Computer literacy should be the very first qualification for teachers. Also, the paper viewed the applications and the benefits of ICT in educational system. The paper summarized in making six recommendations that can support and sustain ICT environment in Nigerian education system and other nations that may find the study relevance.

Keywords: *Technology Integration, Sustainable Development, and Information and Communication Technology (ICT).*

Introduction

21st century is known for her knowledge explosion, versatility and usability of modern technologies in all works of life including in education system. In spite of this technological versatility and its usability, many still believed that technology have more diffusing influence than its benefits therefore should not be integrated into education system especially in developing country like Nigeria. Technology in reference to this paper refers to diverse set of technological devices and resources which are used transiently for course delivery, interaction and stores information for retrieval irrespective of geographical Laguna. The technology in quote ranges from our hand cell phones and its social media applications to sophisticated computer and other artificial intelligence devices. Today, technology used in schools is one of the most far-reaching and fast growing developments in education via the use of ICT as enabled by the internet services. According to (Joseph, 1990; Madu, 1990; Macaulay, 1993), technology grows like maize in a plantation during a storm; countries all over the world are bending towards the fad of computer education. As a result, they further opined that development in science and technology has brought into lime light the indispensable roles of computer in the area of information technology. It is a new

instructional system. The incursion of the electronic computer system into the educational parlance, according to Sherman (2005) provides the wherewithal to solve teaching and learning problems even more rapidly and accurately than hitherto conceived. This has eventually made the computer system the doyen of humanity as it continues to exert greater acceptance. Computer, according to Jayesimi (1985), has become the 'nowology' in our society and possibly futuristic years ahead. Technologies have reduced the world into global village as well as the stress in it. We are now in the era of technological based society, a society in which information is an essential and valuable commodity that one can buy, sell, store, or exchange information regardless of the distance and time. As educators, it is expected to utilize this advancement in knowledge to enhance learning. According to Sansanwal (2009), he observes that with the present infrastructures, class size, availability of teachers, quality of teachers, training of teachers, amongst other factors, it is difficult to achieve all the objectives of education. He says that not a single teacher is capable of giving up to date and complete information in his subject. This is where technology set into education to bring about proper and adequate information in order to enhance and improve quality of education by enraging and motivating the learners to learn. It was on this note that Galbreath (2000) affirmed that technologies have become central to contemporary societies. Whether one is talking on phone, sending an email, going to the bank, using a library, listening to sports coverage on the radio, watching the news on television, working in an office or in the field, going to the doctor, driving a car or catching a plane, one is using ICTs (technology). The prevalence and rapid development of technology and the ICTs has transformed human society from the information technology age to the knowledge age with a minimal cost and it is believed that; If ICT is fully incorporated into educational system of a developing country like Nigeria, it will help to promote functional educational programs as well as achieving the objectives of the national development goals.

ICT as popularly known simply refers to information, communication and technology. Taken separately, information are facts told or discovered about something or a person, events, issues, place, etc. communication means the process of passing on the discovered fact which is the information, while technology is the scientific study and the use of the applied sciences to practical tasks in industry. In a more generic term, information and communication technologies (ICT) are technologies which are being used for collecting, strong reediting passing on information in various forms (SER, 1997, cited in Jager and Lokman, 1999). These include all other multimedia devices which can be used in teaching and learning a personal computer is the best known example of the use of ICT in education. One unique features of the computer as a teaching and learning tool is visualization, and this powerful visualization capacity of the computer is unprecedented and incomparable with all other traditional teaching aids (Babaghemi 2011). ICT in education involves the adoption of general components of information and communication technologies in the teaching and learning process. This implies that the educational policy should support strategies that improve the teaching and learning processes that take place in our schools and colleges by fully engaging ICT in education which will enhance a sustainable national development, thereby improving the chances of employment in different sectors.

Concept of ICT in Education

Definition of ICT: Many authors have defined ICT based on their discipline and individual perspectives or area of relevance to their study, we consider ICT to be; a momentumous driver for academic, economic, political and social development per excellence, not bound with time, space and ages. ICT as it implies in education is one of the key stone catalyst to national development and sustainability. As Nigerian economic composition deteriorate to an

alarming level of economic recession, parents and sponsors could no longer afford to feed their families much more to pay high cost school fee for their wards. This is an economic pandemic which calls for an urgent need to diversify and back up the teachers and learners effort where necessary to avoid chaos in the education system. However, many constraints on delivering education to the right people at the right time especially in this era of insurgencies in the world of which Nigeria as a nation is not left out, budgets are always fought against, qualified teachers rarely want to work in remote rural areas, to mention but a few. All these have encouraged an interest in the use of information and communication technology in education, where many universities now offer degrees online and also developed course content and credits online for example, the National Open University of Nigeria (NOUN). The adoption of general components of information and communication technologies in the teaching and learning process as a tool and a vehicle would definitely increase and improve the quality of education and bridge the learning Laguna and reduce further digital gap. Deploying Technology (ICT) tools to teaching and learning processes in school and classroom must be the focus of attention of both the government and all stakeholders if our education system must take headway. Reason being that about 80% of tangers both in rural and urban areas spends most of their time of social media. This wasted time can be judiciously use to engage them in meaningful activities via online group interaction of what has been taught or the next topic to be taught. Especially those subjects that looks scaring to some of them. By establishing distance group discussion, the timid among them can freely express their handicaps either by questioning or responds to other people's contributions.

Education for sustainable development

Education for Sustainable development is the organizing principle for meeting human development to provide all resources that the ecosystem upon which the economy and society depends for growth and sustainability. The desirable end result is a state of society where living conditions and resource use continue to meet human needs without undermining the integrity and stability of the systems.

Education must be revisited in light of a renewed vision of sustainable human and social development that is both equitable and viable in terms of reaching the reachable and the unreachable. This vision of sustainability must take into consideration the social, environmental and economic dimensions of human development and the various ways in which these relate to education: 'An empowering education is one that builds the human and material resources to stand the test of time. The society needs to be productive so it can move our education system from where it is to where it ought to be. When nations ensure that such education is accessible to all throughout their lives, to learn and to solve problems in a creative way becomes easy, and to live together with nature in peace and harmony. A quiet revolution is set in motion: education becomes the engine of sustainable development as powered by moving machines (ICT).

Challenges to Technology integration in Nigerian classrooms

Nigeria as a multicultural state, rich nation both in human and material resources, despite all these numerous blessing endued to her by the creator still lack the ability to keep to growth. There are various challenges in integrating ICTs in Nigerian educational system, these include policy planning and implementation, infrastructure, learning content and language, capacity building and financing. Tinio (2002) discuss issues such as analysis of current practices and arrangements, identification of potential drives and barriers, curriculum and pedagogy, infrastructure and capacity building to be considered in the formulation of policy and planning.

- It has been observed that there are problems that affect individuals while others affect the masses. Where there is no adequate policy planning and implementation, this will result to none actualization of the National Policy both in education and other sectors of the nation economy.
- Infrastructure Challenges: It includes absence of building and rooms to house the technology (equipment's), shortage of electric supply and telephone lines
- Capacity building challenges: This is as a result of lack of competence in the teachers and school administrators. According to Ainto (2002). Teachers need professional development to gain skills with particular applications of ICT integration into existing curricula, curricular changes related to its use, changes in teacher role, underpinning educational theories such as construction or student-centered learning. School administrator must be competent enough to have a broad understanding of the technical curricular, financial administration and social dimensions of ICT for the effectiveness of ICT integration in Education.
- Learning content and language: This is one of the areas that have been neglected in the integration of ICT in education. It is important that in the integration of ICT in education, the content must be designed in such a way that it suites the targeted learners or groups. According to Tinio (2002) it is imperative that teaching and learning materials that match national curriculum requirements and have locally meaningful content, preferably in the local languages, be developed.
- Finance: ICT integration in education programs requires large capital investment in terms of acquiring adequate and appropriate facilities and infrastructure. According to Tinio (2002) overcoming the mentioned challenges may help education systems benefit the most from this technology. Other challenges may includes
 - ❖ Corruption
 - ❖ Inadequate man-power
 - ❖ Storage and caring facilities
 - ❖ Users perception and characteristics
 - ❖ Epileptic nature of power
 - ❖ Community clashes/rivalries
 - ❖ Lack of NGO's support
 - ❖ Inadequate security. And lot more.

Solutions to ICT menace

For every problem or challenge there is always a solution. Therefore, the problems confronting integration of ICT into teaching and learning process also have solutions.

- Government as well as non-governmental organizations should endeavor to make facilities in terms of classrooms buildings or computer laboratory available in order to stock all ICT gadgets and to provide shelter for both learners and teachers.
- Government should always organize computer conference for teachers who are still in service. Attendance of these training, workshop, seminar and conference should be made compulsory for all teachers both in public and private schools. Computer literacy should be the very first qualification for teachers especially those teaching ICT in schools.
- Government should invest in educational sector by purchasing and supplying quality teaching equipment in schools; such as computers, projectors, educational software and ensure that all schools are internet compliance. The equipments should be well monitored to make sure that they are not vandalized or stolen; this could be done by charging the school management with this responsibility. The era of Government of government properties are no one's properties has gone therefore, the head of the school should learn to take responsibility for the facilities under his care.

- NGO's should join hands with the Government to provide funds for the maintenance of all ICT gadgets supplied to schools.
- Every corrupt person should be brought to book in accordance to the law.
- There should be massive recruitment for ICT experts to schools.
- ICT Centre's should be sited in a peaceful community's void of secret cult activities and communal wars.
- Power generation must be seriously looked into because an interrupted power supply is the heart of every technology. The present situation where government is playing lip service to stable power supply is unacceptable; they must commit enough money to the power sector. Every government has been promising uninterrupted power supply but we have not witnessed that in Nigeria; the government should do something positive to show their genuineness.

Benefits of ICT in Education

The benefits of ICT in this 21st century cannot be over emphasized, therefore, the world of Technology has sphere the entire globe in a way that it has become possible to conduct research, have classes, group discussions irrespective of the geographical locations with a minimal cost. The world of ICT transient time and space thereby reducing cost as earlier said for the students and stress for the teachers. The electronic computer proves extremely helpful today in forming an exhaustive list of permutations or combinations of variables and then identifying those which best fit the observed data points introduced as input. It is quite inconceivable how with just pencil or pen, paper and a hand-held calculator or mathematical tables, a researcher could have listed and tested all possible and reasonable combinations or permutations of the variables in such complex research projects as those involving multivariate analysis, loglinear analysis, logic analysis, MANCOVA, path analysis, conjoint analysis, etc (Busk & Marascilo, 1989: 220-241; Wilson & Moore, 1989: 196- 219; Cooper & Weekes, 1983: 284).

- 1) It promote a supportive teaching and learning environment by creating broader learning communities and therefore provide learning tools for students especially those with special needs.
- 2) It ensures that more effective interactive environments are created through the use of a learner-centered and activity oriented teaching-learning approach.
- 3) It motivates the students for independent studies.
- 4) It encourages deeper understanding about data collection, measurement, recording and data analysis
- 5) It improves the quality of instruction
- 6) It encourages collaborative learning
- 7) It transform the school by improving school management and administration
- 8) It enriches learning through images, text and animation.

The application of ICT in education

ICT as discussed by many authors tends to focus on the use of ICT for teaching and learning only. As opined by Becta, (2004). Supported by Bankole, O., Onaade Ojo, Risikat, Y. (2006) the ways in which information technology can be used in education are numerous to mention. The applications of web search and other off line software applications have made it precision, incredible and reliable with high speed more than as it were before time. It is infact now well-acknowledged that the pace of knowledge accretion through research is actually largely determined by the availability of efficiency-enhancing computerpower (Reisman and Xu, 1992).

Many students of higher education including the graduate students have long stayed their academic years as a result of research issues, many that could not withstand the stress quite along the search but today through the help of the ICT, people carry out their research at their pace (comfort zone) excluding the empirical studies. Osah-Ogulu, (2000). There are now very helpful and vast bibliographic database carefully classified by the usual publication descriptors such as author, title, year of publication, subject, field, or media such as specific editions of books, specific journal volumes and corresponding issue numbers, etc. he further explained that the prospective researcher(s) submits to the computer Library such details as the tentative research project title and discipline or field of study. From this, the key word to aid in the literature search are identified and listed with very closely allied words and their synonyms may be included on the list. The comprehensive list of relevant papers and book publications will pop up spinning a requested range of publication dates (years) is then display of the computer monitor (VDU) in a readable format. The researcher is then invited to view the resulting screen display and indicate which entries on the screen that appeals to him/her by their apparent content and regency.

In conducting a research either scientific or social sciences research, it involves a logical and analytical procedure that must be systematically observed with minimal errors (Okpala, 1995; Ogulu, 1996) It involves the conceptual structuring of the relevant population and then the random sampling of elements within the cells of the imposed structure with a view to meeting the analytical demands of the investigation while minimizing sampling error and other error variances. The application of modern Technology (ICT) in education especially in research is indispensable. Ogulu (2000) in Odili (2000) statistical programs are available which enable the ICT which he called computer to access and pick random numbers from its memory unit or generate them using a random number generator (RNG). This assertion was supported by (Loomba, 1978; 402). Who opined that there are also computer simulation packages which make it possible for the computer to generate a study population of any desired size and complexity in terms of number of categories and by member characteristics. Nwogu (1991; 73) also affirms that a computer can be programmed to yield a sample of random numbers which the researcher can then use to draw the corresponding elements of the population into his effective sample for the study. ICT diversification in research finding is gaining ground though Nigeria as one among the developing nations is yet at the ankle of this global growth.

Summary

Modern technology (ICT) influences all aspects of life including education. The significance of ICT in education makes major differences in the teaching approaches and the way students are learning, it motivates the students, saves time and improves the quality of instruction in teaching and learning process as advantaged over the traditional method. The use of ICT has made it very easy to analyzed robotic research data that would not have been possible with mere human initiate, Therefore sustainable national development of any country depends upon the quality of education and educational programmes offered to citizens. It was on this note that the paper was summarized by making sustainable recommendations strategies that will enhance academic excellence among our students and keep up to date the teachers.

Recommendation

For ICT to be fully integrated into Nigerian education system, the government, NGO's and all stakeholders should:

- 1) Support the use of modern aid to teaching and learning.
- 2) Be involved in the design and development of appropriate ICT for educational purposes.

- 3) Schools and colleges should make provision for adequate facilities and infrastructures to house the technology.
- 4) Workshops conferences and seminars should be organized to develop teacher's skills in applying ICT in their different subject areas.
- 5) Allocation of funds by the government to develop appropriate ICT for schools and education institutions irrespective of where they are located.
- 6) There should be constant supply of power in order to make good use of the facilities

Reference

- Aina, J.K. (2013) Integration of ICT into Physics Learning to Improve Students' Academic Achievement: problems and solutions. *Journal of Open journal of Education 1(4) 118-120.*
- Babagbemi, A. P. (2011). Human Capacity building through: Information and Communication Technology in Educational Technology. A published paper presented at the 2011 International Conference of Nigeria Association for Educational Media and Technology (NAEMT) at Imo State University, Owerri from Sep. 19-23
- Bankole, O., Onaade, O., & Risikat. Y (2006). Using ICT to transform Education and Youthem powerment. Devnet, 2006, Pg 9,11.
- Becta, H. (2004). Enabling Teachers to make successful use of ICT.
- Busk, P.L & Marascilo, L.A. (1989). Estimation and hypothesis testing for the loglinear model. *Australian Journal of Education, 33 (3)*
- Galbreath, J. (2000). Knowledge management technology in education: An overview. *Educational Technology, 40 (5), 28 – 33.*
- Jayesimi SB (1985). Programming the Unprogrammable. Inaugural Lecture
- Kadir, H, Kadir, M., Yusuf, T. M. & Rasheed, D. (2014) Role Of ICT In Enhancing Sustainable Educational Development In Selected Secondary Schools In Ilorin Metropolis. *Journal Of Economics And Sustainable Development. Vol.5 No 9. (pp. 89) ISSN 2222-1700 (Paper) ISSN 2222-2855*
- Loomba, N. P. (1978) Management – a quantitative perspective. New York: macmillian.
- Nwabueze, A.U & Ozioko, R.E. (2011) Information and Communication Technology for Sustainable Development. *Published by Library Philosophy and Practice. ISSN 1522-0222.*
- Nworgu, B.G. (1991), Educational Research: basic issues and methology. Ibadan: Wisdom.
- Odili, G. O. (2000). Reading in science and Mthamatics Education for the Teachers. Anachuna Educational Books, Anambra State.
- Ogulu, D.J. (2000), Computer Utilization in scientific research. Published in Reading in Science and Mathematics Education for the Teachers (2000)
- Okpala, P.N.(1995). Research in education a cretic o what to do and how to do it. Distinguished college lecture series in Education, No 1 (July) of Abia State university. Lagos: Stirling- Horden.
- Reisman, A. & Xu, X (1992) On stage of knowledge growth in the management sciences. *IEEE Transaction on Engineering Management, 39(2).*
- Sansanwal, D. N. (2009). Use of ICT in teaching, learning and evaluation. Educational Technology lecture series. New Delhi: Central Institute of Educational Technology, NCERT.
- Ser, (1997). Impacts of ICT in Education: The Role of the Teacher and Teacher Training. Being a paper presented at the Macaulay OA (1993). Computer: A Tool to Help Children with Specific Learning Difficulties in Mathematics. J. Issues Spec. Educ. 1(1).European Conference on Educational Research, Lahti, Finland 22-25 September, 1999. Series 76, Obafemi Awolowo University, Ile-Ife.

Sustainable development goals. 17 goals to transform our world

<http://www.un.org/sustainabledevelopment/education/>

Tinio, V. L. (2002). ICT in Education: UN Development Programme.