



# **I**MPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON TEACHING AND LEARNING

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## **Abstract**

*The use of Information and Communication Technology (ICT) has caused many changes in the society. In the last decades, the field of education has been affected by these changes as contemporary generation of learners grew up and is comfortable in a digital world. Conventional teaching which emphasized content and is teacher-centered is no longer adequate in educating the net generation. A major tenet of the policies that supported the introduction of ICT in education was that they can become catalysts for change. This paper therefore, discusses the concept of ICT, its application to teaching and learning process, and challenges associated with it. Positive and negative impacts of applying ICT to teaching and learning process were also discussed. The paper concluded that the negative impacts notwithstanding, integrating ICT into teaching-learning process in all our institutions of learning is long over-due.*

**Keywords:** *Information and Communication Technology (ICT), teaching-learning process and education.*

## **Introduction**

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning and research (Yusuf, 2005). Principles of teaching and learning have been generally redefined by the recent trend in ICT. Teachings, according to Fakoya and Ayoola (n.d), can no longer be done the same way as in the 19<sup>th</sup> and 20<sup>th</sup> centuries.

Conventional teaching has emphasized content. For many years, courses have been written around textbooks. It focused on the teachers and instructors as the “sage on the stage” who disseminates information through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICTs are able to provide strong support for all these requirements and there are now



many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (Oliver, 2000).

Contemporary generation of learners grew up and is comfortable in a digital world. Skiba and Barton (2006) in Fakoya and Ayoola (n.d) called this generation *Net generators* who are both information and multimedia literate. Educating this generation of learners therefore, demands integration and application of ICT into the teaching and learning process.

According to Zhao and Cziko (2001), three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potentials of ICT to contribute to the quality of learning environments, although they value these potentials quite significantly (Smeets, 2005). Moursund (2005) conducted case studies in three primary and three secondary schools focusing innovative pedagogical practices involving ICT. Moursund (2005) concludes that the benefits of ICT will be gained when teachers confidently explore new opportunities for changing classroom practices by using ICT. The use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers.

In this domain learning is viewed as the construction of meaning rather than as the memorization of facts (Lebow, 1993). Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student-centered settings and by enabling learning to be related to context and to practice (Berge, 1998). Any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become. Teachers generate meaningful and engaging learning experiences for their students, strategically using ICT to enhance learning. Students enjoy learning, and the independent enquiry which innovative and appropriate use of ICT can foster. They begin to acquire the important 21st century skills which they will need in their future lives.

### **The Concept of ICT on Teaching and Learning Process**

ICT can be defined as computer based tools and techniques for gathering and using information. It encompasses the hardware and software, the network and several other devices (video, audio, photographic camera, etc) that can convert information, images, and sound into common digital form. It includes electronic information in processing technologies such as computer and internet, as well as fixed-line



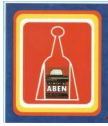
telecommunication networks. ICT is an eclectic application of computing, communication, telecommunication and satellite technology (Yusuf, 2000).

Information and communication technology (ICT) is one of the most important driving forces promoting economic growth in the economy. However, there is less of a consensus among economists on whether the impact of ICT also stems from higher total factor productivity (TFP) growth and improved efficiency of production (due to a better educated population). During the last two decades, countries have invested heavily in ICT. Indeed, the use of ICT in education and training has been a key priority in Nigeria in the last decade, although progress has been uneven. ICT has had a major impact on the education sector, on organization and on teaching and learning methods. Yet there are considerably different ICT expenditure levels between institutions within the country. Some schools have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas. However, some other schools are in the early phase of adopting ICT, characterized by important enhancements of the learning process, some developments of e-learning (ICT-enabled learning), but without any profound improvements in learning and teaching (Butcher, 2003).

The information accessed through digital technologies can promote innovation, increase productivity and enrich the quality of lives. ICT in education is broad, deep and rapidly growing field of study (Moursund, 2005). ICT utilizes a broad range of technologies that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms. One of the major factors or agencies of national development and global competitiveness is education.

### **ICT as aids to teaching and learning process**

The importance of ICT is quite evidence from the educational perspective. Though the chalkboard, textbooks, radio/television and film have been used for educational purpose over the years, none has quite impacted on the" educational process like the computer. While television and film impact only on the audiovisual faculties of users, the computer is capable of activating the senses of sight, hearing and touch of the users. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability. The main purpose of ICT "consists just in the development of human mental resources, which allow people to both successfully apply the existing knowledge and produce new knowledge" (Shavinina, 2001). The collective and rigid nature of learning and the passive nature of the learning associated with the use of radio, television and film do not contribute any innovative changes to traditional methods in education system. Information and communication technologies are being used in the developed world for instructional functions. Today, computers perform a host of functions in teaching and learning as many nations are adding computer



literacy, reading and writing literacy as skills students need to succeed in a technologically developed world (Thomas, 1987). At the instructional level, computers are used by pupils to learn reading, mathematics, social studies, art, music, simulation and health practices. Access to the internet with the use of computer hardware and software provides access to wide range of information and learning experiences that motivate learners and enrich teachers.

Trace board, which is an example of interactive whiteboard, displays computer content when connected. It is touch sensitive and makes teaching and learning process interactive and interesting.

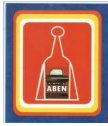
Blog: An online reflective journal in which other internet users can post comment is called blog. It is like a virtual/digital classroom which affords teachers and learners to communicate and exchange ideas electronically like in a conventional classroom situation. It enables both teacher and learner to interact outside the limit of conventional lecture and/or school hours.

Virtual learning environment is another technological facility with wide range of tools to support learning and management of learning experience. It also extends learning beyond the classroom.

iPod touch is a pocket-size media player and Wifi mobile platform designed for viewing multimedia productions. Learners have access to online resources in multiple locations through the use of iPod. It provides additional and robust learning opportunities both for teachers and the students.

Podcast is a recorded lecture made available for downloading from a website. It covers theoretical and factual knowledge required by the students and usually released before face-to-face teaching/learning activities to prepare students in advance. It is different from blog because it is not interactive. It can, otherwise, be referred to as uploaded audio lecture for students to download. This made teaching period flexible as teacher can prerecord his/her lecture at convenience and learners also listen at convenient time and place.

According to Shavinina (1997), domain-specific educational multimedia is directed to knowledge acquisition skills development in the language arts, history, physics, literature, biology and so on. There is no doubt that ICT provides productive teaching and learning experiences in order to increase people's creative and intellectual resources especially in today's information society. Through the simultaneous use of audio, text, multicolor images, graphics, motion, ICT gives ample and exceptional opportunities to the students to develop capacities for high quality learning and to increase their ability to innovate.



### **Challenges Associated with Application of ICT to Teaching and Learning Process**

Integrating the use of ICT into teaching and learning process at all levels of education is not without its attendant challenges. The problem most often noted by educationists is concerned with cost of procurement and maintenance of ICT equipment and facilities. Teachers, in Reid's (2002:3) study observed problem of "maintenance of equipment needed to operate a technologically enhanced school".

Effective application of ICT to teaching and learning process demands that both teachers and students have access to computers and the internet outside the classrooms. Disparities between students who have access to the ICT facility and those who do not pose a challenge. For instance, blogging may not be adequately successful when parts of the student's population do not have access to the internet at home.

Integrating the use of ICT into teaching and learning process places new and extra demands on teachers. Teachers need extra time to learn the use of new technologies and software for effective use of such. Upward wave of technological development also demands that teachers learn to create new things for teaching to meet up with greater expectations being placed on them. In order to promote professional development in integrating ICT into teaching-learning process, there is need for training and re-training of teachers. For teacher to confidently apply new technologies to teaching-learning activities, they must be well trained.

### **Positive Impact of ICT on Teaching and Learning Process**

According to Cabero (2001), integration of ICT into teaching and learning processes contributes to increase in information and reception. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning. The use of ICT in educational settings acts as a catalyst for change in this domain. ICTs, by their very nature, are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Pulkkinen, 2007), the influence of the technology on supporting how students learn will continue to increase.

ICT provides resources and services to support the education, research and public services missions to universities. It enhances the development and implementation of policies and procedures necessary to ensure effective, secured and appropriate use of information resources and services. ICT provides a lot of services for students including distance education programmes, inexpensive printing, cell phone plans, internet connection, free dial-up, technology equipment, rentals classroom media stations, etc. Lecturers and students get relevant materials needed through the Internet. Such quality



materials are used in equipping the students and upgrading their knowledge in their field of study.

Moursund (2005) stated that ICT brings some very powerful aids for translating theory into practice. Two of these aids are computer-assisted learning and distance education. These days, computers with internet connectivity have become common household items. Students often have access to communication tools and reference materials including e-mail, web, encyclopaedia, blogs, books, podcast and other reference materials.

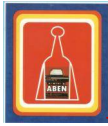
It is evident that ICT incorporates and extends some of the power of reading, writing and arithmetic. It facilitates the automation of many mental activities. ICT has proven to be a valuable aid to solve problems and accomplishing task in education, business, industry, science and many other human endeavours. The Science of Teaching and Learning (SOTL) have made great progress in recent times. Braisford (1995) in Bamigboye, Aderibigbe and Buraimo (2007) described four important components of SOTL to include: Constructivism, Situated Learning, Motivation, and Transfer of Learning. Each of these is important to all teachers and students at all levels and in all academic discipline.

Today, ICT provides knowledge based system that includes knowledge acquisition, knowledge incubation, knowledge amplification and knowledge dissemination. It is evident that information is a key resource which permeates teaching, learning, research and publishing. To this end, Robinson (1991) in Okeh and Opone (2007) stated that the use of new information technology can serve three main functions in the national educational growth. These are to:

- a. Deliver all or part of the learning experiences to learners;
- b. Supplement and extend content provided in different forms other than printed (hard copy); and
- c. Provide a two-way channel of communication for exchange between tutors and students with their peers for feedback or for learning, problem solving, advice, debate, and reports.

Other ways in which ICT can be used in education as stated by Ikelegbe (2006) in Okeh and Opone (2007) include:

- i. Supporting conventional classroom work; the teacher could ask his/her students to access his blog for further information on a particular teaching topic. Students attendance and grades can be recorded electrically;
- ii. Helping in the design and development of learning materials. A lot of materials can be downloaded from the Internet. Such materials must however be adapted to suit the specific instructional objectives;
- iii. Accessing electronic teaching materials such as books, journals. These can be accessed, stored and analyzed by the use of ICT;



- iv. Accessing virtual library “stocks” electronic versions of books’ journals;
- v. Giving or providing access to the world of resources especially in electronic form;
- vi. Playing a key role in educational administration. Students’ data, personnel administration, purchasing and supplies, advertisement, etc can be handled with ease using ICT;
- vii. Facilitating independent study and individual instruction especially on the open distance-learning programme;
- viii. Making learning more vivid, interesting and engaging;
- ix. Assisting the teacher in assessment and testing;
- x. It sometimes reverses teacher/learner relationship when students have to show teachers how to use technology. This boosts student’s confidence and as such enhances teaching-learning process.
- xi. Bringing a permanent solution to brain drain problems as we now live in a global village.

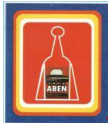
ICT is now a global phenomenon. It has been embraced all over the world due to its importance. Governments all over the world are harnessing the rich potentials of ICT and are using ICT as a tool for educational developments, economic recovery and wealth creation (Lebow, 1993). It is very useful in tackling the ills and problems facing the educational system. Today, no nation can attain its height educationally, economically and socially without ICT. ICT has also increased the ability to perform ‘impossible’ experiments’ by using simulations, as well as the possibility for students to have individual learning programs within a topic, rather than everybody having to do the same thing at the same time at the same pace. More able students can be given more challenging work; less able students can access remedial lessons.

ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; cited by Yusuf, 2005).

### **Negative Impact of ICT on Education**

There are large costs involved and poorer students and educational establishments may end up being disadvantaged. This is often referred to as being a factor in the digital divide.

Students, and sometimes teachers, can get hooked on the technology aspect, rather than the subject content. Facebook, Twitter, Youtube, Instagram and other social media networking sites can be a distraction to living and learning in the real world. Advertisers take advantage of the big data that exists in the interface of users of these networking sites and market their various goods and services to the users. Educational institutions are



not exempted from this marketing effort of the big data houses such as Google, Microsoft, Yahoo etc. There are services geared toward the institutions offering them free Internet hosting and data storage space in the cloud in exchange for access to their data availability for analysis and advertising.

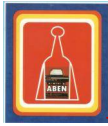
Likewise, the surge in ICT developments is gradually eroding reading culture in the society. Technology increase plagiarism. It makes it easy to reproduce and revise someone else's work, doing a lot of "cutting and pasting".

### **Conclusion**

The negative impacts notwithstanding, the importance of integrating the use of ICT into classroom teaching/learning process cannot be over emphasized. Application of ICT to classroom situation makes teaching learner-centered. However, the challenges associated with the use of ICT in teaching and learning process must be carefully considered and handled for effective and successful utilization of these technological facilities into teaching/learning process.

### **References**

- Bamigboye, O. B., Aderibigbe, N. A. & Buraimo, O. K. (2007). Information Communication and Dialogue in conflict management: A study of Olabisi Onabanjo University Students and Ago-Iwoye Community Conflict, *Journal of Library and Information Science (JOLIS)*, 4 (1 and 2), 23 – 38.
- Berge, Z. (1998). Guiding principles in Web-based instructional design. *Education Media International*, 35 (2), 72-76.
- Butcher, N. (2003). Technological Infrastructure and Use of Information and Communication Technology in Education in Africa: An Overview, Paris: ADEA.
- Cabero, L. (2001). Oversold and underused: computers in the classroom. Cambridge, MA: Harvard University Press.
- Fakoya, A. A & Ayoola, K. A. (n.d). Educating the net generation. Lagos: Open Arms Limited.
- Lebow, D. (1993). Constructivist values for instructional systems design: Five principles toward a new mindset. *Educational Technology, Research and Development*, 41, (3), 4-16.
- Moursund, D. G. (2005). Introduction to Information and Communication Technology in Education, University of Oregon, Eugene, <http://uoregon.edu/~7emoursund/Books/ICT/> ICT Book.pdf. Retrieved November 1, 2014.
- Oliver, R. (2000). Creating Meaningful Contexts for Learning in Web-based Settings. *Proceedings of Open Learning 2000*. (53-62).Brisbane: Learning Network, Queensland.



- Okeh, O. D. & Opone, M. C. (2007). Information and Communication Technology (ICT): A veritable tool for national Educational Growth, *Journal of Academics*, 2(3), 234 – 246.
- Pulkkinen, J. (2007). Cultural globalization and integration of ICT in education. In K. Kumpulainen (Ed.), *Educational technology: Opportunities and challenges* (pp. 13–23). Oulu, Finland: University of Oulu.
- Reid, S. (2002). The integration of ICT into classroom teaching. A series of reports research in Ontario secondary schools, 7 (1). Retrieved from <http://legacy.oise.utoronto.ca> in Sept., 2015.
- Smeets, E. (2005). Does ICT contribute to powerful learning environments in primary education? *Computers & Education*, 44, 343-355.
- Skiba, D. J. & Barton, A. J. (2006). Adapting your teaching to accommodate the net generation of learners. *OJIN* 11 (2).
- Shavinina, L. V. (1997). Educational multimedia of “tomorrow”: High intellectual and creative psycho educational technologies. Presented at the European congress of Psychology, April 17-19, 1997, Dublin, Ireland.
- Shavinina, L. V. (2001). A new generation of educational multimedia: High intellectual and creative educational multimedia technologies. In L. R Vandervert, L. V. Shavinina & R. A. Cornell (Eds.), *Cyber education: The future of Distance Learning*. Larchmont, NY: Mary Ann Liebert, Inc, 63-82.
- Thomas, R. M. (1987). Computer technology: An example of decision-making in technology transfer. In R. M. Thomas & V. N. Kobayashi (Eds.), *Educational technology: its creation, development and cross-cultural transfer*, Oxford: Pergamon Press, 25-34.
- Yusuf, M.O. (2005). Information and communication education: Analyzing the Nigerian national policy for information technology. *International Education Journal* 6 (3), 316-321.
- Zhao, Y. & Cziko, G. A. (2001). Teacher adoption of technology: a perceptual control theory perspective. *Journal of Technology and Teacher Education*, 9, (1), 5-30.