

## The Imperatives of Information, Communication and Technology (ICT) for 21<sup>st</sup> Century Teaching and Learning

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**Abstract:** This paper discussed the imperativeness of Information, Communication and Technology (ICT) in effective classroom teaching and learning in the 21<sup>st</sup> century education. The author noted that the evolution of ICT has brought new innovations into education sector which made it easier for the teacher to teach and interact with the learner, thereby reducing abstraction; verbalization, and the learner comprehends knowledge with ease. The paper identified the benefits and limitations of ICTs in the teaching and learning process. It recommended that because of the importance and power of these technologies in enhancing knowledge and national development, government should increase funding for adequate supply of basic learning facilities both in quality and quantity e.g computers, educational videos, multimedia projectors and internet facilities among others from primary to tertiary levels of education. Furthermore, on effectiveness of use of these technologies, there should be stable source of energy to operate the devices such as provision of electricity or standby generators in schools whether rural or urban and the need to motivate of teachers and stakeholders in education including periodic training and retraining in order to keep them abreast with the latest techniques in classroom management.

**Keywords:** Imperatives, ICT, 21<sup>st</sup> Century, Education, Teaching, Learning.

### Introduction

Education is regarded as a vehicle of change and national development. It is concerned with the all-round development of an individual; intellectual, psychological, social, religion and moral into a sound personality to enable him or her function well and contribute meaningfully in the society they may find themselves. Hence, education should integrate individuals into their society. Akinkuotu and Olufowobi (2016) sees education as the development of the whole man – soul, body, intellectual, emotional and physical well-being. They added that education ought to be a process through which man is raised up in the right way so as to be good through the inculcation of the right values that empower the learner to be fitted to his immediate environment. The relevance of education in the civilization and modernity cannot be over emphasised. The development of information technology field has impressively transformed the education sector into a new face in Nigeria. ICTs have become the major means of enhancing learning outcome and the rapid transformation of any nation on the globe (Aniah & Tukura, 2011).

The emphasis on Information and Communication Technology (ICT) in this paper cannot be complete without discussing its relevance in 21<sup>st</sup> century classroom instructions. The application and use of ICT tools, information and communication

technology is becoming imperative in many parts of the world. Nigeria is not left behind as ICT is gradually finding its way into the educational system despite the limitations brought by economic disadvantages (Nwachukwu, 2006). ICT is defined as computer-based tools used by people to work for information communication processing needs of an organization. It encompasses computer hardware and software, the network and several other devices (video, audio, photography, camera etc) that convert information (text), images, sound and motion and so on into common digital form (Yusuf & Onasanya, 2004). Yusuf (2005) defined ICT as an electronic application of computing, communication, telecommunication and satellite technology.

ICT in education simply mean ways of passing academic instruction, storing, retrieving, coding and decoding of information for better understanding of the learner and easy illustration and teaching by the teacher. Adebayo (2007) describe ICTs as tools and processes used to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the form of personal computers, scanners, digital cameras, phones, faxes, modems, CD, DVD players and recorders, digitalized, radio and programs like data base system and multimedia applications.

Adamu (2015) explained that ICTs can be used to access global knowledge and communication with other people. National Policy on Education (2009) stated that the Federal Government of Nigeria in recognition of the prominent role of Information and Communication Technology in advancing knowledge and skills necessary for effective functioning in modern world stressed urgent need to integrate ICT into education in order to reduce to the minimum the problems of classroom instruction in Nigeria education. The policy also in its "blue print" recommended measures to be taken by government to implement educational policies as follows: it stressed that modern educational techniques shall be increasingly used and improved upon at all levels of education system. The policy further stated that education and training facilities shall continue to be expanded in response to the societal needs and made progressively accessible to afford the individual a far more diversified and flexible choices.

Davis (2010) pointed out that through ICTs the problems facing classroom instruction such as, over-crowded classrooms, shortage of qualified teachers, inadequate funding, ineffective teaching methods, rote-learning and insufficient school facilities among others could be solved through planning and good management of learning resources. Hence, Abdullahi (2003) stated that the need for instructional media in the classroom is inevitable and that teachers in this technological age 21<sup>st</sup> century need to strive to meet up with new innovations for instance the use of computer packages and internet connectivity. The author noted that teachers are supposed to be innovative, creative and resourceful in order to meet up with the challenges of effectiveness in educational processes.

Nsofor (2010) explained that excellent education policies cannot be effective unless there are equally excellent measures to see to their realization. The author further stated that it is not enough for the teacher to prepare and plan his lesson, what matters most is for him to be able to present the lesson using ICTs, internet and multimedia facilities in order to sustain the learners' interest and bring about a desired outcome. Mangal and Mangal (2013) in the same light remarked that it is important that teachers should use varieties of instructional media such as computer, television and radio stressing that instructional media are powerful weapon for effective teaching and learning if the right types are used and at the right time. Mangal (2013) posit that these media have the potentials to change the status of learners from passive listeners to active thinkers and participants in the teaching learning

process. Kankaaranta (2005) while explaining on the subject innovative uses of technology stated that meaningful and effective teaching and learning can hardly take place if classroom is deprived of instructional materials. It is in this regards that scholars of educational technology now lay strong emphasis on the acquisition and utilization of instructional media (ICTs) in order to enhance smooth running of classroom lessons and to promote school education system at all levels.

### **Classification of ICT tools and how they can be Integrated into Teaching and Learning**

ICT tools are classified into five major groups namely:

1. Audio Technology –deals with sound only, such as audio CDS with recorded educational programmes that can be played on tape-recorder or tape-recorded for students to learn through it eg pronunciation exercises or oral English language testing.
2. Audio – visual –This is a combination of sound and sight media technology, it uses the sense of hearing and seeing, examples include computer, television and motion picture films. They are source of motivation especially as the learner sees and hear the instruction at the same time.
3. This category of ICT tool is the web-based or on-line technologies which is usually used for facilitating of researches at all levels of learning such as literature review for student project or thesis.
4. Social media technology – this media is very important in facilitating teaching and learning. This has to do with face book and WhatsApp supported instructions.
5. The fifth category of ICT tool is mobile technology which uses tablets, smart phones and android phones, they are portable and provide ease of information and knowledge.

### **Benefits of ICT in Classroom Instruction**

ICT as product of technology today makes problem solving much more possible for man in all fields of life especially in the area of communication and education at all levels.

ICTs cater for individual's academic needs and abilities through the use of modern instructional technology such as computer assisted instruction (CAI) and programmed instruction (PI) in a textual form while individual learners' progress with their study at their own pace, rate and convenience. Furthermore, instruction becomes more interesting and meaningful as a result of the application of educational media in classroom teaching and learning. Learners' are given the opportunity to come in contact with what they are taught and the lesson becomes livelier.

The utilization of ICT facilities in classroom such as radio, instructional television and newspapers in teaching and learning provides equal opportunity for learners' irrespective of their socio-economic status and location. ICTs brings about immediacy in learning as students learn on the spot by adopting the use of already prepared and produced instructional materials like slides, films, video-tape, audio cassettes, charts and books.

Students who use ICTs gain deeper and better understanding of complex topics and concepts and are more likely to recall information and use it to solve problems. In addition, through ICT, students can deepen their knowledge of investigation and enquiry according to their needs and interest. The paper also identified the benefit of ICT in conjunction with educational technology as capable of affording students especially post primary and undergraduates opportunity of life-long learning through skills acquisition. Modern technologies reduce boredom, forgetfulness and as well allow students to participate actively during instruction (teaching and learning).

### **Specific ICTs and how they can be related to 21<sup>st</sup> Century Education**

In the 19<sup>th</sup> and 20<sup>th</sup> century, educational activities were mainly analogy eg the way level advisers process students results, kinds of materials used in teaching and learning eg charts, blackboard among others on like today (21<sup>st</sup> century) technology has brought rapid transformation and relief in nearly all sphere of human endeavours eg in teaching, computer is used to developed packages and also present information to the learner, student results are no longer proceed analogy but digitization, white board and markers have almost replaced chalkboard while internet can be used to download recent materials in order to enhance classroom instruction and carry out researches. Computer Base Testing (CBT) can now take care of large number of students or subjects with high enrolment and results of such test or examination released

within the shortest possible time. It therefore implies that for teachers to function and be relevant in the 21<sup>st</sup> century classroom teaching and learning, there is need to be Information and Communication Technology (ICT) compliance.

### **Limitations of ICTs in Classroom Instruction**

The following are some of the limitation of ICT use in classroom teaching and learning:

**Poor funding and Remuneration of Staff:** Okon (2003) stated that graduates from Nigerian universities have fallen below international standard because of lack of application of modern technology devices in teaching and learning institutions such as computer and internet connectivity among others. The author explained that the few qualified manpower in the nation's university are not adequately catered for, resulting in their exodus to foreign land (beside the in-ability of government to bring Nigeria experts in specialized disciplines back home to teach and research in our universities). This attitude of staff exodus is largely attributed to poor remuneration simply referred to as brain drain syndrome.

**Shortage of Qualified Teacher:** Joseph (2008) observed that despite advancement in technology and the advantages to be derived from audio-visual in instruction, teachers in tertiary institutions are yet to adopt their use in teaching and learning process, stressing that majority of teachers' have no adequate knowledge on how to operate, maintain and use the available audio visual equipment and materials as a result of lack of trained professionals and poor governance in the country. Wodi (2009) noted that one major problem that hinders ICT smooth application in Nigerian classroom is the absence of inadequately trained staff for maintenance and repair and the non – availability of spare parts for different types of ICT equipment.

**Power Supply:** A major source of concern in education industry in line with technology application in the classroom is inadequacy of electricity supply to enhance the operation and maintenance of the available instructional media in our institutions of learning in Nigeria. In (2007) when late president Umaru Yar'adua assumed office, in his median broadcast to the nation he said "our plan is to lunch a national emergency program on power supply". Unfortunately, the sector has not witness any meaningful change to this moment in spite of Nigeria's position as the 6<sup>th</sup> largest producer of crude oil in the organization of petroleum exporting countries (OPEC) and 5<sup>th</sup> largest US

source of imported oil and 8<sup>th</sup> worldwide crude oil producer. It is indeed pathetic and even more worrisome because the nation cannot boast of stable and affordable power supply to put into use the available technological media that aid or support teaching and learning in our classrooms and also take care of other economic activities that enhances development such as government industries and companies. In addition to the challenges faced by teachers, schools and the education system described above, making technology a force for learning and positive change in our schools poses serious problems to the society. Furthermore, the over reliance on electricity as the major source of power for most of the ICT equipment with little regards to the fact that this equipment may be mostly needed in rural parts of Nigeria where there is no electricity.

**Technical know-how:** Nwoji (2002) stated that one area that has remain a major source of concern is equipment maintenance eg installation, spare parts and repairing cost which has remain very high especially where there are no competent technicians, for instance the percentage of specially trained computer technicians in schools is alarmingly low. Lack of trained and qualified competent computer engineers, data analysis and key punch operators in schools has remain a plaguing problem in Nigerian education. These catalogues of problems pose inadequate care, maintenance and handling of media hardware and software. The problem of technical know-how can only be overcome if aggressive staff training programme is mounted to train engineers and technicians. In addition, teachers on the job could be sent on in-service or refresher courses to expose them on the job.

Finally, the cost of technology media varies from one device to another and sometime can be too expensive for schools to afford. It is in the light of the above problems that Bissong (2009) professor in geography onetime deputy Dean post-graduate school, University of Calabar called on Nigeria government to reverse its non-interest on education and pay adequate attention to the sector through realistic funding as one of the most important area responsible for the rapid advancement of any nation.

### **Conclusion**

This paper has clearly shown that Information and Communication Technology (ICT) has become imperative and a major tool in addressing educational problems such as school enrolment and effective classroom management in the 21<sup>st</sup> century

and above all the rapid advancement of nations the world over. It therefore holds that, for effective classroom communication in the Nigeria schools and the society at large, government need to stuff schools with relevant learning facilities at all levels of education, organize retraining programmes for its staff in line with the latest devices in technology application and constant electricity supply to enhance operation if she must catch up with other developed nations of the world such as United States of America and United Kingdom and a host lot of others.

### **Recommendations**

The following recommendations were made in line with the application and use of modern instructional facilities (ICTs) in the 21<sup>st</sup> century classroom. If adhered would promote teaching and learning in our schools and classrooms as well boost knowledge of students.

1. Government should increase funding to purchase and maintain some of the ICT equipment
2. Government and other relevant stakeholders should organize workshops on periodic basis
3. Teachers should be retrained through in-service programmes to update their knowledge and skills on application of ICTs in classroom instruction
4. Teachers should be kept abreast of latest innovations in the field of teaching and learning
5. The supervisors of schools and teachers need to be motivated to enhance productivity.
6. ICT education should be made compulsory at all levels of education (primary to tertiary institutions) and centres should be established in all schools to create more awareness and help teachers and learners take advantage of its use.

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