

INFORMATION AND COMMUNICATION TECHNOLOGY AS AN INTEGRAL TOOL FOR IMPROVING TEACHING AND LEARNING FOR SUSTAINABLE EDUCATION IN TERTIARY INSTITUTIONS IN NIGERIA

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Abstract

Information and communication technology (ICT) in teaching and learning is rapidly becoming one of the most vital widely discussed contemporary issues. The importance of ICT is quite evidence from educational point of view. Though the chalkboard, textbooks, radio/television and films have been used for educational purposes over the years, none has quite impacted on the educational process like the computer and internet for example. The ability of any institution of learning to improve on teaching and learning as well as sustain their recipients educationally, hinges mostly on the application of ICT in instruction delivery. Three research question and two hypotheses guided the study. The design employed in the study was descriptive survey. The population of this study consisted of educators in selected tertiary institutions in Nigeria. Mean and standard deviation were used to analyze the research questions, while T-test statistics was used to test the null hypotheses, at 0.05 level of significance. Findings revealed that ICT is indeed an integral tool for sustainable education towards improving teaching and learning in tertiary institutions. Based on the findings, recommendations were offered among others; that government should provide adequate ICT facilities for teaching and learning in tertiary institutions; and educators should appropriately apply ICT in their instructional delivery to make teaching and learning more rewarding.

Keyword: ICT, Teaching and Learning, Sustainable Education

Introduction

Information and communication technology (ICT) in teaching and learning is rapidly becoming one of the most important and widely discussed contemporary issues. Education liberates human beings and makes them capable and fit to handle their various life endeavours. The increasing need for effectiveness, efficiency and continuity, compared with the variety of

expectations from man in various disciplines, to function appropriately in the society has become imperative that information and communicating technology be employed in teaching and learning for sustainable education. Information and communication technology simply connotes a process of capturing, storing, retrieving, manipulating, transmitting or receiving of information, facts or data. Popyk in Oyagiri and Ekoh, (2013) asserted that ICT is any fact or figure capable of providing knowledge, Njie (2009) opined that ICT is the use of computers and telecommunication gadgets in information processing. Agbanu in Oyagiri and EKoh (2013) noted that ICT is the use of electronic computers and computer software to convert, store, and process, transmit and retrieve information. It is concerned with systems for creation, processing, storage, retrieval, selection, transformation, dissemination and use of vocal, pictorial, textual and numerical information.

In a more vivid understanding of ICT, it means the technology/modern equipment used in processing and storing/preserving of information. Information technology (IT) is the whole range of equipment, which variously manipulates stores and communicates information electronically. Ezenoyih (2010) stated that information technology encompasses various forms of information delivery system such as radio, television, newspaper, books, telephones, loud speaker, facsimile technology and the internet services. In a nutshell, information technology means combination of various technological equipment, facilities and application to enable information accessibility. Technology is the collection of techniques, skills, methods and processes used in the production of goods or services or in accomplishment of techniques and processes. It can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things. Technology can simply be defined as the entities, both materials and immaterial, created by the application of mental and physical effort to achieve some value. In this usage technology, refers to tools and machines that may be used to solve real world problems.

The importance of ICT is quite evidence from the educational point of view. 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 for example. While television and film impact only on the audio-visual faculties of the users, the computer is capable of activating the sense of sight, hearing and touch of the users. ICT has capacity to provide higher interactive potential for users to develop their individual intellectual creative ability. The main purpose of technology “consists just in the development of human mental resources which allows people both successfully apply the existing knowledge and produce new

knowledge. ICT provides numerous tools that teachers can use in and out of the classroom to enhance students learning. Using teaching and learning resources that can be manipulated electronically can extend the learning experience of students beyond the time and space limitations of conventional materials.

There is no doubt that ICT provides productive teaching and learning in order to increase students' creative and intellectual resources especially in today's ICT driven world. Though the simultaneous use of audio, text, multicolour images, graphics, motions, electronic boards, marker boards, computers, internet, projectors and others, gives ample and exceptional opportunities to the students to develop capacities for higher quality learning and increased ability for innovation. The relevance of ICT to the entire educational sector cannot be under-estimated; therefore the challenges of the school system in the 21st century will be incomplete if the demand for ICT is not met. The ability for timely acquisition, utilization, communication and retrieval of relevant and accurate information has become an important attribute for better teaching-learning process.

Why ICT in Nigerian tertiary institutions? The question of why Nigerian tertiary institutions need ICT for teaching-learning process is necessary. This is because the present day society is being driven by technology, ranging, from the food we eat, the cars we drive, the clothes we wear and every aspect of our living. The necessitated the federal government of Nigeria to partner with Afrihub-zinox and they commissioned digital awareness programme (DAP) to provide ICT sustainable intervention and enhance the use of ICT in teaching and learning in tertiary institutions of learning, (Nwachukwu, 2009). In support of this, NCC (2000) vision was to make Nigerians an IT super power in the information society before now, using it as the engine for sustainable development and global competitiveness. In this vein, Oyodele (2001) opined that we exist today in a society where information technology has grown like "Topsy", a society where the power centers have shifted from land (agriculture society) and capital (industrial society) to data, information, judgments and decision, making. Technology is the central nervous system of this information society. Before now computer was not part of classroom technology in over 90 percent of public schools in Nigeria. The situation presently is not too different due to mismanagement of the huge resources of the country and the inability of our political leaders to prioritize Nigeria's developmental needs. There is no doubt that in the current harsh economic competition in Nigeria, the private sector has embraced technology to stay afloat. The banking sector, insurance, manufacturing industries, and multinational companies in oil sectors have embraced

multimedia technology to bring innovative solutions to their current challenges. The unanswered question is why is educational sector lagging behind in integrating ICT fully in the instructional delivery, despite the fact that ICT is a central focus for the educational policies and an integral tool for effective teaching-learning processes.

Inije (2012) noted that ICT is used in teaching and learning as follow; to facilitates information exchange amongst educators and the outside world, facilitates interaction between educators and students, it enhances effective storage and retrieval of information and as well make information easily accessible at a very fast rate thereby enabling educators to acquire necessary concepts without barrier. The author further stated that utilization of ICT in teaching is seen as a way of affording opportunities to shift from teacher centered to student centered learning. Information and communication technology can be used to improve the quality of teaching and learning through the following ways; preparing individual for the work place, expanding access to education, improving the quality of learning and transforming the learning environment into learner-centeredness (Gaible, 2009).

Obayi and Madukwe (2010) suggested that if Nigeria is intending on potential rapid technological advancement in the context of overall socio-economic development, it is required that it should create the necessary enabling environment. A combination of computer literacy and professional literacy on a conducive environment will invariably enhance the performance of the educator and the learner. Attainment of enhanced learning is highly dependent on the will and competencies of the educator in performing his duties. To buttress the role education plays in the development of any nation, Kwache (2007) noted that indispensability of the school in the utilization of ICT hinders the growth of an ICT learning culture of any country. He suggested that the school should offer efficient leadership in ICT integration through research, modeling of effective integration of ICT and provision of opportunities for professional development of citizens of a country. The educators in tertiary institutions in Nigeria are expected to play a leading role in this regard. Unfortunately some educational administrators at tertiary institutions in Nigeria tend to perceive ICTs as tool to pass NUC, NBTE and NCCE accreditations rather than a necessary tool for effective teaching and learning.

Sustainability generally connotes the ability to manage the present, without compromising the future. Geir in Douglas (2010) defines sustainability as the requirement of our generation to manage the resource base such that the average quality of life that we ensure ourselves can

potentially be shared by all future generation. In the light of the above, sustainable education can be said to mean finding long lasting solutions through education, with regards to social, environmental and economic issues, hence the need for sustainable education. IGI Global (2018) sees sustainable education as a concept that involves active academic participation to create economic, social and environmental programmes, improving life standards, generating empowerment and respecting interdependence. Education especially at tertiary level is a very crucial segment. This is because this segment is very significant to the attainment of general education goals and the overall development. However, one of the greatest challenges of education system in Nigeria is sustainability. Eke (2010) agrees that sustainability is one of the disturbing characteristics in education reforms and change. A good reasons for this assertion may not be far from the lack of use of ICT in teaching and learning at all levels of education and especially in tertiary institutions in Nigeria.

According to Sterling (2008), sustainable education implies four descriptors; Educational policy and practice which is sustaining, tenable, healthy and durable. In explaining these descriptor, he said that, for any system to be sustainable, it must involve: Sustaining, meaning helping to sustain people, communities and ecosystems; tenable means that it is ethically defensible, working with integrity, justice, respect and inclusiveness; healthy means that it is itself a viable system, embodying and nurturing healthy relationships and emergence at different system levels; durable means that it works well enough in practice to be able to keep doing it.

From the above descriptors, we can deduce that sustainability is an important element in all human endeavours including education system. In Nigerian tertiary institutions however, teaching and learning experience seems to be far from the above descriptors. These elements are either lacking totally or exist partially. ICT therefore could be a viable tool for teaching and learning in our tertiary institutions that will strengthen sustainable education both for present and the future generations, because of many advantages of its application in Education process.

No nation can strive for meaningful development without according priority to its education sector and particularly on the ICT for effective teaching and learning. ICT has come to stay and to change our way of teaching and learning, which must be welcomed by everyone especially the educators' at all educational levels. ICT indeed has become a critical tool for achieving success in education. It is disheartening to note that ICT has not been fully integrated into the curriculum of tertiary institutions in spite of the elaborate emphasis laid on technology education in Nigeria. This seems to

portray the low extent at which technological innovations are managed in the educational system. Poor integration of ICT into the tertiary institutions curriculum seems to have given rise to very poor utilization of ICT facilities in instructional delivery with the view to improving the teaching – learning process. In some institutions, ICT facilities seem to be completely lacking. In some others where they exist, the ICT facilities seem to be poorly utilized in the teaching learning process such that they appear to distract the very teaching-learning process instead of improving them as purposed. This necessitated this study; information and communication technology as an integral tool for improving teaching and learning for sustainable education in tertiary institutions in Nigeria.

The purpose of this study was to determine information and communication technology as an integral tool for improving teaching and learning for sustainable education in tertiary institutions. Specifically, the study sought to;

- determine the relevance of ICT in improving teaching-learning process in tertiary institution.
- ascertain strategies for effective utilization of ICT facilities in improving teaching-learning process in tertiary institutions.
- find out the challenges faced by educators on the use of ICT in improving teaching-learning process in tertiary institution.

The following research questions and hypothesis in addition to the study objectives guided the study.

- What is the relevance of ICT to the teaching-learning process?
- What are strategies for effective utilization of ICT in improving teaching and learning process?
- What are the challenges faced by educators on the use of ICT in improving teaching and learning process?
- There is no significant difference in the mean ratings of male and female educators regarding the strategies for effective utilization of ICT in improving teaching –learning process.
- Federal and state tertiary institution educators do not differ significantly in the mean ratings of their responses on the strategies for effective utilization of ICT in improving teaching and learning process.

Method

This study adopted a descriptive survey research design since it involved eliciting information from respondents. The population of study comprised of 140 lecturers in three selected tertiary institutions in south east

Nigeria which included Abia, Ebonyi and Enugu States. There was no sampling as the population was not large enough for sampling. A 30 items questionnaire was the instrument, designed and used for data collection which was structured in 4-points rating scale of strongly agree 4 points, agree 3 points, disagree 2 points and strongly disagree 1 point.

Data generated was analyzed using mean and standard deviation. Any item with mean ratings of 2.50 and above was regarded as agree while items with mean ratings of 2.49 and below was regarded as disagree. The null hypotheses were tested using T-test statistical tool at 0.05 level of significant. A null hypothesis was accepted if the P-value was greater than 0.05 level of significant and rejected if otherwise.

Results

Table 1: Means and standard deviations of the relevance of ICT in teaching and learning process.

S/N	Items	X	SD	Decision
1.	ICT facilities such as the computer, television, video, multimedia, internet, project or electronic board provide instructional materials for improving teaching and learning	2.78	0.66	Agreed
2.	ICT makes records and information accessible to both educators and students such as access to latest textbooks, journal and research findings is possible through ICT.	3.01	0.74	Agreed
3.	ICT encourages enhancement of curriculum content through internet searches by teachers, curriculum planners and developers	2.86	0.69	Agreed
4.	ICT is used in classroom to illustrate concepts which may be difficult to understand by other means	3.12	0.88	Agreed
5.	ICT is used in conducting researches and analyzing data for researcher	3.19	0.93	Agreed
6.	ICT encourages active participation in classroom interaction through shared knowledge	2.89	0.59	Agreed
7.	ICT facilities, for instance the computer, could be used to review an article or research work of students without the students being present with the hard copy of work	2.63	0.77	Agree
8.	Students and teachers/educators use ICT	3.06	0.73	Agreed

	such as internet, email to solve their academic issues			
9.	ICT facilities for instance the computer is used to prepare lecture note, storage of academic data and computing students results	2.73	0.69	Agreed
10.	ICT serves as evaluative tool in the areas of evaluation and analysis of learning outcomes, for instance, ICT has given room for modern method of assessment and evaluation of students performance	2.81	0.88	Agreed

Data in Table 1 shows that the mean responses of respondents in all the items (1-10) are above the mean bench mark of 2.50. This indicated that respondents agree in all the items statements as relevance of ICT in the teaching and learning process in tertiary institutions.

Table 2: Means and standard deviation of strategies for effective utilization of ICT in improving teaching and learning process.

S/N	Items	X	SD	Decision
1.	Total inclusion of ICT in the curriculum of tertiary institutions will create the consciousness among students and teachers on the need for technology based instruction	3.08	0.71	Agreed
2.	ICT integration into the curriculum of tertiary institution students will enable them get acquainted with the required knowledge and skills to effectively use the facilities later in life	2.76	0.88	Agreed
3.	Creation of awareness among the in service educators pedagogy and their subsequent training will enhance the use of ICT facilities in improving teaching-learning process	3.04	0.92	Agreed
4.	Organization of ICT skill acquisition workshop for both students and teachers will enhance/improve the use of ICT facilities in teaching and learning	3.11	0.84	Agreed
5.	Provision of adequate internet connectivity by both government, stakeholders and philanthropists will avail both teachers and students the opportunity of getting used to ICT for improving teaching enhance participation in knowledge-based instructional delivery	2.80	0.69	Agreed
6.	Curriculum reforms emphasizing technology-	3.15	0.74	Agreed

	based teaching methods at the expense of traditional method will favour the utilization of ICT facilities in instructional delivery			
7.	Installation and maintenance of ICT facilities units in schools by the government will enhance their utilization in instructional delivery	2.85	0.59	Agreed
8.	Provision of generating sets in various units of the institutions where they have ICT facilities will enhance power supply and sustain technology based instructional delivery	2.86	0.81	Agreed
9.	Cultivation of managerial attitudes towards the development of ICT related facilities and their use in improving the teaching-learning process will enhance the proper use of ICT facilities in instructional delivery	3.10	0.83	Agreed
10.	Attitudinal change among students especially in the use of ICT facilities for nefarious activities will encourage positive use of ICT facilities in the content of teaching and learning	2.84	0.76	Agreed

Data in Table 2 reveals that the mean responses of respondents in all the items (1-10) are above the mean bench mark of 2.50. This showed that respondents agree in all the item statements as strategies for effective utilization of ICT in the teaching and learning process in tertiary institutions.

Table 3: Mean and standard deviation of challenges faced by educators with the use of ICT in improving teaching and learning process.

S/N	Items	X	SD	Decision
21.	Lack of ICT facilities such as computers laptops, projectors, militate against their use in instructional delivery	3.24	0.74	Agreed
22.	Lack of appropriate training in ICT related courses for effective use of ICT facilities for improving teaching and learning process is a challenge on utilization of ICT facilities in instructional delivery	3.07	0.75	Agreed
23.	Inadequate internet connectivity in tertiary institutions is challenge on utilization of ICT facilities as an integral tool for improving teaching and learning process	3.10	0.81	Agreed
24.	Poor attitudes of educators towards ICT training is a challenge on utilization of ICT facilities as an integral tool for improving teaching and learning	2.65	0.66	Agreed

25.	process Over loaded curriculum with academic activities left ICT training with little time allocated for ICT as a challenge on the use of ICT in improving teaching and learning process	2.66	0.83	Agreed
26.	Educators sticking to the traditional method of teaching than to modern method with ICT is a challenge in improving teaching and learning with ICT	3.15	0.66	Agreed
27.	Lack of sensitization programme in form of workshops, seminars and conference for acquisition of ICT skills is a challenge in utilization of ICT in improving teaching and learning process	3.02	0.64	Agreed
28.	Lack of sponsorships in form of study leaves, international and local conferences on ICT training is a challenge in utilization of ICT facilities in improving teaching and learning process	3.05	0.53	Agreed
29.	Poor power supply affects the utilization of ICT facilities in instructional delivery	2.67	0.73	Agreed
30.	ICT not fully integrated or given adequate position in the curriculum of tertiary institutions is an inhibiting factor towards its utilization as an integral tool in improving teaching and learning process	2.54	0.66	Agreed

Data in Table 3 indicates that the mean responses of respondents in all the items (21-30) are above the mean bench mark of 2.50. This revealed that respondents agree in all the item statements as challenges faced by lecturers/ educators in the teaching and learning process in tertiary institutions.

Table 4: T-test analysis of responses of male and female educators on the strategies for effective utilization of ICT in teaching and learning process

Gender	N	\bar{X}	SD	Df	t-cal	P-value	Decision
Male		8.14	1.66	-	3.44	1-36	N.S
Female		7.68	1.24				

Table 4 reveals a t-calculated value of -3.44 and significant P=value of 1.36 since P-value of 1.36 is greater than 0.05 level of significance, the null hypothesis is accepted. Therefore, there is no significant difference between the mean responses of male and female educators on the strategies for

effective utilization of ICT in teaching and learning process in tertiary institutions.

Table 5: T-test analysis of responses of educators in federal and state tertiary institutions on the strategies for the utilization of ICT in teaching and learning process

Gender	N	\bar{X}	SD	Df	t-cal	P-value	Decision
Male		10.67	0.35		-4.11	0.83	N.S
Female		9.89	0.28				

Data in Table 5 indicates a t-calculated value of -4.11 and significant P-value of 0.83. Since the P-value of 0.83 is greater than 0.05 level of significant, the hypothesis of no significance is accepted. Therefore, there is no significant difference between the mean responses of educators in federal and state institutions on the strategies for effective utilization of ICT in teaching and learning process in tertiary institutions.

Discussion

The result of the analysis shows that ICT facilities provides instructional aides for improving teaching and learning, ICT make information accessible among others. This findings tally with the assertions of Inije (2012) which noted that ICT is used in teaching and learning as follows; facilitates information exchange amongst educators and outside world facilitates interaction between educators and students. This findings also blend with Gaible (2009) which observed that ICT is used to improve the quality of teaching and learning through the following ways; preparing individual for the workplace, expanding access to education, improving the quality of learning and transforming the learning environment into learner centeredness.

The findings also revealed that total inclusion of ICT in the curriculum of tertiary institutions, creation of awareness among the in-service educators, organization of ICT skill acquisition, workshops, seminars and conferences are the strategies of ICT utilization in teaching and learning process. This finding is in line with the vision of NCC in Oyagiri and Ekoh (2013) which was to make Nigerians an IT super power in the information society before now, using it as the engine for sustainable development and global competitiveness.

The findings relative to research question 3 indicated that educators in tertiary institutions agreed that all the items listed in table 3 are challenges confronting educators in utilization of ICT in teaching and learning process.

This is in consonance with Kwache (2007) which noted that indispensability of the school in the utilization of ICT hinders the growth of ICT learning culture of any country. Similarly, Obayi and Madukwe (2010) suggested that if Nigeria is intending on potential rapid technological advancement in the context of overall socio-economic development, it is required that it should create the necessary enabling environment. The corresponding hypotheses showed that there were no significant differences in the mean responses of male and female educators as well as educators in federal and state tertiary institutions. The above results were in consonance with Nwachukwu (2009) which stated that the federal government of Nigeria partnered with Afrihub-zinox and they commissioned Digital Awareness Programme (DAP), to provide ICT sustainable intervention and enhance the use of ICT in teaching and learning in tertiary institutions.

Conclusion

Based on the findings, it was concluded that utilization of ICT in teaching and learning process by educators in tertiary institutions is very relevant for effective instructional delivery strategies. Effective utilization of ICT by educators was believed to enhance/improve teaching and learning process, though some challenges were identified to have been confronting educators in the utilization of ICT in carrying out their teaching tasks effectively.

Recommendations

Based on the findings, the following recommendations were proffered.

- The agencies/Boards in charge of tertiary institutions should as a matter of urgency integrate/include ICT totally in the curriculum. This will enable both the educators and students have access to information and as well collaborate with their colleagues.
- The management of various institutions and government should create enabling environment and ensure that educators apply various strategies which will enhance their use of ICT in teaching and learning process.
- The government and education stakeholders should provide all the relevant ICT facilities and ensure adequate training for educators to enable them utilize ICT effectively for teaching tasks.

References

- Douglas, H. (2010). Sustainability the world bank. Retrieved on July 31,2018 from <http://www.dictionay.com/browse/sustainability>.
- Eke, E. (2010). Reforms and challenges in education and the learning environment in Nigeria. In L.O Ocho (Ed), Nigerian Academy of Education. *Reform in Nigerian Education*. Enugu, New Generation Books.
- Ezemoyih, C.M. (2010). Evaluation of information and communication technology skills needed by Accounting education lecturers in Nigeria. *Business Education Journal* 7 (2), 110-119.
- Gaible, E. & Bums, M. (2009). *Using technology to train teachers: Appropriate uses of ICT for teachers' professional development in developing countries in ICT and education: Issues and Opportunities*. Warner Books.
- IGI Global, (2018). What is sustainable education. Retrieved on July 31, 2018 from <http://www.igi-globaldictionary/giss-gisp-facilitate-hgher-education/28864>.
- Inije, G.O. (2012). Strategies for upgrading the use of information and communication technology in business education. *Association of business education of Nigeria. Book off Readings*, 2(1), 163-167.
- Kwache, P.Z. (2007). The imperative of information and communication technology for teachers in Nigerian higher education. *MERLOT Journal of Online Learning and Teaching* 3(4), 395-399.
- National Communication Commission (2001). *National policy for information technology*. Kaduna: National House.
- Njie, M.J.(2009). Information and communication technology skills used by secretaries in selected companies in Delta State. Unpublished Thesis Ebonyi State University.
- Nwachukwu, V.N. (2009). Computer technology application and utilization in Nigeria. Federal University Libraries. Unpublished Doctoral Dissertation University of Nigeria, Nsukka.
- Obayi, A. U. & Madukwe, U.D. (2010). Orienting Nigerian juveniles towards technological education. In O.C. Anuka, O.O. Okorie, L.E. Okafor, A.U. Obayi and A.U. Ozongwu (Eds). *Functional education in Nigeria towards 2010 A.D and beyond*. Enugu Cresco Printing and Publishers.
- Ominiyi, C.N. & Opa, A.F. (2010). Strategies for effective utilization of ICT facilities in lesson delivery as perceived by teachers in Ebonyi State. Paper Presented at the Faculty of Education Annual Conference at Nnamdi Azikiwe University Awka.

- Oyagiri, J.O. & Ekoh, A.C. (2013). Information and communication technology skills required of office technology and management lecturers in Nigerian Polytechnics. *Vocational Business Educators* 2(1), 43-51.
- Oyedele, J.F. (2001). The business teacher education curriculum. *Business Education Journal* 3(4), 231-232.
- Sterling, S. (2008). Sustainable education-towards a deep learning response to sustainability; policy and practice. *A Development Education Review* 6(1), 63-68.