INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING IN SECONDARY SCHOOLS IN AFRICA

By

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Abstract

This paper examined integration of information and communication technology in teaching and learning in secondary schools in Africa. Concept of information and communication technology was defined. Importance of integration of information and communication technology in teaching and learning in secondary schools in Africa were highlighted. Problems militating against integration of information and communication technology in teaching and learning in secondary schools in Africa were enumerated such as computer illiteracy on the part of teachers, problems of electricity, lack of fund. The paper recommended among others that federal and state governments should organize re-training programmes, workshops and seminars for teachers on computer skills acquisition. Every state government should ensure that generators are provided to every school for effective utilization of ICT facilities. Fund raising should be by a combined effort of governments, philanthropists and parents.

Education is a tool for national and international development. This being the case, there is a very need to look for strategies which will promote effective teaching and learning in all levels of education, hence, the need to integrate information and communication technology in teaching and learning.

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This paper therefore looked at the integration of information and communication technology in teaching and learning in secondary schools in Africa. This will be examined under the following sub-headings:

1. Concept of information and communication technology.
2. Importance of integration of information and communication technology in teaching and learning in Africa.
3. Problems militating against integration of information and communication technology in teaching and learning in Africa
4. Conclusion
5. Recommendations.

Concept of Information and Communication Technology

The term information and communication technology has been defined in different ways by different authors, educationists and researchers. Ijioma (2004:205) defined information and communication technology as: "technology that acquires, processes, stores, retrieves at will, disseminates vocal, numerical information by combining data processing and telecommunication techniques". Eze (2007) viewed information and communication technology simply as the various ways the computer works, together with other telecommunication equipments, which are needed in data processing and information transmission to solve problems in different aspects of human endeavor.

Discussing the same issue, Ibiam, (2007) viewed information and communication technologies as encompassing all that is involved in modern communication technologies such as communication satellites, radio, television, videos, tape recorders, compact discs, floppy diskettes and personal computers and other related equipment so that the output generated can reach users at reasonable cost in good time to the overall benefit of mankind. In the same vein, Olelewe (2007:129) defined ICT as:

> *Computer based tools used by people to work with the information and communication processing needs to an organization. It encompasses the hardware and software, the network and several other devices (video, audio, photograph, camera, etc) that convert information (text), images, sound, and motion and so on into common digital form. It is an eclectic application of computing, communication, telecommunication and satellite technology.*

To Eze (2012) information and communication technology is an off-shoot of communication revolution. It is a term that includes the communication devices comprising radio, mobile phone, computer, internet, satellite systems, hardware/software, power point, video, television, overhead projection.

From all these definitions, one can define information and communication and technology as a form of communication devices which is electronically based which can receive process and send information to many people at different places as the need arises when well operated.

Having explained the concept of information and communication technology, there is every need to identify the importance of integrating information and communication technology into teaching and learning.

Importance of Integration of Information and Communication Technology into Teaching and Learning in Africa

Importance of integrating information and communication technology into teaching and learning cannot be under-estimated. Information and communication technology has proved to be very useful in many ways especially in terms of communication. To that end, Omoniyi (2007) remarked that the technology evolution in information and communication services like telephone, telex, e-mail made the world to be a global village; either directly or indirectly, events are brought to live as they occur elsewhere. No wonder, Onyeachu (2010) was of the opinion that integrating ICT into teaching and learning is necessary because ICT employs a combination of print, mechanical and electronic devices. Unamma (2004) therefore identified prints to include module, books, magazines, newspapers and pamphlets. Where those print materials are not sufficient, two or more people can be linked to ICT. Onyeachu (2010) therefore remarked that with the integration of information and communication technology in teaching, two or more people are linked together to have access to online information and other services in a complex computer network.

Integration of ICT in teaching and learning .in African secondary schools is very important because ICT can be applied in various ways by teachers to store information such as planned lessons, diagrams, and pictures of objects relevant to their teachings for retrieval when needed. Observing this, Kanno and Onyeachu (2009) emphasized that a teacher as an implementer of curriculum content and learning experiences can successfully make use of ICT facilities for effective teaching in the classroom. A teacher can store his lessons in the computer for use when teaching the learners; the teacher can disseminate vocal, pictorial, textural and numerical information by combining data processing and telecommunication techniques.

With the aid of computer, secondary school students can retrieve information for their personal studies when needed. This encourages individualized learning.

Integration of ICT in teaching and learning is equally important because, through the use of internet, the concepts in the secondary school curriculum can easily be learnt. On that note, Adiele (2005) remarked that the internet could be used as

instructional tool to explore, investigate, solve problems, interact, reason, communicate and learn many concepts in the school curriculum. In consistent with the views of Adiele (2005), Mkpa (2007) stressed that secondary school teachers can make use of the vast array of internet services covering subjects of academic and cultural interest. This would help to keep them in line with the trends in their different subjects. Ugwu (2007) equally noticed that internet enables learners to exchange ideas with their peers from outside the classroom and even the country. In the teaching of English language for instance, ICT helps learners in the acquisition of four basic language skills of listening, speaking, reading and writing. Acquisition of these four basic language skills is very important because, when the learners acquire them they can easily master the concepts of all other subjects in the secondary school curriculum. ICT increases reading skills. That may perhaps he the reason why Udensi (2006) earlier remarked that, the teaching and learning of writing (essay) can now be better enhanced by using computer that corrects errors and provides immediate feedback. No wonder, Mkpa (2007) remarked that, it is an established fact that most effective learning occurs by engaging the students in relevant learning activities (experiential) and giving him immediate feedback on his performances.

Furthermore, by integrating ICT in teaching and learning, learners can make use of the most up to date texts from the conventional library. This will help the learners to get access to relevant texts which will help them in their lessons. Again, library information can be gotten for use both nationally and internationally. On that note, Udensi (2006) asserted that virtual library provides access to a variety of national and international content, for example, curricular, learning materials, books, journals, magazines, newspapers, services traditionally offered by conventional, libraries and other information sources.

ICT enables learners to ask questions among other things. Okoroh (2006:183) outlined the uses of ICT by students thus:
1. Ask question, predict and hypothesis
2. Observe, measure, record and manipulate variables
3. Interpret their results and evaluate scientific evidence and
4. Present and communicate their findings in a variety of ways.

Ability to ask questions is very helpful in teaching and learning. Appreciating this, Gyuse (2006) asserted that, questioning is essential for active and meaningful learning. When learners ask questions, they are curious to know about things. This facilitates their understanding of school subjects. Recognizing this, Ebenebe and Nwosu (2006) stated that ICT create a new learning environment in which students are engaged learners, able to take greater responsibility for their knowledge. This makes implementation of curriculum content and learning experiences easy as learners will no

longer stay in the classroom as empty vessels and passive listeners waiting for the teacher to spoon feed them with his repository methods of teacher 'chalk and talk'.

Another importance of integration of ICT in teaching and learning is the creation of individualized and collaborative instruction. With the use of computer, learners can learn individually and collectively with or without the teacher in the classroom, hence, Tuoye (2007) stated that computers are tools for teachers and students. They can be used for creation of individualized collaborative instruction and can manage and generate instructional research and administrative data. This makes full implementation of curriculum in all levels of education easier and more practicable; hence, there is greater hope of realizing educational objectives of all countries in Africa.

Integration of ICT in teaching and learning assists in evaluation of students' performance. Evaluation is a very important aspect of curriculum implementation. With the use of ICT evaluation of students' performance is easy for both teachers and administrators, since it provides immediate feedback to the students. With provision of immediate feedback, students and teachers can find out the areas of strength and weaknesses for modification. Commenting on the usefulness of provision of feedback to the learners, Mkpa (2007:5) stated that: "it is an established fact that most effective learning occurs by engaging the students in relevant learning activities (experimental learning) and giving him immediate feedback on his performance as he learns".

Furthermore, integration of ICT in teaching and learning facilitates the education of the disabled. Recognizing this assistance by ICT, Oluwole (2007) stressed that ICT tools could be used to tech and facilitate learning compatibilities of both able and disabled learners.

Suggesting the need to integrate ICT in teaching and learning in the classroom, Ojo (2011) was of the opinion that ICT provides opportunity and possibility for stimulating accurate second language teaching and learning. Ojo asserted that world web makes it possible for students to tackle a huge amount of human experience in such a way that they can learn by doing things themselves. Integration of ICT in teaching and learning will make students to become the creators not just the receivers of knowledge. On that note, Odo, suggested that in this ICT dominated era, language art teachers must be ready to achieve effective teaching by integrating technology into teaching. Odo (2011) urged teachers to be models of the process. He (Odo) asserted that it is important that the vocabulary of Computer Mediated Communication (CMC) be taught in the English language to familiarize the students with it. Students may be asked to list some meaning of the words and use them in the appropriate context. It is

believed that when students practice the above strategies, they will be consciously learning the register of Computer Mediated Communication (CMC).

Problems Militating Against Integration of Information and Communication Technology in Teaching and Learning in Secondary School in Africa

In spite of the numerous importance of integrating ICT in teaching and learning, there exist myriads of problems militating against its integration in teaching and learning in secondary schools in Africa. These include

1. **Computer Illiteracy**

   This is one of the major problems militating against integration of ICT in teaching and learning. Majority of students and teachers are computer illiterates as such they cannot integrate ICT facilities in their teaching. Confirming this, Mkpa (2005) remarked that a good number of students and teachers are yet to be computer literates and as such are not ICT complaints. Omeje (2006) therefore complained that since majority of the students and their teachers are unable to manipulate computer, they cannot carry out assignments using computer. In the light of the above shortcoming, Ogunsola (2008) emphatically complained that placing technology in the classroom does not ensure that it will be used appropriately or even that it will be used at all.

2. **Lack of Time**

   This is one the greatest problems militating against integration of information communication in teaching and learning in Africa. Teachers have so many things to do, since planning instruction to integrate ICT is time consuming, it will be difficult for the teachers to apply it in teaching. Ogunsola (2008) observed that each day teachers find themselves pressed to complete multiple tasks each of which represents competing demands on their time. Teachers need time to reflect and time to acquire the new skills necessary for integrating technology into the classroom.

3. **Lack of Rural Connectivity**

   Many places especially rural areas in Africa are not connected with the internet. This being the case, it is very difficult for secondary schools located in such areas to have access with internet. This militates against integration of ICT in teaching and learning. Noting this, Eyibe (2010) lamented that one major problem facing the growth of information and communication technologies (ICT) on the African continent is lack of rural connectivity.

4. **Inadequate Funding**

   Computers and other ICT facilities are too expensive to purchase as such not all schools can afford the purchase of ICT facilities. No wonder, Onyeachu

(2006) earlier asserted that no organization functions effectively without fund. For ICT facilities to be made available, used and maintained in teaching and learning situations, it requires money. Where the required money is not available or insufficient, ICT facilities will not be purchased. Thus limiting its use in teaching and learning.

5. **Problem of Electricity**

This is another major problem militating against integration of ICT in teaching and learning in Africa. Most schools especially those located in rural areas are not connected with electricity and even the schools that are connected with electricity, the general problem of epileptic power supply noticed in most African countries, Nigeria for instance restricts effective use of ICT in teaching. Ezeoma (2002) therefore complained bitterly that since most of the schools in rural areas are without electricity; students in these areas are denied the tremendous benefits of learning school subjects through the use of electronic instructional resources.

6. **Availability of ICT Facilities**

ICT facilities are in limited supply in all levels of education in most African countries. Observing this shortfall, Eze (2012) lamented that because of limited availability of ICT facilities, students and teachers know them by name, in theory and not in practice. What a big set back in integration of ICT in teaching and learning in Africa.

7. **Problem of Space**

In most secondary schools there is lack of space for installation of computers. This result to principals packing the few available computers given to them in cartons and stores without using them. Eze (2012) emphatically remarked that instructional communication can only be effective when the classroom is well organized, arranged, spaced and equipped. Electrical connections, seats, hardware and software must be made available and enough for ICT in teaching and learning to take place.

8. **Support from School Administrators**

For effective integration of ICT in teaching and learning, school administrators must be in support, but unfortunately in most cases, school administrators do not support the integration rather, they (school administrators) complained ICT activities are costly, hence, no need for bordering oneself about its purchase or its existence in their schools. This militated against integration of ICT in teaching and learning.

9. **Lack of Personnel from Maintaining ICT Facilities**

There are shortages of manpower for maintaining ICT facilities, as a consequence, when ICT facilities are damaged, principals of secondary schools will pack them.

10. **Teachers lack of Confidence**

Teachers lack the confidence needed to use the technology effectively in the classroom. Ogunsola (2008) regrettably noted that many teachers want technical help available on demand. When a technical problem arises, frequently teachers have to wait hours, days or weeks to get them resolved. As a result they will abandon their efforts to incorporate technology. Again because of lack of confidence, Bingimlas (2009) observed with dismay that many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do.

11. **Lack of Acquisition of ICT Skills by Students and Teachers**

Majority of students and their teachers lack necessary ICT skills. Noticing this, Joshua and Alaba (2010) emphatically remarked from the findings of their study that lack of skills was the highest factor on why ICT is not integrated into teaching and learning. Adaomi and Kpangban (2010) described lack of acquisition of ICT skills by most students and teachers as a cog on the wheel of integrating ICT in teaching and learning. This needs immediate attention.

Conclusion

The paper conclusively recommends that all hands should be on deck for effective integration of ICT in teaching and learning. The federal, state and local governments as well as parents, teachers, students themselves, and governmental and non-governmental organizations should contribute their quota either through funding or by donating ICT facilities to schools. All these efforts if collectively done will promote the integration of ICT in teaching and learning in secondary schools in Africa.

Recommendations

For effective integration of Information communication technology in teaching and learning in secondary schools in Africa, the following recommendations are made;

1. Government should organize seminars, conferences, in-service training and workshop for teachers on the use of ICT facilities. Teachers should also engage in weekend and holiday programmes on computer training. Students themselves should engage in computer training after school and during holidays.

2. The government should employ technicians who will be designing soft wares for teachers use. Teachers who were able to use their private time and master the

effective use of the software and integrate them in their teachings should be rewarded.

3. Provision of funds for purchase of ICT facilities should be by a combined effort of the three ties of government, parents, philanthropists, and other non-governmental organizations.

4. To tackle the problem of electricity, federal and states governments should ensure that all the schools in both rural and urban areas are connected with electricity. School administrators should ensure that their schools have generators which are maintained from time to time. Parents should aspire to buy small generators for their children/wards.

5. Parents, Alumni of schools and philanthropists should join hands in providing ICT and its facilities to secondary schools within their localities. This can be done through donation of computer sets, and other ICT facilities.

6. School administrators should ensure that computer laboratories are well organized, arranged, spaced and equipped. Dilapidated buildings should not be used as computer laboratories, large and well ventilated buildings should be set apart for computer operations. This is to enable students and their teachers to have enough space for effective teaching and learning using computers.

7. Every state government should ensure that at least one computer engineer is posted to every secondary school in their states for easy maintenance of the systems. School administrators should as well ensure that they report any case of system damage or inefficiency to the engineer assigned to them without delay.

8. Teachers should be well trained on computer usage. This is necessary because when all the secondary school teachers are computer literates, it will be easy for them to learn how to integrate ICT in teaching different school subjects assigned. In fact, full knowledge of ICT and its facilities will make teachers to be conversant on the integration of ICT in teaching all the topics in their different areas of specialization. The government should equally assist teachers by giving them loan to buy personal computer sets or by supplying system for them (teachers) to pay in installments. Federal government should organize series of competitions for the students on computer usage and maintenance. This will enable students to learn computers and how to apply them in their different subjects since they will receive rewards from their state governments based on their performance.

References

Adiele, E. E. (2005). Emerging trends in information technology: the need for a re-appraisal of the instructional delivery strategies in secondary education. *Journal of curriculum organization of Nigeria* (CON), 12(2), 187-191.

Adomi, E. E & Kpangban, E. (2010). Application of ICTs in Nigerian secondary schools. *Library philosophy and practice.* Retrieved from World Wide Web on 25th April, 2013; www.unllib.unl.edu/lpp/2010.htm:/improved sec. edu.

Bingimlas, K. A. (2009). Barriers to the successful Integration of ICT in teaching/ good learning Environments: A review of the literature *Eurasia Journal of Mathematics, science and Technology Education,* 5(3), 235-245.

Ebenebe, R. C. & Ezenwosu, W. E. (2006). Information and communication technology (ICT) in Human Behavior: the use of ICT in Teaching English language in secondary schools. The educational psychologist: *journal of the Nigerian council of educational psychologists.* Markurdi: NCEP 3(1), 1-8

Eyibe, S. C. (2010). Globalization and distance learning in educational and industrial sectors in Eyibe, S. C. (Ed). *Globalization and Distance learning* Owerri: Cape publishers 1-13.

Eze, R. O. (2007). *Improving the quality of learning in upper basic education in Nigeria through information and communication technology (ICT).* A paper presented at the 20th annual conference of the curriculum organization of Nigeria (CON) held at the faculty of Education Auditorium, Abia State University, Uturu on Wednesday 19th September – Saturday 22nd September.

Ezema, T. A. (2002). Improving the teaching and learning of the English language in the rural areas in Nigeria in *world council for curriculum an instruction.* (W. C. C. I.) Nigerian chapter W. C. C. I 3(2), 29-33.

Eze, P. I. (2012). Application of ICT for improvement of teaching and learning of Christian religious knowledge in Nigerian schools in *The intuition USA*: West and Solomon corporate Ideals ltd. 2 (1), 21-28.

Gyuse, E. (2006). Spotlight on the classroom pupils questions in a primary school social studies class. *Journal of research in curriculum and teaching: Markurdi: Department of Curriculum and Teaching. 1 (1). 78-79.*

Ibiam, J. U . (2007), Primary School Teachers' Information and Communication Technology (ICT) competence in Kogi State. *Journal of Curriculum Organization of Nigeria.* Nigeria: CON 14 (3), 291-298.

Ijioma, M. A. (2004). The place of Information Communication in Distance Education in Nwahunanya, C. (Ed). *Distance Education at the Cross Roads in Nigeria.* Nigeria: spring field publishers ltd. 200-208.

Kanno, T. N. & Onyeachu, J. A. E. (2009). Curriculum and information and communication technology. *Journal of curriculum organization of Nigeria.* (CON) 16(1*), 156-165.*

Mkpa, M. A. (2005). Challenges of Implementing the school Curriculum in *Journal of Curriculum Organization of Nigeria* CON 12(2). 1-9.

Mkpa, M. A. (2007). *Moving Secondary Education forward in Nigeria through Information and Communication Technology (ICT).* A paper presented at a seminar organized by all conference of principal of secondary schools in Nigeria (ANCPS) Abia State chapter, at Koping hotel World Bank estate Umuahia on the 13th of February 2007.

Odo, A. C. (2011). Using information communication technology (ICT) to enhance the teaching of English language in Nigeria secondary schools. *Journal of curriculum organization of Nigeria* (CON) 187(2), 62-67.

Ogunsola, A. L. (2008). Challenges in information communication technology: implications for teacher education. *Journal of Art and Education* Lapai: IBB university, Lapai.

Okereke, C. (2007). The use of information and communication technology (ICT) in enhancing the learning ability of the child in primary school at Ikenegbu layout Owerri. Imo state. *Journal of Curriculum Organization of Nigeria* (CON). 14(1), 60-65.

Okoroh, D. (2006). Using information communication technology and learning of physics in Nigerian secondary schools in Nigerian journal of professional teachers. *An international Journal of the Teachers' Registration Council of Nigeria:* Abuja: Teachers' registration council of Nigeria 1(3), 174-187.

Olusola, A. J. & Alaba, S. O. (2011). Globalization of ICT and open/distance learning in Nigeria: Trends, issues and solutions. *Online Journal of Distance   Education, TOJDE.* (3) Retrieved from World Wide Web on 25th April, 2013; www.tojde.anadolu.edu.tr/tojde43/articles/article-1/htm

Olelewo, C. J. (2007). Functional ICT literacy and educational enhancement in Nigeria. *Journal of Applied Literacy and Reading*. Enugu: pan-Africa publishers 3 129-134.

Oluwole, O. M. (2007). Functional ICT tools for instructional delivery in teaching education program. *Journal of Curriculum Organization of Nigeria.* (CON) 12(1), 234-238.

Omeje J. C. (2006). The use of computer based information and communication technology in behavior modification among counselors. *Journal of the Nigerian Council of Educational Psychologist* Nigeria: NCEP 2(1), 168-169.

Omoniyi, A. O. (2007). *Primary education: challenges for the 21ˢᵗ century.* A paper presented at the 6ᵗʰ annual National Conference of National Association for Research Development (NARD). At the college Auditorium, Alvan Ikoku College of education, Owerri, Imo state.

Onyeachu, J. A. E. (2006). Management of primary Education in Nigeria. *Journal of curriculum organization of Nigeria.* (CON) 13(3), 191-201.

Onyeachu, J.A. E. (2010). Integration of ICT in Teaching in Distance Learning in Nigeria, in Eyibe, S. C. (Ed). *Globalization and distance learning Owerri*: Cape publishers int'l ltd. 32-42.

Tuayo, M. U. (2007). The role of computer in efficient inclusion of exception children in *Multidisciplinary Journal of Research Development. (MULJOREO)* Markurdi: national association for research development (NARD) 8 (4), 54-58.

Tedla, B. A. (2012). Understanding the importance, imparts and barriers of ICT on Teaching and learning in East African countries. *International Journal for e-learning security* (IJELS) 2. Retrieved from World Wide Web on 25ᵗʰ April 2013; www.tojide.anadolu.edu.tr/tojide43/articles/article-1/htm.

Udensi, U. J. (2006). ICT: its role in language teaching and learning. *Journal of Personal Teachers. An International Journal of the Teachers' Registration council of Nigeria.* Abuja: Teachers Registration council of Nigeria. 1 (3), 121-129.

Ugwu, J. (2007). Information and communication technology (CT) and human resource development in secondary school mathematics education in Nigeria. *Journal of Curriculum Organization of Nigeria.* (CON) 14 (11) 79-88.

Unamma, A. O. (2004). The relevance of distance education in contemporary Nigeria in Nwahunanya, C. (Eds) *Distance Education at the Cross Roads in Nigeria:* Spring field publishers' ltd.