ICT in Education: Implications for Distance Learning

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Abstract

We are living in a period when information rate is growing exponentially. There are implosions of more and more specialties in various disciplines. A discipline today may have more than 50 or more journals as a result of findings, methods and reviews from all over the globe. The role of printing press in knowledge revolution is stressed. ICT is seen as an exciting and innovative ways to provide learners with global access to information, learning and support. The integration of ICT in teacher education programme is explained with emphasis on emerging pedagogy. The UNESCO study which identified four broad stages of ICT adoption and use in education is stressed. Distanced learning as a way of ensuring that acquisition of knowledge and skills through mediated information and instruction using ICT. ICT and teachers professional growths using distance learning is encouraged. Today we are witnesses to teachers who are professionally developed using this process. The knowledge economy is dynamic. Hence, recommendations are made for institutions and governments for positive changes.

Keywords: *Information age, ICT Integration, Emerging Pedagogy, Instructional Delivery, Death of Distance and Professional Development.*

1. Introduction

We are living in an information age. This is a period when information rate is growing exponentially. It is a fact today that so much new information is being referred, revised and generated so quickly that even experts in any known field of endeavour could not keep up to date. To highten the poor situation in the information management is implosion of more and more specialty areas in various discipline. For instance, in Biology we used to have Botany and Zoology, but today Zoology alone has these parts such as *Acaranology*–Arachinids; *Cetology*–Wales; *Entomology*–Insects; *Herpetology*–Reptiles and Amphibians; Ichthyology–Fishes etc.

2. Knowledge Explosion

A discipline of study might have more than 50 or more journals given to publishing new findings, methods and reviews from all over the globe. A serious minded teacher must have discovered that textbooks and other instructional materials were being rendered obsolete before they get to the end users or readers. Even if you have time to access all of them, you may find it difficult to read them very well all in time to remain relevant.

This phenomenon emerged when Johannes Gutenberg reinvented the printing press which brought about the first knowledge revolution. This singular act shattered teachers' monopoly of knowledge. As if this was not enough, the inventions of the first mechanical Computer-Difference Engine and Analytical Engine by Charles Babbage, the father of computing set the stage for this great revolution. Also critical in this revolution is Vincenth Atanasoff, the father of the computer and inventor of the first electronic digital computing device provided the stage for the astronomical digitalization of human activities. These improvements in ICTs have completely wiped away whatever was left of the teachers' monopoly of knowledge.

The learning resources available to teachers in information competitive society have become enormous with the globalization of the world. These resources that are everywhere in the cyberspace, can be extremely scarce to some. Anyone who cannot locate these resources is living in the Black Holes of Cyberspace. A teacher at any level of education, who is not on the net take it for granted that, his most current information is obsolete even as he is receiving it by snail mail is living in oblivion.

3. ICT in Education

Iwu and Ike (2009) defined ICT as the acquisition, processing, storage and dissemination of vocals, practical;, textual and numerical information by a micro electronic based combination of computing and telecommunication. ICT simply means the use of computer based information systems and communication systems to process, store and transmit data. It is to describe exciting and innovative ways to provide learners with global access to information, learning and support. It is an umbrella term that includes any communication devices or applications, encompassing, radio, television, cellular phones, computer network, hardware, software, electronic mail, facsimile, satellite systems as well as the various services and applications associated with them. The field of education has been affected by ICTs which have undoubtedly affected teaching and learning. ICTs have the potential to accelerate, enrich, deepen skills, motivate students and to help them relate school experiences to work practices.

4. Integration of ICT in Teacher Education Programme

ICT have become an important part of most organizations today. As a result, teaching and learning are fast changing as a result of innovations and new findings in ICT. This is evidenced in developed economies of the world. These developed economies are in constant and progressive use of ICTs in their educational institutions. As a result of this paradigm shift, these nations are in a position to overcome most of the challenges confronting them.

ICTs are playing revolutionary roles in teaching, learning and research. The educational use of such technologies as computer, electronic databases, teclecommunication devices, laser discs and hypercard screen, provide among other things easy access to information for both learners and teachers making activities flexible and interesting. It is axiomatic that schools should as a matter of urgency equip learners with the technological tools and thinking skills that are absolutely essential for the productive employment and informed citizenship.

Teacher education institutions must change to meet the challenges of this information age. Iwu (2005) observed that successful schools are those that provide integrated technology experience for their students to:

i. increase their technology capabilities;
ii. seek, analyse and evaluate new information;
iii. become problem solvers and decision makers;
iv. use tools creatively and effectively to assist them in decisions;
v. become communicators, collaborators, publishers and producers.

To achieve this, ICT should be an integral part of the school programmes. The school activities should be driven by ICT in such a way as fuel is used to move a car. Teacher education students are expected to graduate with strong skills, positive attitudes, including the idea of lifelong learning and thoughtful approach to using ICT in their schools. It will be necessary for these student-teachers to experience ICT at all levels of their preparations. Teaching the student-teachers basic computer literacy the traditional topics of operating system, word processing, spreadsheet, data base and telecommunication topics are not enough.

ICT integration therefore should be used to enable the student-teachers to function well. ICT integration connotes a range of learning environments from a standalone computer in a classroom to a situation where the teaching is done by the computer through pre-packaged teacher proof course ware. An appropriate integration of ICT in education should ensure that new ways of doing things must be in place. In other words the traditional teacher-centered learning must give way to a pragmatic learner-centered learning environment. This change in approach will form the bedrock for effective acquisition of the knowledge and skills needed by the learners. ICTs have the potentials of equipping the students of better ways of teaching and learning. Ibe-bassey (2011) pointed out that the traditional pedagogy paves way for the adoption of an emerging pedagogy enabled by ICT. He stressed that the emerging pedagogy that is ICT centered has definite attributes such as: active learning, collaborative learning, creative learning and evaluative learning

These can be seen on the adapted table 1 below

Table 1: An overview of traditional and emerging pedagogy in education

Learning Aspect	Traditional Pedagogy	Emerging Pedagogy
1. active	-Activities set by teachers -whole class instruction -little variation activities -programme determines pace	-activities set by learners -small group -many different activities -learners determine pace
2. collaborative	-individual -homogenous group -everyone by himself/herself	-working in teams -heterogenous group -supporting each other
3. creative	-reproductive learning -apply known solutions to problems	-productive learning -find new solutions to problems
4. integrative	-no link between theory and practice -separate subjects -discipline-based -individual teachers	-integrating theory and practice -relations between subjects -thematic -teams of teachers
5. evaluative	-teacher-directed -summative	-student-directed -formative

(**Source**: Adapted from Ibe-Bassey, 2011).

Generally, ICTs-emerging pedagogy will accommodate **'just-in-time'** learning where learners can choose what to learn and when they need to learn it. There is interaction and cooperation among learners, teachers and experts irrespective of where they are. There is the manipulation of existing information and the creation of real-world products than mere regurgitation of received information. An ICTs-emerging pedagogy encourages student-directed and diagnostic pathways of learning. Students can explore and discover rather than listen and remember.

There are lots of policy considerations in ICT integration in education. However, such policies may become useless until there is an appropriate and effective implementation. The classroom is the last checkpoint for the implementation of any educational policy. Teachers as managers and facilitators of a given instructional system hold the key to whether ICT is implemented appropriately and effectively or not.

In 2005, a UNESCO study in Ibe-Bassey (2011) identified four broad stages of ICT adoption and use in education. These are:

- Emerging stage (ICT literacy & basic skills, ICT tools, use & function),
- Applying stage (using ICT tools in different disciplines),
- Infusing stage (understanding how to use ICT tools for real life situations),
- Transforming stage (approaching learning & teaching situations in a specialized ICT tools).

This can be represented in Figure 1.

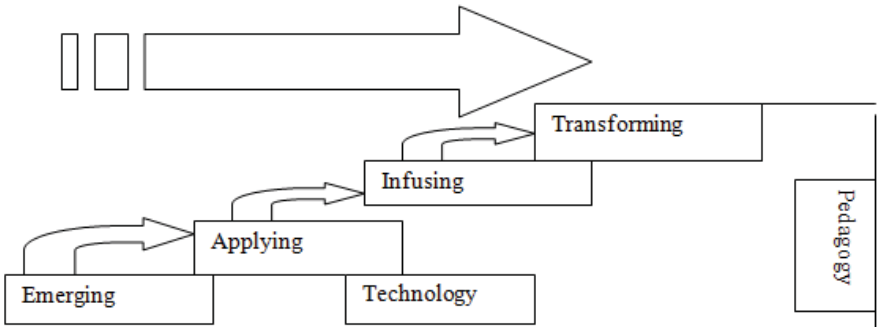

Figure 1: Stages of ICT integration in education.
(**Source**: Ibe-Bassey, 2011)

A detailed description of these stages of ICT integration based on the experiences and behaviour of teachers and learners can be presented in Figure 2.

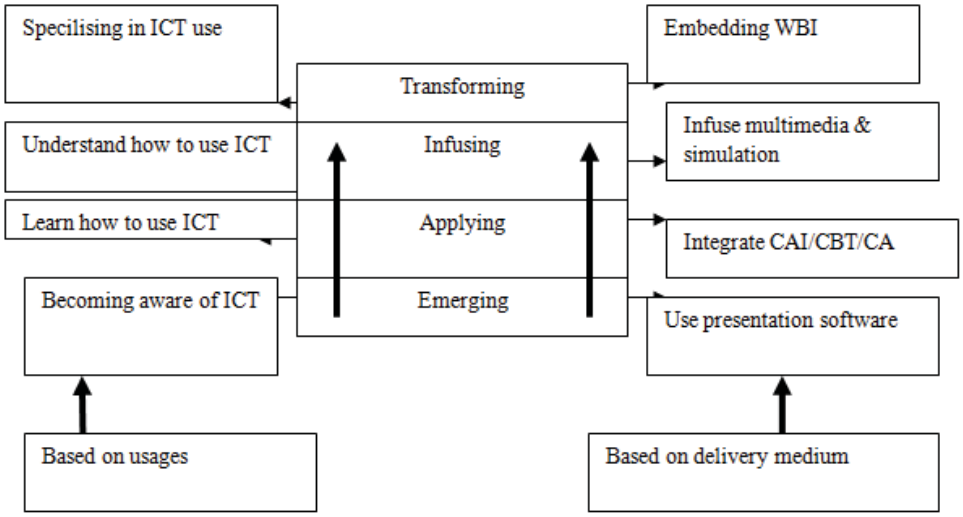

Figure 2 Mapping teaching & learning to the stages of ICT integration in education.
(**Source**: Ibe-Bassey, 2011)

A cursory look at the curricula of all the teacher education institutions in Nigeria such as Colleges of Education, Faculties of Education in the Universities and Teachers Registration Council of Nigeria (TRCN),

they lacked professional development programmes that have an ICT-based study. If our learners would be relevant there would be need for all the stake holders to come up with programmes that will be tailored to training and re-training of both staff and students. This will enhance the quality of instruction and learning. Student-teachers will always teach the way they were taught and trained in their various institutions. There is no gain-saying the fact that what we have today as products of these institutions are as a result of what the producers, that is the lecturers in these places are the reflection of their institutions.

To achieve the expected, there is need for these institutions to adopt UNESCO 2008 ICT competency standard framework for teachers. Ibe-Bassey (2011) observed that, the guidelines given by UNESCO and provided for teachers and Teacher Professional Development (TPD) programmes as a planning tool that can be used to access levels of attainment during the implementation of the TPD programmes. Below is the graphic presentation of UNECSO, 2008.

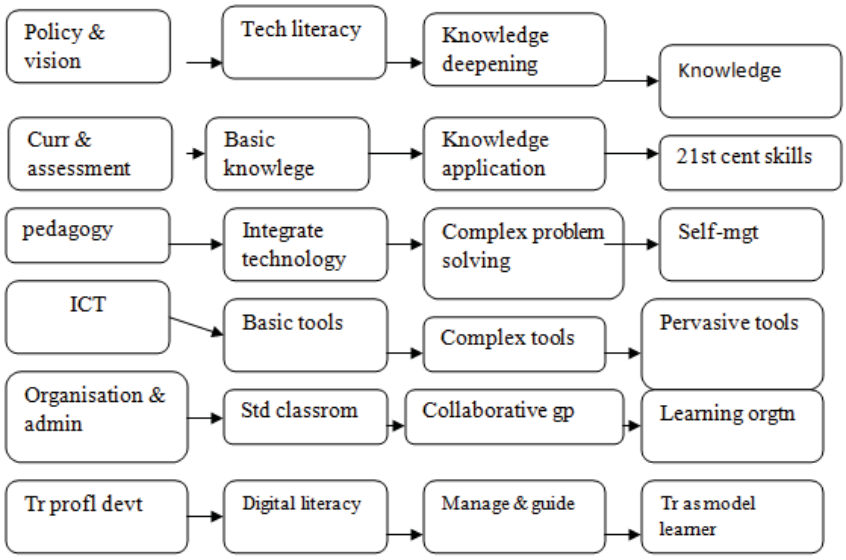

Figure: UNESCO ICT Competency Standards Framework for Teachers
(**Source:** UNESCO, 2008).

The usefulness of the above UNESCO 2008 proposal is dependent on the political will of the financing authority. Most supervising agencies sometimes are handicapped by the politicians who do not know why so much money should be spent in the project. Anytime they are ready, they areas of consideration may include:

a. Determination of the educational purpose that technology will serve.
b. Decision on the ICT integration approach to follow.
c. Selection of infrastructure and hardware with consideration on cost-effectiveness, appropriateness and sustainability.
d. Decision on universal access to technologies.
e. Social sustainability.
f. Financial cost of ICT acquisition in schools.
g. Development of content for ICT supported teaching, learning and curriculum relevance.
h. Consideration for trained personnel who will implement technology integrations (Ibe-Bassey, 2011).

5. Prospects of Integrating ICT for Effective Instructional Delivery

Nsofor, Ala and Abdu (2012) observed the following to be some of the major relevancies of ICT for effective instructional delivery:

- **Teaching Large Class**: There have been complains over the years by the lecturers in tertiary institutions on how to deal with students over population. ICT provide solutions for that and holds a great promise of extending the instructional method to a large classroom at the same time if effectively utilized.
- **Teaching the Abstract Concepts**: With the help of Computer Assisted Instruction (CAI) learners' phobia of understanding the abstract concepts of scientific concepts would be solved. This is because learners at whatever levels do not prefer learning by imagination rater they love reality. They may learn better especially when they see, touch or hear sound. CAI holds great promise for that.
- **Exposing Students and Teachers into the Contemporary World:** Through exploration by using ICT for instructional purpose one learns better what is happening in the modern world. This may be done in a place where internet facilities are provided for students and teachers consultation. In his contribution of the relevance of ICT for effective instructional delivery, Nwaboku (2003) cited in Nsofor et al (2012) contend that for this age and time, students will need the internet for learning while teachers beyond being computer literate need to update their knowledge through ICT with resources outside their immediate environment via internet, in a few more years, if higher institutions in Nigeria fail to be linked to the outside World whatever knowledge and skills reposing within them would become obsolete and the education offered would be invalid.

In view of this, teacher education at all levels must as a matter of necessity take their rightful place to direct the ship of education. For these educators to enjoy this new and better way of learning, ICTs in teacher preparation should be emphasized and deployed for the training of pre-service and in-service teachers. The tertiary institutions involved in preparing teachers of tomorrow must provide the leadership role for the student-teachers. These student-teachers today will be teachers of future leaders who should function well in the knowledge economy and society of the 21st century. This knowledge based global society according to Abimbade (2012) is one in which:

- The World's knowledge base double every 2-3years.
- 7000 scientific and technical articles are published each day.
- Data sent from satellite orbiting the earth transmit enough data to fill 19 million volumes of text every 2 weeks.
- Graduates of secondary industrialized nations have been exposed to more information than their grandparents were in a life time.
- There will be as much change in the next three decades as there was in the last three centuries.

The challenges before us today will be how to re-structure our schools to provide learners with the appropriate skills to function in this dynamic and information rich environment. The re-structuring should move from the present teacher-centered and text bound classroom into the student-centered interaction knowledge environments that is based on the constructivism. This is a way of learning by doing, here learning is fun.

It is true that ICT is useful in teaching and learning, however, each subject has its peculiarities. Hence, there is need for in-depth training in each subject area. Since most schools may not have all the resources to be ICT complaint and teachers cannot fold their arms. The surest way to acquire these training and skills is through distance-learning.

6. Distance Learning and Teacher Preparation

Distance learning sometimes is seen as distance education. We shall use them interchangeably as the same. This is a way of ensuring that the acquisition of knowledge and skills through mediated information and instruction and it encompasses all technologies and supports the pursuit of lifelong learning for all. This learning is usually certified by a recognized agency or institution. Distance learning therefore is a mediated means of communicating with those who are physically and emotionally separated from the communicator. This approach is parallel to the traditional face-to-face approach in which the teacher and the students are in close physical and emotional proximity.

The long distance between the communicator and the learners makes it needful to use ICT to reduce distance in the communication. The ICT that could be used include:

- Communication technologies such as all media employed in transmitting audio, video, multimedia, satellite, fibre optics, wireless radio, infra-red, Bluetooth and wifi.
- Computer technologies which include all removable media such as optical disc, flash memories, video books, multimedia projectors, personal computers.
- Network technologies which include Wide Area Networks and the Internet.

These technologies ensure that learners come to terms with "death of distance" which happens when the cost of communication comes down to next to nothing. The death of distance has today given life to education. Distance learning has not only changed how quickly educators and students can exchange and access information, it has altered the educational equation in fundamental ways. These technologies have made the school, students and teachers to have and become part of virtual classroom in every technology oriented environment.

7. ICT and Teachers Professional Growths Using Distance Learning

Teachers have opportunities to develop themselves now more than ever before. The ICTs have provided the platform for teachers to unlock the vast world of time, and space for professional development using distance learning (DL). DL has made available contents to teachers undergoing in-service training DL driven by ICTs have the potentials to strike the difficult balance between pressure to do one's primary assignment as classroom teachers on the one hand, and the obligation to maintain up-to-date qualifications on the other. Today we are witnesses to teachers who are situationally positioned to develop themselves using DL programme. This programme of the College can broaden the range of professional growth of teachers and reduce the cumulative cost of retraining of teachers.

ICTs using DL help teachers who are focused to meet most of their professional expectations. They include but not limited:

- Making available training resources in digital format at a given centre.
- Use of individualized examination in formative and summative format.
- Providing access to information using productivity tools such as internet.
- Use of social learning networks such as Video, Ning, Wikipedia, Skype and Googledocs.
- Tutorial feedback and support at a distance.
- Peer sharing of experiences and research findings through web based fora.

8. Recommendation

It is necessary to request all institutions preparing teacher of tomorrow to be proactive. The knowledge economy is dynamic. The institutions and government should see themselves as positive change agencies.

They should therefore:

- Establish campus wireless connectivity.

- Develop website and video-driven lectures.
- Build a critical mass of ICT proficiency and competencies.
- Provision of alternative power supply.
- Promotion of the development of instructional materials in electronic format.
- Subject teachers should be encouraged to develop the skills required to use computer in their instructional activities.

9. Conclusion

As we conclude, we must have a vision for teachers of tomorrow. The people that will stand and direct our future leaders, these men must be prepared to stand and direct well. These teachers must be at home with www.com. They are the products of this ceremony today. At the right time they will be absorbed in our educational system to teach our sons and daughters. Therefore, they need to be effectively and efficiently trained with modern ICTs in order to cope with the challenges of ever changing society.

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