ICT Education: A Tool For Quality Assurance In Tertiary Institution In Nigeria

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Abstract

Information and Communication Technology (ICT) affects the ways we do things nowadays, including our educational processes. This paper considers information and communication technology (ICT) education and how it can improve quality assurance in our tertiary institutions. It also discussed ICT education, the use of ICT in education, ICT and quality education and ICT education and quality assessment.

Key Words: Information and Communication Technology (ICT), Education, Quality, Assurance, Tools.

1. Introduction

Quality assurance in education is a common target for all education system especially in developing countries of Africa like Nigeria [1]. He argued that many countries are progressing towards the goals of education for all but struggle to achieve quality education for all. The quality of education according to [1] is the prime factor that determine the worth and or significance of the system to both the recipients and the society at large.

Education according to [2]; [3] is the driving force of economic and social development of any country. If so, it is necessary to find ways to make education become qualitative, accessible and affordable to all.

ICT is that tool that will make education qualitative, accessible and affordable. In recent years according to [4], there has been groundswell of interest in how computer and internet can be best harvested to improve the efficiency and effectiveness (quality) of education at all levels in both formal and informal settings. ICT stands for Information and Communication Technology and are defined for the purpose of this paper according to [4] as diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information. These technologies include but not only these:

- Computers
- The internet
- Broadcasting technologies such as (radio and television)
- Telephone
- Interactive whiteboards
- ETC [4].

ICT is also defined as a powerful collection of elements which includes computer hardware, software, telecommunication networks, workstations, robotics and smart chips [5]. ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere [6]. It influences the way students are taught and how they learn, since the process of learning are now focused on learners instead of teachers. It improves the quality of learning and provides several tangible and intangible benefits for all stakeholders involved in the economic growth of any country [7].

Wider availability of best practices and best course materials in education, which can be shared by means of ICT can foster better teaching [8]. ICT allows the academic instructions to reach disadvantaged groups in the society. ICT has the potential to remove the barriers that are causing the problems of low rate and poor quality of education, cost of education, less number of teachers as well as overcome time and barrier [9]. This paper will discuss how ICT education could be used to improve the quality of education.

2. Related literatures.

There are a lot of researches on how ICT education can improve the quality of education. ICT provides some avenues for those looking to use benchmark as a means of quality assurance [10]. But according to [11], one of the difficulties benchmarking posses for quality assurance in high education is the process of describing best practices in a way that supports the necessary comparative process. There have been a number of recent attempts to describe and state standards as an alternative means. Standards provide levels of achievement of a benchmark that can be qualitatively or quantitatively measured [10].

Without quality, education becomes wastage and even poses danger to the individual beneficiary and the society [12]. Indicators of declining quality and wastage in the education system include high drop-outs; and failure rates, rampant examination malpractices, poor reading and writing skills among students at all levels [4].

Quality is perceived differently by various professionals who often use the item, but however quality is something everyone considers good and want to have. According [4], quality has to do with whether something is good or bad, it is about the standard of something when compared with other things. It is therefore presupposes that there is a standard. [1] quoting [13], noted that quality in an organization could be characterized by three inter-related and interdependent strands as follows:

- Efficiency in the meaning of goals.
- Relevance to human and environmental conditions and needs.
- Exploration of new ideas, the pursuit of excellence, encouragement and creativity.

On the other hand, assurance implies a positive or encouraging declaration, full confidence, firmness of mind and certainty. It is a statement that something will certainly be true or will certainly happen, particularly when there have been doubts about it [14].

The purpose of quality assurance in institutions is capacity building within an institution for pursuing quality improvement leading to stakeholder's satisfaction. Quality assurance is a continuous and conscious process aiming at excellence. This can be ensured through quality assessments that the institutions are doing what it claims to have been doing [1]. Quality assurance may be seen as any action taken to pervert quality substandard from occurring. Quality assurance aims to ensure that product or service of an organization meets the already established standard and a well fit for the purpose for which such product is meant to serve [15].

3. ICT Education

Information and Communication Technology (ICT) education is the study and ethical practices of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources [16]. Since we live in information society everyone is expected to be ICT literate which according to [5], entails awareness, knowledge and interaction. It is also referred to e-learning, which means the use of modern technology such as computers, digital technologies, networked digital devices and associated software and course ware with learning scenarios, worksheets and interactive exercise which facilitates learning [16]. E-learning encompasses learning at all levels, both formal and non-formal, that uses an informational network, i.e. the internet and intranet (LAN) or extranet (WAN) – whether wholly or in part, for course delivery, interactions, evaluations and/or facilitation [4].

Another system of ICT education is the blended learning. Blended learning according to [17], refers to learning models that combine traditional classroom practice with e-learning solution. These is such that students in traditional class can be assigned both print-based and on-line materials, have on-line mentoring sessions with their teachers through chatting and are also subscribe to class e-mail list. Or web-based training course can be enhanced by periodic face - to face instructions. Blending was prompted by the recognition that not all learning is best achieved in an electronically-mediated environment particularly one that depends with a live instructor all together. Instead consideration must be given to the subject matter, the learning objective of the learner, and the learning context in order to arrive at optimum mix of instructional and delivery method [17]. Information and communication technologies

(ICTs) such as laptops, low cost video cameras, cell phone etc according to [18] have become affordable, accessible and integrated in large sections of society throughout the world and this brings education to our doorsteps.

According to [18], ICT can be used as a tool in the process of quality education in the following ways:

- **Information tools:** It provides vast amount of data in various formats such as audio, video, and document.
- **Situating tools:** It creates situation, which the students experiences in real life thus simulation and virtual reality is possible.
- **Constructive tools:** To manipulate the data and generate analysis
- **Communicative tools:** It can be used to remove communication barriers such as that of space and time.

ICT uses the following mechanism for the delivery and for conducting educating process, according to [3].

- **Voice:** Instructional audio that include interactive technology as well as the passive ones.
- **Video:** Instructional video tools that include still images, prerecorded moving images and real-time moving images combined with audio conferencing.
- **Print:** Instructional print formats that include textbooks, study guides, work books, and care studies.

ICT allows for the creation of digital resources like digital libraries where students and professionals can access research materials and course materials from any place at any time [19]. Such facilities allows the networking academics and researchers and hence sharing of scholarly materials. This helps to avoid the duplication of works according to [2]. UNESCO listed the following as the advantages of ICT education [20].

- It eliminates time barriers in education for learners as well as the teachers.
- It eliminates geographical barriers as learners can log in from any place.
- Asynchronous interaction is made possible leading to thoughtful and creative interactions.
- Enhanced group collaboration is made possible through ICT
- It can provide speedy dissemination of education to target disadvantaged groups.

4. Use of ICT in education

Education policy makers must first of all be clear about what educational outcome are being targeted. The targeted educational outcome should guide the choice of technologies and modalities to be used. There are at least five levels of technology use in education. These according to [21], are as follows:

- Presentation
- Demonstration
- Drill and practice
- Interactive
- Collaboration

At the level of **presentation** and **demonstration**, technologies such as print, audio cassette, radio and television broadcast, computers or the internet are applied, which is the most basic of the five levels. On the other hand, networked computers, and the internet are the ICTs that enable **interactive** and **collaborative** learning the most [21]. It will be interesting to note that if these ICT tools are used merely for presentation and demonstration, their full potentials as education tools will remain unrealized. Below are few lists of these ICT tools.

1. **Radio and TV Broadcasting:** Radio and television have been used widely as educational tools since 1950s [22]. There are three general approaches to the use of radio and TV Broadcasting in education. They are according to [21] as follows.

- **Direct class teaching:** This is where broadcast programming substitutes for the teachers on temporary basis.
- **School broadcasting:** This is where programming provides complementary teaching and learning resources not otherwise available.
- **General education programming over community:** In this case, national and international stations provide general and informal education opportunity.

Examples of these are the Interactive Radio Instruction (IRI) that are implemented in Thailand, Indonesia, Pakistan, Bangladash etc in the 1980s [21]. Another according to [6] includes Mexico's Telescundria, the 44 radio and TV Universities in China, Japan's university of Air, etc.

2. **Teleconferencing:** This refers to interactive electronic communication among people located at two different places. According to [23], there are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology. They are:

- Audio conferencing
- Audio-graphic conferencing
- Video conferencing
- Web-based conferencing [23].

Audio conferencing*:** This involves the live (real-time) exchange of voice message over a telephone network. When low bandwidth text and still images such as graphs, diagrams or pictures can also be exchanged along with voice messages, it is called ***Audio-graphic. Non-moving visuals are added using computer keyboard or by drawing/writing on graphics or whiteboard. ***Video conferencing*** allows the exchange of not just voices and graphics but also of moving images. Video conferencing technology does not use telephone lines but either a satellite link or television network. ***Web-based*** conferencing as the name implies involves the transmission of and graphics, audio and visual media via the internet. It requires the use of computer with a browser and communication can both be synchronous and asynchronous [23].

Teleconferencing is use in both formal and non-formal learning contexts to facilitate teacher-learner and learner-learner discussion as well as to access experts and other resource person remotely. In open and distance learning, teleconferencing is a useful tool for providing direct instruction and learner support, minimizing learner isolation.

3. **Computer and internet:** [22] described three approaches to the instructional use of computers and internet. They are as follows:

- *Learning about computer and the internet*, in which technological literacy is the end goal.
- *Learning with computers and the internet*, in which technology facilitates jlearning across the curriculum.
- *Lhearning through computers and internet*, which is integrating technological skills development with curriculum applications [22]

When we learn about computers, and the internet, attention are focused on developi3ng technological literacy. It typically includes:

- Fundamentals; basic terms, concepts and operations.
- Use of the keyboards.
- Use of productivity tools, such as word processing, spreadsheets, database and graphic programs.
- Use of research and collaboration tools such as search engines and e-mails.
- Basic skills in using programming and authority applications such as Logo or Hyper studio.
- Developing an awareness of the social impact of technological change [22].

When we learn with computer and the internet it means focusing on how the technology can be the means to learning ends across the curriculum. It includes the following, according to [22]:

- Presentation, demonstration and manipulation of data using production tools.
- Use of curriculum; specific application types such as educational games, drill and practice eliminations, tutorials, virtual laboratories, visualizations and graphical representation of abstract concepts, musical composition, and expert system.
- Use of information and resources on CD-ROM or online materials such as encyclopaedia, interactive maps and atlases, electronic Journals and other references.

Technological literacy is required for learning with technologies to be possible. This implies a two - step process in which students will first learn about the technologies before they can actually use them to learn [22]. Learning through computers and the internet combines learning about them with learning with them. This according to [8], involves learning the technological skills "just in time" or when the learner needs to learn them as he or she engages in a curriculum-related activity. For example secondary School students who must present report on the impact on their community of an increase in the price of oil for an economic class, may start doing research online, using spreadsheet and database programs to help organize and analyze the data they have collected as well as using word processing application to prepare their written reports

4. **Tele-collaborating**: This is an online learning that involves students to login into online formal

courses. This is perhaps the most commonly thoughts of the internet in education. However, it is by no means the only application. According to [10], web-based collaboration tools such as e-mail, list servers, message board, real-time chat, and web-based conferencing connect learners to other learners, teachers, educators, scholars and researchers, scientists and artists, industry leaders and politicians; in schools, to any individual with access to the internet who can enrich the learning process.

The organized use of web resources and collaboration tools for curriculum purpose is called ***Tele-collaboration***. [24] described Tele-collaboration as "an educational endeavours that involves people in different location using internet tools and resources to work together." Most Educational Tele-collaboration are curriculum-based, teacher designed, and teacher coordinated. They use e-mail to help participants communicate with each other. Most Tele-collaborative activities and projects have websites to support [24]. The best Tele-collaborative projects according to [2] are those that are fully integrated into the curriculum and not just extra-curriculum that would not have been possible without it, and those that empower students to become active, collaborative, creative, integrative, and evaluative learners. One of example is the voice of youth project developed by UNICEF. This project encourages students to share their views on global issues such as HIV/AIDS, and child labour with other Youths and Adults around the world through an electronics discussion forum [2]. The voice of Youths website also provides background information on the different discussion topics as well as resources materials to help teachers integrate other classroom activities. Other Tele-collaborative projects according to [24] are as follows:

- International Telementor program (ITP)
- Global Learning and Observation to Benefit the Environment (GLOBE). Their websites are http://www.unicef.org/voy, http://www.telemelor.org, and http://www.globe.org respectively

5. ICT and Quality Education

Improving the quality of education is a critical issue. ICT enhances the quality of education in several ways. This can be done by several ways according to [1] quoting [25], ICT potentially offer increased possibilities for codifications of knowledge in education and for more innovations in teaching activities especially through the delivery of learning and cognitive activities anywhere anytime. ICT support and spurs learning at a distance which can be more learner-centred, self paced, and problem solving based, than face-to face teaching using traditional medium [1]. ICT creates social media through networking; create open space interactions between the instructor/lecturers and the students without necessary face-to face classroom situation [26]. ICT are transformational tools which, when used properly and appropriate, can promote the shift to learner-centred environments. Below are ways ICT can enhance the quality of education.

- **Motivation to learn:** ICT such as video, television, multimedia, computer software etc, that combine text, sound, and colourful moving images can be used to provide challenging authentic contents that will engage the students in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatization comic skills and other performance convention to compel the students to listen and become involved in the lesson being delivered. More so than any other type of ICT, networked computers with internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICT, with the opportunity to connect with real people and to participate in real world events [23].

- **Facilitating the acquisition of basic skills:** The transformation of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICT through drills and practice. Educational television program use repetition and reinforcement to teach the alphabets, numbers, colours, shapes, and other basic concepts. Most of the early uses of computer were for computer based learning (*also called computer assisted instruction*) that focused on insisting of skills and contents through expectation and reinforcement [23]
.
- **Enhancing teacher training:** [1] noted that staff development; growth and career

advancement is one of the indices or indicators of quality assurance in education. With the use of ICTs; teachers are opportune to be trained and re-trained in the use of ICT in discharge of education. Thus, the use of ICT in education today is a common agenda pursued by both developed and developing nation across the globe. This in keeping with the development of knowledge economy as well as the new trend of internationalization of institution of higher learning, both of which are clear indicators of quality in the education system [1].

- **Holding and up-dating of minimum academic standard:** The development holding up-dating of benchmark minimum academic standard (BMAS) is one of the primary functions of the monitoring bodies of tertiary institutions in Nigeria [1]. The discharge of this function is supported by the use of ICTs. In doing this, the bodies can easily develop, up-date, and disseminate BMAS to institution where they are needed for implementation. This singular responsibility according to [1] is very vital in the pursuit of quality assurance in education. Thus, the role of ICT in holding, maintaining and updating the BMAS cannot be under estimated. Such is the same in the records holding role of ICT keeping with quality assurance [1].

- **Provision of virtual library services:** According to [1], the relevance of library information in quality assurance cannot be under-estimated. Most institutions stock only limited number of books, journals, and periodicals. The limited copies are equally outdated in contents. The provision of virtual library information is in fact one of the best cardinal areas where the ICT impact on quality of education [1]. With the ICT powered by the internet facilities, students and teachers have limitless opportunities and provisions to surf the web for and in search of vital and current information that are required for research and knowledge growth of students and lecturers in their various endeavours.

6. ICT Education and Quality Assessment

One of the problems facing those who seek to describe quality in ICT education are to understand precisely what constitutes ICT education. ICT education occurs in a wide range of teaching activities where technology of one form or another is involved. Technology necessarily underpins the administrative functions of higher institution. ICT takes many forms and our common instantiations in ICT delivery and approaches according to [10] include the following:

- Flexible learning, technology support for learning anytime and anywhere.
- Blended learning varying mixes technology with conventional learning.
- Online learning, where technology provides the means for higher the implementation and delivery of learning programmes totally distinct from face-to face teaching.

Within this diverse and broad range of activities, we are now seeing increased levels of awareness and concern for the quality of activities and their results. According to [27] quoted by [10], there is a heightened level of interest in being able to monitor and review performance and to demonstrate successful outcomes. In catering for diversity, most exercises in quality assurance steer towards the activities with the highest levels of technology use and dependence.

There are usually two main ways by which the quality of process or activity can be assessed. They are through Benchmarking or by the specification of standards. Benchmarking compares the performance of an outcome in one setting against that achieved by selected others operating in a similar sphere. This is a process of relativity. The use of standard on the hand uses criteria-related references to judge performance [10]

Benchmarking is a difficult process to apply in most University setting. [28] argued that learning and teaching is difficult to Benchmark because there will always be diversity from institution to other.

E-learning which is embedded in the ICT education is one activity in higher institution setting where benchmarking processes might be employed to ascertain quality? E-learning comprises of discrete and distinct teaching and learning elements that can be isolated and identified for benchmarking purposes. There are currently existing number of standards and guidelines that have developed to aid this process. These includes

- Institution for higher education policy.
- Learning Objects Metadata (LOM)
- Learning Technology Standard Committee (LTSC)
- QAA
- ETC

At the same time, there has been considerable research and development in e-learning and many reports have resulted that showcases examples of best practice that can be used as potential benchmark against which comparison can be drawn [10]. According to [29], there are number of researches that have attempted to provide frameworks that can be used to provide over reaching models to describe the critical elements of learning settings that can be used to contexualize the factors influencing effective outcomes. Typically, the framework distinguishes four discrete elements. They are:

- *The curriculum*, that which is to be learned
- *The learning design*, that planned learning environment
- *The learning resources*, the courses contents
- *The delivery processes*, supports and scaffolds for learning

Within these four elements, there are examples of best practice that apply to teaching and learning in general and examples that could be considered unique to e-learning. Since e-learning is primarily a descriptor of the medium of instruction, descriptions of best practice would tend to apply mainly to instantiations of curriculum and course itself. Therefore learning designs, learning resources, and delivery processes are the elements of e-learning that could form the basics of any benchmarking activity.

7. Conclusion

ICT affects the delivery of education and enable wider access to the same. It increases flexibility so that learners can access the education regardless of time and geographical barriers. It influences the way students are taught and how they learn. It enables development of collaboration skills as well as knowledge creation skills. This in turn would better the learners for lifelong learning. It improves the quality of learning and this contributes to the economy. Wider availability of best practice and best course material in education which can be shared by means of ICT can foster better teaching. However, successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagements with students in learning rather than acquiring computer skills and obtaining software and equipment. Also proper controls should be ensured so that accountability, quality assurance, accreditation and consumer protection are taken care of.

8. Recommendations

The European standards and guidelines for internal quality assurance within higher education institution (2009) recommended thus.

- **Policy and procedures for quality assurance:** Institutions should have policy and associated procedures for the assurance of the quality and standards of their programmes and awards.
- **Approval, monitoring and periodic review of programmes and awards:** Institutions should have formal mechanisms for the approval, periodic review and monitoring of their programmes and awards.
- **Assessment of students:** Students should be assessed using published criteria, regulations and procedures, which are applied consistently.
- **Quality assurance of teaching staff**: Institution should have ways of satisfying themselves that staff involved with teaching of students are qualified and competent to do so.
- **Information System:** Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes of study and other activities
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