USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN TERTIARY EDUCATION IN NIGERIA: A CASE STUDY OF ELECTRONIC LEARNING (E-LEARNING)

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Abstract

Population growth and the increasing number of people seeing the relevance of education as well as demand for tertiary education in Nigeria have been on the rise yearly. Tertiary institutions in Nigeria have been unpleasantly turning large numbers of qualified applicants due to lack of facilities. To solve some of these problems in the tertiary educational sector of Nigeria, e-learning and using ICT in education have a major role to play. This paper discusses and elaborated the importance of e-learning in the tertiary educational sector of Nigeria as well as the different issues concerned in the implementation of an e-learning system. This study also shows how ICT through e-learning has helped or can help people access tertiary education by not necessarily being on the campus of the respective tertiary institutions. E-learning can be seen as a solution to the various factors that affect access to tertiary education such as lack of facilities to meet increasing educational demand due to population growth. The study recommends that every tertiary institution in Nigeria should make e-learning part of its structure, so as to facilitate and speed up the development of education and the country as a whole.

There is a growing clamour in Nigeria public universities and polytechnics to be run as businesses. These tertiary institutions are usually assessed in terms of business models and measures. Consistent with these models, universities and polytheist are now required to justify their existence based not on criteria such as quality of faculty or resources alone, but on whether they satisfy current demands; anticipate future demands; continuously increase product offering i.e programmes and sales (enrolment).

The Concept of ICT and E- learning

Information and Communication Technology (ICT) can broadly defined as the tools, facilities, processes, and equipment that provide the required environment with physical infrastructure and the services for the generation, transmission, processing, storing and disseminating of information in all forms including voice, text, data, graphics and video (Nicholas and Anderson 2005). From the definition, ICT has a role to play in any country's educational development. The ideal and plan of using the computer as a learning tool has been around since the advent of computes. E-learning is known to be a product of this idea and plan. E-learning refers to the provisions of quality and flexible education to those who are unable to attend lectures/classes on-campus, due to a particular reason, (Action Plan, 2001). E-learning opportunities are usually accessed via the internet and facilitated by different types of information and Communication Technologies (ICTs) which offer new opportunities for teaching. E-learning builds on the same principles and opportunities of teaching many individuals at each learner's own rate compared with teaching on a class of students meeting at the same place at the same time.

E-learning and Distance Learning

It must be noted that e-learning and distance learning are not the same. Distance learning involves teaching or lecturing of students at a distance away from the institution. The lack of distinction between e-learning and distance learning accounts for the misunderstanding of the role ICT plays in e-learning. It was observed by Guri-Rosenblit (2005) that because of their interchangeability as synonyms there is continuous blurring of boundaries between e-learning and distance learning. What most universities and polytechnics in Nigeria practice is distance learning. E-learning involves the use of ICT and is currently being employed and adopted by a few institutions.

In view of the above, distance alone cannot be necessary condition for the application of E-learning, although alone cannot be necessary condition for the application of e-learning, although one of the most important advantages of e-learning is the flexibility it offers with regard to distance. According to Guri- Rosenblit (2005) Distance learning and e-learning do overlap in some cases, but are by no means identical. In the traditional lecture based education typically found in large tertiary institutions, lecturers and students are at the same place (often in a lecture room) at the same time. Teachers are the principal source of knowledge delivered to students in this approach. Teachers can call upon ICT support, such as audio/video materials, slides or films. Students can use supplementary means to obtain knowledge, such as books and manuals; here the Teacher or Lecturer is the key to learning. Instruction in e-learning system is different, if for no other reason than the teacher not being physically present to keep students awake. The teacher as the centre of learning is replaced by the provision of e-learning process.

In e-learning system, the principal source of knowledge is not the teacher, but knowledge-based collected, assembled and sequenced some time by the teacher, along with links to other sources of information, typically accessible via the internet. Here teacher's role shifts from that of a teacher to that of course developer and, once a course is in session, the course facilitator. The main differences between these two models of education are shown in Table 1.

Table 1:   **Types of Educational Models**

Features/Model	Traditional Models Education	E-Learning System
Main knowledge source	Teacher	Knowledge bases in education system; any knowledge source accessed through the internet
Additional knowledge sources	Books, Manual, Audio and Video Materials	Traditional sources, Teacher, Fellow Students
Assessment	Only by Teacher	System and teacher is responsible for final assessment
Quality of Education	Depends on Teacher quality, level of knowledge and ability to share knowledge	Depends on quality of electronic knowledge sources and other didactic materials

Source: Interdisciplinary journal of knowledge and learning objects 2006

Demand for tertiary education in Nigeria has been on increase over the years, and the expansion of public universities and polytechnics seem not to meet this increasing demand. There is a general problem of access to public tertiary education in Nigeria. Available statistic indicate that from 1996-2001, only about 32% on the average of qualified applicants for admission into the universities, and about 54% of same for admission into polytechnics, were actually admitted (Ministry of Education 2006). The figures have not change much over the period.

For the 2005/2006 academic year, 55% of qualified applicants were admitted into all the public universities while in the polytechnics it was 78%, Ministry of Education (2006).

The factors that have been identified as reasons for the situation of limited access to tertiary education include the following:

1. Existing tertiary institutions are unable to meet the high demand for tertiary education, which has risen out of the rapid growth in population and the reduction of the years for pre-tertiary education.

2. Disparity between existing academic facilities and physical infrastructure on one hand, and the increasing number of students admitted into tertiary institutions on the other.

3. Pubic Universities and Polytechnics being originally developed as residential institutions because of their national character and model adopted.

4. The Existing structure and facilities that tertiary institutions provide are limited and in some cases, there is no access for people with disabilities and special needs (Ministry of Education 2006).

Types of E-Learning

According to the Danish Ministry of Science and Innovation, World bank (1991) e-leaning operates with four different of e-learning methodologies in which a wide spectrum of learning is illustrated. The different types of e-learning methodologies namely;

Mode A: E-learning without presence and without communication,

Mode B: E -learning without presence and with communication

Model C: E-learning with combination of occasional presence-blended learning

Model D: E -learning used as a tool in classroom teaching.

These models are described as follows.

Model A: E-learning without Both Presence and Communication

This model involves an e-learning process whereby the teacher and the students never meet physically. There is no dialogue or no kind of interaction between students and the teacher. This type of e-learning can be done entirely off-line as all information can be stored on a secondary storage device such as a compact disc (CD), hard disk(especially external), pen drives or flash disks. Continuous or occasional on-line access will however enable up-date of the teaching material. The student is provided with information on a certain topic or course and may thereafter be given training through a number of exercises. The student may also be tested through a number of multiple choice tests. Guidance can be sought through the use of a help function.

The main advantage of this type of e-learning is its flexibility. The learning can take place anywhere and at all times, if the requested equipment is available. On the other hand, the disadvantage of this type of e-learning is that, it is difficult to design the learning process according to the needs of the individual user, and the user cannot seek guidance from the teacher beyond what is included in the e-learning system before hand. Users must be able to work independently and solve unexpected problems by themselves without any help since there is no communication.

This type of e-learning is mainly used for teaching in very specific competences such as the use of a particular IT-system, training in a new sales concept etc. But the method is less suitable for teaching in general competences and is therefore difficult to apply in teaching at

universities and polytechnic institutions. As a result of the processes involved in this type of e-learning, it is difficult for use in tertiary institutions because of its disadvantage for effective teaching or lecturing students.

Mode B: E-Learning without Presence and with Communication

With this model of e-learning, the teacher and the students never meet physically, but there is dialogue between the course participants and the teacher through the support of ICT based communication services, tools and facilities (World Bank 1991). This type of model demands some type of technical connectivity. Communication can either be asynchronous (e.g. e-mail communication) or synchronous (e.g. chat rooms). Communication can either be with a tutor or with fellow students. The model is almost as flexible as model A. As a tutor is involved in the learning process, the use of this type of e-learning system often demand the user to register as a participant, if he wants to receive advice from the tutor or teacher.

This model can therefore be used for teaching, where reflection and dialogue is important for the learning process. Model B is often used in situations, where flexibility in time and space is important. For instance it is used for offering cross-border teaching by American universities. It can be suitable for some tertiary institutions depending on the facilities and costs available for the proposed e-learning system.

Model C: E-learning with Combination of Occasional Presence:
Blended Learning

Model C of e-learning involves parts of the learning process taking place in a class room and other parts being done elsewhere (e.g. at home or at work) using ICT based learning facilities and tools. In this model, e-learning is combined with traditional class room teaching.

A wide spectrum of models is possible here. The "electronic" part can be with or without communication, and it can either be a minor supplement to the traditional teaching, or the traditional teaching can be a minor supplement to the "electronic" part of the course. Use of classroom teaching adds to the economic costs, but it also helps to make e-learning more efficient, as it facilitates a dialogue between students and lecturer-also outside the classroom. In most cases, e-learning is used to supplement traditional classroom teaching, (Word Bank 1991). Model C is suitable for implementation in Nigerian tertiary institutions since it has advantages over Models A and B and is more suitable and convenient for a tertiary institution's teaching and learning environment.

Model D: E-Learning as a Tool in Classroom Teaching

This type of e-learning involves al teaching being done in a classroom, and where computers are used as a learning tool. E-learning here is used as a tool in the traditional classroom teaching. The major advantage here is that it enables the use of modern pedagogic teaching methods. For instance use of games and scenarios in realistic settings. However, this model of e-learning is very expensive, because computers are used by the students as a learning tool. If a lot of students are admitted, it means a lot of computers have to be procured to meet the requirements of this model which will be very costly for the institution involved.

It is more appropriate to use this model if the participating students are not many, and if each of them can afford a computer (laptop).

E-Learning Experiences in Nigeria

For about ten years, the universities and polytechnics in Nigeria have had the unpleasant duty of rejecting a large number of qualified applicants every year as a result of their inability to admit not even half of the qualified applicants

for admission into their institution (World Bank 1991). As a result of the above and many other reasons some tertiary institutions have adopted distance education and e-learning as a viable complement to the conventional face-to-face education. This step is inspired by the vision that all Nigerians should have access to all forms of education and training regardless of where they live.

Some institutions outside the shores of Nigeria especially in the UK offer different programmes of study in Nigeria through distance education and e-learning. Some institutions that practice e-learning in Nigeria include:

University of Lagos (UNILAG). UNILAG offer programmes such as MSc in Information Technology, ICT professional courses and MBA in Finance through ICT usage for the Nigerian public. The Institute of Distance Learning offer programmes to the general public through distance education. The programmes involve both undergraduate and post graduate programmes.

The Resource Development International (RDI) founded in the year 1990 is a provider of high-level management development interventions that are interrelated and focused on the provision of skills development and performance enhancement for individuals and organizations, specializing in distance learning. RDI is the world's largest independent provider of UK University qualifications by e-learning and distance learning and comprises an international group of companies with its headquarters in Coventry, UK. RDI partners with a number of UK universities to provide its Professional Pathways portfolio of related higher education programmes. RDI markets and delivers these programmes worldwide through offices and partners across Asia, North America, Africa and Europe enrolling and supporting more than 3,000 new students each year.

In Nigeria, the RDI partners with various UK Universities for delivery of education through distance learning and e-learning. The universities in the UK in partnership with RDI Nigeria include: The University of Warwick, Bradford School of Management, University of Birmingham, University of East London, University of Sunderland, University of Wales, University of Derby, Teeside University, Sheffield Hallam University and Birmingham City University. Students in Nigeria apply for admission to the Universities mentioned above through the RDI office (Bloom and Chan 2006).

The RDI office helps students with admission procedures and serves as an intermediary between the student and the University being applied for. Upon successful admission to the University, the students pursue their programmes through distance learning and e-learning modes.

Drivers of E-Learning in Nigeria

Pressures have emerged from various stakeholders to implement e-learning technologies in mainstream tertiary education. The interest in putting in place e-learning technologies in tertiary educational institutions in Nigeria is influenced by a number of factors, one of which is the high demand for tertiary education, Nicholas and Anderson (2005). E-learning strategies are being aimed to meet the needs of a high number of workers and people who desire to upgrade themselves and meet the needs of lifelong learning, up skilling and quality improvement.

Challenges of E-Learning in Nigeria

Lack of access, particularly in the rural communities of developing countries such as Nigeria poses a significant challenge in realizing the full potential of ICT worldwide, Johanson and Adams (2004). Deploying traditional wired infrastructures in remote, sparsely populated areas has been commercially unfeasible and has

created a huge financial barrier to getting these communities connected to the internet, Nicholas and Anderson (2005). This limitation has created a "digital divide" a gap between those able to benefit from digital technology and those who cannot. Although socio-economic factors are the primary cause of the digital divide, additional factors including differing levels of literacy and technical skills, social and legal constraints, as well as access to relevant high-quality content. Poor infrastructure leads to unsavory experiences that can cause more damage to teachers, students and the learning experience. A community's inability to use ICT effectively also contributes to the digital divide. Location, culture, age and background significantly influence the use of ICT and e-learning in our institutions of higher learning.

Advantages and Disadvantages of E-Learning to Nigerian Trainers, Institutions and Learners
Advantages of E-Learning to the Trainer and Institution
The following are some of the advantages of e-learning to the Trainer or Institution:

1. **Overall Cost Reduction** is the single most influential factor in adopting e-learning. The elimination of costs associated with instructor's salaries, meeting room rentals, and student travel, lodging, and meals are directly quantifiable. The reduction of time spent away from the job by employees may be the most positive offshoot.

2. **Consistent Delivery** of content is possible with asynchronous, self-paced e-learning.

3. **Expert Knowledge** is communicated, but more importantly captured, with good e-learning and knowledge management systems, World Bank (1991).

Disadvantages of E-Leaning to the Trainer or Institution
1. E-learning is not however, the be all and end all to every training need.
2. **The Up-front Investment** required for an e-learning solution is larger due to development costs. Budgets, finance, accounts and cash flows will need to be available and negotiated.
3. **Technological Issues** that play a factor include whether the existing technology infrastructure can accomplish the training goals, whether additional technology expenditures can be justified, and whether compatibility of all software and hardware can be achieved.
4. **Inappropriate Content** for e-learning may exist according to some experts, though they are limited in number. The acquisition of skills that involve complex physical or emotional components (for example, juggling or mediation) cannot be augmented with e-learning.
5. **The Cultural Acceptance** is an issue in organizations where student demographics and psychographics may predispose them against using computers at all, let alone e-learning (World Bank 1991).

Advantages of E-Learning to the Leaner
Along with the increased retention, reduced learning time, and other aforementioned benefits to students, particular advantages of e-learning include:
1. **On-demand Learning Availability** enables students to complete training conveniently at off-hours or from home.
2. **Self-pacing** for slow or quick learner reduces stress and increases satisfaction.
3. **Interactivity** engages users, pushing them rather than pulling them through training.

4. **Learner Confidence** is achieved because refresher or quick reference materials are available and this reduces burden of responsibility of mastery.

5. **Learning Times** are reduced for students because they do not have to attend lectures in the classroom almost every day which causes fatigue as it is with the traditional method of learning.

6. **Portability** of training has become the strength of e-learning with the proliferation of enabled-Wi-Fi notebook computers and laptops. (World Bank 1991)

Disadvantages of E-learning to the Learner

The ways in which e-learning may not excel over other training modules include:

1. Technological Issues of the learners are most commonly technophobia and the required technologies may not be available for the learner.

2. Reduction of Social and Cultural physical interaction of students can be a drawback. The impersonality, suppression of communication mechanisms such as body language and elimination of peer-to-peer learning that are part of e-learning with advances in information and communications technologies will lessen social and cultural interaction of students as compared to traditional face-to-face education (World Bank 1991).

Contemporary Trends in E-Learning

The growing interest in e-learning seems to be coming from several directions. These include organizations that have traditional offered distance education programmes either in a single, dual or mixed mode setting. They see the incorporation of online learning in their repertoire as a logical extension of their distance education activities. The corporate sector, on the other hand, is interested in e-learning as a way of rationalizing the costs of their in-house staff training activities, Johanson and Adams (2004).

Findings and Discussions

Adopting e-learning the tertiary institutions in Nigeria can be beneficial in various ways:

1. Students no longer need to spend time traveling after work to a centre to attend lectures of a course, they can now have access to learning when they want it, the time you want it (day or night), wherever they want it – at home, at work, in your local library. For many students this would open up a new, much more flexible and accessible world of learning that was previously closed to them due to disability or family circumstances, or perhaps due to the fact that the university has not got the physical facilities to admit and accommodate on its campus. In other words, there are now no longer any geographical constraints to learning; e-learning brings learning to people, not people to learning.

2. Learning will be more exciting, engaging and compelling. Hard and boring subjects can now be made easier, more interesting and appealing with e-learning. For example, videos and documentaries of various courses or subjects which will give a better understanding to students can be displayed or shown through the e-learning system or a video conferencing centre (CEC 2001).

Conclusion

The paper looked at the use of information and communication technology (ICT) in tertiary education in Nigeria, a case study of electronic learning (e-learning). E-learning calls for overall cost reduction,

consistent delivery and expert knowledge by the trainer and institution to boost the knowledge acquired in tertiary education in Nigeria by the citizens. It is in the light of this and the increasing population growth of this country, e-learning can be seen as the way or solution to the various factors that prevents qualified applicants from gaining admission. In addition, e-learning can help provide avenues for working people and those who for one reason or the other have had to truncate their education for a number of years to re-enter or acquire higher education through other modes. It provides opportunities for lifelong learning.

Recommendation

This paper recommends that every tertiary institution in Nigeria should:

1. Introduce and implement e-learning as part of its educational structure, facilitation and delivery in order to sustain educational and economic development in Nigeria.

2. To sustain the e-learning system further research should be done on how to develop a business model for it.

3. Every tertiary institution should have an ICT complex that will be accessible by the students.

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