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The Adoption of the Mobile Phones in Maintaining Teaching and Learning Quality Assurance in Nigerian Private Universities

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Abstract

The inability of the public sector to satisfy the growing demand for University education necessitated the entry of the private sector operators into the Nigerian University System, to expand educational access. In as much as higher education is crucial to economic growth, it is thus expedient to consider the place of maintenance of quality assurance in the teaching and learning activities in these private universities. This is in order to generate a relevant theoretical and practical base for adoption by the management of private universities. This paper adopted a case study research design as a source of generation of lessons on the role of new Information and Communication Technologies (ICTs) on educational outcomes. Evidences were drawn on the extent to which mobile phone facilitated learning has contributed immensely to improving educational outcomes in Asia.

Key words: Nigerian University System, Quality Assurance, Teaching/Learning, Private Universities, Information and Communication Technologies.

Introduction

Education is widely accepted as a major instrument for promoting socio-economic, political and cultural development of any nation in the world. In this regard, it has always been seen as playing an important role in furthering the economic and particularly the human capital development of a nation (Schultz, 1961; 1982). Expanding education, especially at the tertiary level promotes economic growth. Thus, investment in human capital is important to ensure that educational provisions are made available to the new generations for the acquisition of the appropriate parts of the knowledge that was accumulated by previous generations. Furthermore, the new generation should be taught how the existing knowledge can be used up to develop new products at the various levels of education (Adedeji and Bamidele, 2003). By the 1980s, the problem of students’ inability to gain access into university
education in Nigeria was becoming serious, harassing and alarming to parents, policy makers and the society at large. Thus, in order to bridge the existing supply-demand gap, the Federal Government of Nigeria approved the establishment of forty-one private universities all spread over the six geopolitical zones of the country (NUC, 2009).

Quality Assurance is an all-embracing term referring to an ongoing, continuous process of evaluating (assessing, monitoring, guaranteeing, maintaining and improving) the quality of a higher education system, institutions or programmes (UNESCO, 2007). It can simply be defined as a system put in place to support performance according to standards. It implies a systematic way of establishing and maintaining quality improvement activities as an integral and sustainable part of systems or organizations. In education, this includes all activities that contribute to the design, assessment, monitoring of standards agreed upon by all stakeholders and improving quality of service delivery, client satisfaction and effective utilization of resources. It is thus a process of establishing stakeholders’ confidence that provision (input, process and outcomes) fulfils expectations or measures up to threshold minimum requirement.

The delivery of cost-effective and quality education remains a persistent problem in higher education. In an attempt to find viable solutions to these problems, much emphasis has been placed on new information and communication technologies (ICTS). It has been found out that ICTs empower teachers and learners by facilitating communication and interaction, offering new modes of delivery and generally transforming teaching and learning processes. Of the many different forms of ICTs, the mobile phones is thought, for several reasons to be a particularly suitable tool for advancing education in developing nations (Samrajiva and Zainudeen, 2008). According to this submission, the mobile phone is the most prevalent ICT in the developing world and its penetration rate is rising rapidly. Yelland (2001) puts it that traditional educational environments do not seem to be suitable for preparing learners to function effectively, and above all, be productive in the work places of today’s society. She
claims that organizations that do not incorporate the use of technologies in schools cannot seriously claim to prepare their students for life in the 21st century. This argument is supported by Grimus (2000) who pointed out that by teaching with information communication technology (ICT), skills at various levels of education, students are prepared to face future developments based on proper understanding of the curriculum. Several other literature reviews on ICT and learning have concluded that it has a great potential to enhance students’ achievement and teachers’ learning (Bransford, 2000). Wong et al (2006) pointed out that technology can play a part in supporting face to face teaching and learning in classrooms. Many researchers and theorists assert that e-learning can help students to become knowledgeable, reduce the amount of direct instructions given to them and give teachers an opportunity to help those students with particular needs. (Iding, Crosby, and Speitel, 2002; Shamantha, Peressini, and Meymaris, 2004; Romeo, 2006).

Furthermore, they are of the opinion that the integration of e-learning into education varies from curriculum to curriculum, place to place and class to class, depending on the ways in which it is applied. The application of e-learning into the core business of education can accelerate and improve learning on a number of fronts; from basic skills, problem solving, information management, work habits to concept development. It can provide means of gathering, connecting and analysing data about teaching & learning in ways that enable us to more accurately diagnose student need and evaluate programs.

Since private universities are relatively new in Nigeria, studies on private university education are still limited in scope and needs updating. More importantly, it is the hope of all stakeholders of private university education that the outputs of private universities will be able to compete favourably with their counterparts from the public university system. It is therefore expedient to conduct a study of this nature, concentrating on evidence from institutions in Asia where the use of mobile devices has been sampled among teachers and students. This study will also serve as a theoretical and empirical base for
suggesting other modes through which quality assurance could be maintained at the institutional management level in the area of teaching and learning methods in private university education. With competitive performance put in place, increased students’ enrolment into private university education in Nigeria will be enhanced. In line with these other modes of teaching and learning, several studies argue that the use of new technologies in the classroom is essential for providing opportunities for students to learn to operate in an information age. ICT has been found to qualitatively improve cognition by conceptualising more creativity, improving teachers’ knowledge and by tailoring learning resources to meet the particular needs of a child at every stage of his/her education.

The Role of Internet Enabled Mobile Phones in Promoting New Mode of Learning

The advent of Mobile Learning (ML) came with the invention of portable technologies and mobile devices. Mobile devices such as cell phones, personal digital assistants (PDAs), smart phones and so on carry powerful functions as do personal computers. Due to their identified characteristics of these mobile devices, they are regarded as teaching instruments in ML (Qu, 2007). Among the mobile devices, the cell phone is the most popular and widely used all over the world, especially in China which is now the world’s largest wireless market and has the greatest number of cell phone users (Leske, 2007). The number of cell phone users in China is impressive because of the advanced functions offered by cell phones such as text messaging, wireless interne-ting MP3 playing and Global positioning system (GPS). Compared with other countries, Chinese users do not adequately explore the functions of cell phones and this leads to a great waste of mobile resources. The powerful features and functions of mobile devices offer cell phone users such as teachers and instructional designers great potential and feasibility for educational use; especially in the mobile learning which will give people from diverse field a new way to learn. Nonetheless, Chinese users have yet seen the educational potential of the cell phone. Mobile learning has developed immensely in the United States of America, United Kingdom and other European countries while ML is still at its starting point in China. In the
transient history of ML, people performing in the technical platform have been exploring various
devices they could use to best facilitate the effects of ML. ML enable people to learn whenever and
wherever they want to. Mobile devices provide individuals with abundant and quality information and
materials for many benefits such as mobile learning, E-learning and so on.

Among the ML devices is the mobile phone which facilitates changes in learning modalities that in
turn impact educational outcomes. According to the proponents of this new learning, the mobile phone
facilitates designs for personalized learning in that it is responsive to diversity in the way learning
occurs. It facilitates designs for situated learning by providing learning during the course of the activity
in the field for a botany student, in the classroom for a teacher trainee, or in the workshop for an
engineer. The use of the mobile phones for learning purposes also facilitates designs for authentic
learning, meaning learning that targets the real world problems and involves projects of relevance and
interest to the learner (Kukulska, Hulme and Traxler, 2007). The use of the mobile phone in learning
exerts a democratizing effect on the learning experience as learners take a greater responsibility for the
learning process instead of being passively fed with information by an instructor. On the other hand, in
the traditional models of learning, the goal is the transfer of knowledge from teacher to student. The
use of mobile phones empowers students to actively participate in the learning process by making it a
process of construction and not mere instruction (Dela Pena- Bandalaria, 2007).

This new learning device theoretically makes learner-centred learning possible by enabling students to
customize the transfer of and access to information in order to build on their skills and knowledge and
meet their own educational goals (Sharples, 2007). As a facilitator of new learning, it goes beyond
placing emphasis on the possession of information which enables learners find, identify, manipulate
and evaluate existing information (Brown, 2000). It also facilitates a knowledge centred learning by
providing efficient and incentive methods by which students can learn with understanding- implying
that they deepen their understanding of a specific subject matter rather than merely memorising large
amounts of information and then using this knowledge as a basis for new learning through integration and interconnectivity. We proceed to discussing the development and usage of the major latest and widely used mobile devices in ML. They include: the handheld computer, audio and video players and the mobile phone.

(i) **The Hand Held Computers:** This is a portable computer which is small and can be held in one’s hand. At present, products such as Personal Digital Assistants (PDA’s) and smart phones are so advanced and versatile. There is hardly any distinction between them. They are convenient to carry and have computer-like functions. The hand held computer can be used to calculate, browse on line, send and receive e-mails, play music, typewrite, record video and audio, send fax, play games and make phone calls. The original hand held computer has a small keyboard and screen, while the latest version is more like PDAs using the stylus as an input device. Some of the new design use voice recognition technology through voice input. The smart phone is usually mobile phone-like and has more advanced functions than the cell phone. This device can enhance the classroom activity and expand the learning time and space (Lamb, 2008). The Learning Support Service (LSS) introduced, into tertiary institutions in China, integrated wireless handheld technology for the teaching and learning of foreign languages and cultures. The wireless handheld was received from big companies and three projects were developed from this. One of the projects provided pictures on line and asked students to partake in discussions. Students in the second project were engaged in a chat activity while those in the third were asked to view poems/write ups/notes on their hand held and then were required to submit their assignments. The experiment turned out “very popular chat sessions” between students and lecturers. It also “motivated students to produce both quantitative and qualitative responses to the target topic” (Becta, 2003).

(ii) **Audio and Video Players:** These include iPod, MP3 and MP4. While walking down the streets, it is a common sight to see pedestrians walking or exercising with one of these players. These
players are portable and simple to use. Each of them carries equal role in mobile learning. For instance, students can download, store, and playback instructional materials on any of these players whenever convenient. Universities in collaboration with an ICT company can arrange for course materials to be offered to students for download. Such course materials can capture course content and notes. They can even repeat listening to lectures that were previously delivered by the lecturers in the institution. Results have shown that the devices brought convenience in both teaching for the lecturers and learning for the students. There is flexibility in location (classroom teaching) and independent access to digital multimedia course materials outside the formal classroom teaching, greater student engagement and interest in what they are being taught.

(iii) **The Mobile Phone:** This is more prevalent and popular among the mobile learning devices. Available data as at 2004 puts it that there were almost three billion mobile phones subscribers worldwide. The mobile phone is making communication much easier to the extent that it will be very difficult to imagine life without a cell phone since people are accustomed to it. It is so advanced and smart that it actually performs almost the same functions and features as a personal computer. It is always with one from time to time. Researchers have proved that the mobile phone, like all other communication and computing devices can be used effectively to learn (Prensky, 2004).

**The Mobile Phones: Analysis of Basic and Up-to–Date Functions before Teaching and Learning can exist**

**Voice:** This is the basic function of the mobile phone. It is used to communicate. Every day, people all around the world spend a large amount of time talking through it. But the question is, “how can people best integrate the voice function of the mobile phones into education”. The response here is that some new types of the mobile phone are equipped with voice recorder with which people can record messages and then send them via the internet or Blue tooth. Another latest free source allows anyone to use their mobile phones to record voice (Kolb, 2008).
**SMS (Short Message Service):** SMS is a service that allows people to interchange text messages between mobile phones. A great number of short messages are sent every day and people have found out that sending SMS is a better means of communicating with other people compared to face to face communication. The SMS system can be used to help students learn different subjects and teachers can use SMS to communicate with one student or even a group of students.

**Browsing:** Browsing with the mobile phone is a very convenient way for students to obtain relevant information on their courses on-line, check E-mails through the browser, read instructional materials such as on line text books and access lectures through the provided course wares by the lecturers anywhere and anytime.

**Downloading:** Students can down load various kinds of materials into their mobile phones. There are many free on-line materials for users to download such as e-books, instructional materials and so on. Students can download their required e-books and read them at their convenience. Useful soft wares and dictionaries can also be downloaded by students through this device.

**The Application of Bybee’s (1997) Instructional Model to Mobile Learning Environment**

A prime consideration in the development of the application of Bybee’s (1997) model into an instructional framework was to consider the pedagogical needs of students, their comfort level with technology and access to technological devices. The issue of how to incorporate convenient mobile learning environment into educational instruction is a concern for higher institutions trying to incorporate unique learning opportunities into teaching patterns. Educational institutions need an instructional model that will help instruction implementers (lecturers) to create and maintain content and learning activities that will be delivered to their student population. Since societal changes have turned mobile technology into a prevalent feature in the daily lives of students, it is advisable for teachers to begin to realize that students’ fundamental knowledge of mobile phones, digital cameras and media players, can conveniently aid their learning without the need for additional training in the
technology. The increasing complexity and availability of software applications, camera, video and internet connection in even the cheapest of cell phones ensures that students have access to a wide range of technological resources (Maramba, 2008). An instructional model, is needed, that engages students in exploratory learning as long as they are familiar with technological devices (James, 2008). The main objective of the application of the Bybee’s (1997) 5E instructional model is to improve student knowledge outcomes through the creation of a more effective learning environment which may more accurately reflect real-life employment settings. The model was designed to address the process of learning, its application to mobile learning situations has been considered as a progression from theory to implementation. Students –based instructional models have been linked to greater learning gains. Rekkedal and Dye (2007) described the use of mobile phones in teaching and learning as “the student flexible learning model” which allows the student the freedom to go over the course wares for the different courses repeatedly, at varying times and places outside the classroom with the aid of self-directed constructive processes. In a study conducted by Cavus, Bicen and Akcil (2008), the ability of students to study and communicate with peers and teachers/lecturers, especially with e-mail forum and chat applications outside the classroom, through the use of mobile phones was perceived by students as highly significant. The 5E instructional model is made up of five model components. They are: Engagement, Exploration, Explanation, Extension and Evaluation. We proceed to discuss these components.

**Engagements:** Submissions in scholarly literature have indicated that mobile learning improves student autonomy and engagement by offering a flexible setting which improves accessibility to education, educational resources and increased communication capabilities within a learning community. Basaeed (2007) noted that mobile learning via the use of the mobile phone embraces a new student-centered framework that is very relevant to the individual. Also, the mobile phone has been found to motivate students to learn and have appreciable control/understanding of the curriculum
components. This, Scheiter and Gerjets (2007) refer to as Learner–Control. Students have also been found able to learn in context (Issroff, Scalon and Jones, 2007). Effective communication between teacher and student is also enhanced (Jones, Issroff, Scalon, Clough and Mc Andrew, 2006). In a study on Taiwanese students, Wang, Wu and Wang (2009) found that students were more likely to adopt mobile phones applications if it met effort and performance expectations and allowed for greater self management even while being socially influential and playful along the line. In order to improve student engagement, specific instructional tools and applications have been studied by several researchers. Singh and Zaitun (2006) found that classroom chat, synchronization of power point slides, accessing on line course ware through mobile phones, sending and receiving feedback and e-mail were all perceived as valuable learning experiences. Student engagement significantly increased when podcasting was used in instruction through the mobile phone for review sessions for student presentations and for supplemental material. Also, surveys among other students in other Asian countries indicate that the use of mobile devices (the mobile phone in particular) is more flexible and allow students freedom from time and place constraints. It allows for qualitative and frequency of communication and feedback.

**Exploration:** The use of the mobile phone for teaching and learning purposes enables teachers to facilitate questioning, sharing and communication with students thus building a collaborative teaching–learning environment. Avraamiodu (2008) reported on the results of a study on some sixth grade science students’ use of the mobile phone in teaching and learning. Using an inquiry based investigative framework in which data were gathered from students through qualitative interviews, the study revealed that students were more enthusiastic, highly motivated and were able to use the mobile phone and other handheld devices successfully. Myers (2007) employed the Student – Centered Problem Based Learning instructional method in an econometrics course to teach content matter and the use of mobile phones by graduate students. In this study, student survey findings revealed that the
use of the mobile phone for instructional purposes illustrated content better and further engaged students than the traditional methods of instruction. Also, a significant percentage was of the opinion that their learning was more effective than what it would have been if traditional methods of teaching were employed. Students also perceived that their ability to identify a problem, collect data, analyze the data by deriving constructive deductions had significantly improved. Finally, the students in Meyer’s study were more confident in their self-directed knowledge attainment.

**Explanation:** Communication between all learners can encourage the learning analysis process. Lan, Sung and Chang (2007) studied how mobile devices such as the mobile phone can be used to find solution to problems found in a traditional classroom collaboration setting. From the study, it was found out that increased mobility and user-friendly input/output interfaces facilitated greater individual collaboration and reading motivation. Bliss and Heinstzman (2006) found out that the mobile phone has facilitated small group discussions, by offering greater flexibility in seating choice and movement. Palmquist and Hochman (2005) extended the work of Bliss et al and noted that a classroom where all students utilize the mobile phone see the teacher as the authority figure and allows for other instructional configurations. Communications occur through individual reflection from teacher–student feedback, in small and large group settings and in facilitated classroom discussions. For face to face classes, the mobile phone can be used to further explain content, offer lecture content for absentee students, provide supplemental materials and to confirm students’ written notes. All of these applications extend the learning period beyond the traditional seat time.

Copley (2007) studied audio and video pod casting in an undergraduate course in a University setting and found out that while both materials had a high use rate, audio pod casts were downloaded significantly more often. This he explained is due to greater students’ accessibility to audio and media players and smaller file size. Students also downloaded podcasts at a high rate when they became available to reinforce learning, and before examinations, they used it to review the contents of the
course wares already provided for courses being taught. The podcast reviews by students served as explanatory resources.

**Extension:** The assumption here is that when students use their mobile phones for learning purposes outside the classroom, students’ attitude may be impacted if they begin to value the mobile phone for its convenience as a research tool and communication facilitator. Zhao and Okamoto (2008) proposed the use of a personalized mobile mathematics tutoring system to facilitate both the amount of practice needed to improve mathematics understanding as well as variation of questions and problems to encourage content analysis.

**Evaluation:** Meyers and Tally (2007) found out that electronic grading of hand written assignments is facilitated by the use of mobile learning devices such as the mobile phone. Since the student’s work is saved in a digitized form, file formats on the mobile phone are well suited for the instructor to mark up the submitted assignments. File organization was facilitated by the use of a single technology tool, and the use of the mobile device has contributed to the ease with which instructors assessed students’ work. Mckinney, Dyck and Luber (2009) conducted a study on the effect of mobile devices on students’ performance. They found out those students who listened to the teacher/lecturer/instructor and provided podcasts along with written notes while in the classrooms/lecture rooms had significantly higher test scores than students who only attended lectures on the content.

**The Mobile Phones and Quality Assurance in Private University Education- Lessons from Asia, United Kingdom and United States of America**

There is the general consensus that nations of the world have entered the information economy and that higher education is a critical element in this knowledge society. This has placed a new demand on its teaching, research and learning functions with increasing emphasis on more flexible forms of service delivery in higher education. Educational institutions in Nigeria are established to produce the most highly qualified individuals the country needs for its manpower requirements as a means and weapon of socio economic relevance and advancement in the society. Also, the proper management of the
academic curriculum determines the survival of the university in the economic long run. If the academic content of programmes and the mode of delivery in the university is one that ensures that highly proficient graduates are produced, such an institution will enjoy greater enrollment than others (NUC, 2005). Okafor (1971) linked two major reasons to the establishment of private universities in Nigeria. The first reason has to do with the need to bridge the supply-demand gap in higher education, while the second reason is more relevant to this study and that is, the search for qualitative university education.

The 21st century ushered in a new world order whereby the work place (labour market) is asking for graduates who have acquired a strong intellectual framework for accessing information in order to be creative. Also, high expectations wait graduates as they lunch into the labour market which is already saturated. It has been widely recognized that harnessing the power of modern technologies for learning purposes requires that appropriate learning strategies be developed. This will harmonize effectiveness in teaching and learning (Allen and Ainley, 2000). Furthermore, it enhances students’ better understanding of the academic content at all levels in the institution. Students in the private universities (PUs) pay exorbitant tuition fees for the provision of adequate facilities that will enhance their academic performance. They are unique. Thus, the outputs of this PUs are expected to be outstanding and above all, they should be able to compete favourably with their counterparts in the public universities. There is the need for teaching and learning at all levels in the PU to embrace new information and communication technology which has greater potential than the traditional modes of teaching and learning. Since most students in PUs have access to the mobile phone, lecturers in PUs can take the advantage of this resource and utilize it basically as a supplemental classroom resource. This will enhance a shift from teacher-centered to learner-centered learning method. The application of the Bybee’s 5E Instructional Model into the PU system will improve students’ knowledge outcomes through the creation of a more effective learning community. This accurately reflects real life
employment settings. Such an instructional model must include the exposition of students through the mobile phone, to the various course wares and interpersonal/ intra personal skills like team management and effective communication that employers value.

In Asia, the use of the mobile phone in education has increased in the last five years. Graduate students at King Mongkut’s Institute of Technology, North Bangkok, used it to participate in tests and more than 90% of the participants owned it themselves. The students sent short message service (SMS) to a given telephone number in order to respond to quiz questions shown on a projector screen. The scores of the mobile phone users were better than those of the traditional test method. Another study was conducted on the use of mobile phones technology for educational reform and increasing access to learning devices in tertiary institutions in Thailand. 56 students who were registered in the department of Technological Education were given similar tests through traditional pen and paper method as well as through audio-mobile and visual mobile methods. The visual method include the projection of questions on the screen to which students responded by sending their answers via SMS. The audio–mobile simulated model involved a tape recorder that played the questions out loud to which students then responded via SMS on their mobile phones. Findings later confirmed that the students who responded to questions via SMS performed much better than those that used the pen and paper traditional method.

In a related study, Thornton and Houser (2004) studied the use of the mobile phone in Japan to teach English as a second language (ESL). They reported that the mobile phone in Japan outnumbers personal computer by ratio five to one (5:1); and that while 43% of Japanese students use computer to send e-mail to their lecturers, 99% of their courses were transmitted through e-mail on their mobile phones. Thorton however emphasized the fact that the mobile phone is very useful in situations where class lecture hours for courses are limited. Students had the opportunity to continue interactions with their lecturers accompanied with immediate feedbacks.
Ramos, Trinona and Lambert (2006) found out that the educational uses of the mobile phone are increasing dramatically in the Philippines. They stated that “with dropping prices and increasing functionality, it is virtually certain that not too far into the future, all students in the Philippines will find it difficult to do without mobile phones for learning purposes”. The University of Philippines already has formal SMS-based courses in English, Mathematics and the Sciences. Ramos et al also reported that 80% of the students surveyed embraced the idea of learning through SMS. 81% of them also confirmed that they were ready to set aside a portion of their loaded credits to learn through SMS. Another test project was conducted on the viability of the use of the technology SMS on mobile phone usage for learning purposes among university students in the Philippines. A group of university students were enrolled for the Alternative Learning Services (ALS) of the Philippines Department of Education and were in turn split into SMS sub-group and non-SMS control group. This project which was led by the Motave Development Foundation Incorporated (MDFI) and funded by International Development Research Centre (IDRC) sought to explore the viability of SMS via mobile phones technologies. Two modules were designed for both English and Mathematics. The impact of the SMS modules was assessed by way of the ALS Accreditation and Equivalency (A&E) high school examination. Those in the experimental group followed the Project MIND SMS modules, while those in the control group did not. Both groups took the A&E examination (Ramos & Trinona, 2009). The A&E examination result revealed that the mean percentage correct score of those who passed in the SMS group was higher than those in the non-SMS group. Students indicated the flexibility in continuing their lessons during break time or having the opportunity of interacting with their lecturers at other times than the usual class contact. Furthermore, the students expressed excitement regarding the use of the mobile phone for teaching and learning purposes (Ramos, 2008). One of the students identified the fact that he was able to answer trivial questions with feedback as to whether the answers were right or wrong. The response was however immediate and thus allowed revisiting the error
instantly. Students also identified the fact that the courseware for each course was easy to follow. They also appreciated the fact that while studying, out of the classroom, they had the opportunity of interacting with their lecturers on technical issues which ordinarily would have been delayed to the next time scheduled for the affected course. SMS made learning more attractive. The SMS based curriculum facilitated an increase in the knowledge of the students that participated in the study (Ramos, 2008).

A group of students in Mongolia have also found SMS educational use less expensive and as a popular alternative to other means of learning. For instance, 94% of learners are willing to use SMS for learning purposes (Batchuluun, 2007). Batchuluun concluded that the mobile phone is a vital resource which should be maximally utilized to aid learning in developing countries. He however cautions that the programming and developing of SMS content and the cost of access must be carefully considered, and a good balance found between providing adequate learning content and charging not more than students are willing to spend. Brown (2003) observed that information provided via SMS messages were large and almost immediate compared to posted SMS which delayed information reaching learners between three and eighteen days. Communication bottlenecks are broken by communicating directly with students. In many countries in Asia, the implementation of e-learning programmes through the mobile phone for higher education involves the consideration of issues associated with infrastructures, pedagogic considerations and the need to associate the usefulness of technology to enhance the learning experience of students. The use of mobile phone along technological path has potentially enhanced the learning process but has not replaced the lecturer or tutor. It was found out that through the use of the mobile phone for teaching and learning purposes, lecturers, in particular, have been able to provide qualitative lecture materials in the form of student’s access to the course wares of different courses. Flexibility in meeting the diverse questions of students on the various topics taught in the classrooms is also made possible, as students’ requests are given prompt responses by
lecturers as and when needed. This however implies that courses are inevitably prepared to suit differing educational needs and aspirations of students (Brown, 2003). Suggestions were however made on the need for lecturers to forcefully change their approach to teaching in order to accommodate the shift in student learning styles. The associated implication of increased workload requires a proactive and effective management. It was also emphasized that the fundamental structure of universities in developing nations cannot retain their traditional structure of facilities, service delivery modes and classroom based activities. With the mobile phone in teaching and learning, students are initially granted face to face sessions on how to access, use courseware or other electronic resources, and can be supplemented with additional help such as “pop up” boxes in the electronic course material providing them with directions and advice.

There was a case study of a School-Based In Service Secondary Teacher Training in Bangladesh. The pilot project sought to determine whether mobile phone-supported education could serve as an effective modality for in-service secondary teacher training in Bangladesh. The training curriculum was revised from a two-week face-to-face workshop to pilot six weeks education programme consisting of 12 units. Mobile phones were made available to the trainees. This allowed the trainer to diffuse reminders, send motivational messages and assessment questions to the trainees via SMS. Trainees were also allowed to communicate with the trainer in order to pose questions, request for instructional materials or respond to assessment questions. They were also able to communicate among themselves. Feedback from participants provided greater indication of mobile phone assisted education. Evaluation revealed high satisfaction with the content and effectiveness of the training programme. The programme was learner-centered and participatory. Trainees were able to apply lessons learned in the classroom to real life situations through expositions to various examples beyond those given in the classrooms.

Volery and Lord (2000) in their own submission on the use of the mobile phone in teaching and
learning in higher education reported that the success of the technological infrastructure also has implications for the success of mobile learning, which should not be overlooked. These implications are categorized as barriers to the learning process. They include: malfunctioning hardware, software configuration, slow or down servers, busy signals and lack of access. Nevertheless, it is noteworthy that higher education demands a change in the service delivery of university lecturers. Traditional teaching and learning skills need a change in order to get maximum benefit from the mobile phone which most students use only for fun outside communication (Mcfadzean, 2001). Lecturers are faced with the new task of developing a new model of effective teaching. Mcfadzean (2001) emphasizes the effectiveness accompanying the use of the mobile phone in teaching and learning. He proceeds to identifying certain criteria for the use of the device in teaching and learning. They include: psychological aspect of learning, the need to shift from behavioural and cognitive approaches (whereby the lecturer controls the learning) to a humanistic approach, where learners can take control of their own learning. This approach suggests that, the aim of education is to assist students to achieve self-actualization, and consequently, the role of the lecturer shifts from that of an information provider to that of supporting-encouraging students to feeding their own community with what they have learnt.

A research conducted on universities in the United Kingdom (UK) reveals that there is widespread use of the mobile phone across UK with even 80% of young people having access to a mobile phone. For this reason, it becomes very personal in nature, has a constant presence on the user and is highly important to the teenage and young adults’ identity. This indicates that this technology holds high potentials for the individual and collaborative learning. The infrastructure supporting this project includes a Learning Management System (LMS) and a custom designed micro portal; interface m-portal contributed by project partner Ultralab. This facilitates access to m-learning materials and services from a variety of mobile devices plus web and TV access. Technologies such as SMS, VoiceXML and picture messaging are implemented in a device-independent way via mobile phones,
smart phones, handheld computers and networked personal computers. M-learning evaluations, rather than measuring specific learning gains, seek to measure changes in attitudes towards learning. In the first phase trial, 34 students took part in a one week trials in four locations. Initial response from the participants was highly enthusiastic and this helped them to develop a heightened interest in improving their academic performance (O’Neill et al, 2004).

In the United States of America (USA), the use of the mobile phone in teaching and learning produces unique educational characteristics such as portability, content, connectivity and individuality. University students come for lectures increasingly equipped with mobile devices, most notably mobile phones which allow quick and easy communication and information sharing. Casual observation shows that the average university student has a mobile phone while considerably fewer own PDA, laptop or a personal computer. The mobile phone has transformed students in terms of how the students interact with their colleagues and their lecturers. The academic performance of students in the sampled universities has also improved tremendously (Famer, 2003).

The engagement component of the instructional model is to improve students’ autonomy and motivation towards learning. The exploration content on the other hand creates more pedagogically valuable educational experiences through the mobile phone. The explanation content is concerned with how interactive sessions between a student and the lecturer through several SMS via the mobile phone can improve educational outcomes. There is also the extension component which considers how instructional teaching methods and learning can continue outside the classroom. Finally, the evaluation component explains how information collection and assessment procedures can occur in a mobile setting in order to measure instructional effectiveness.

Researchers have shown that institutions cannot retain their traditional structure in terms of facilities/service delivery via formal lectures and class-based activities, and derive the best academic performance from their students. They confirm that there is conflict between teacher-centered
pedagogy in the higher education system and student-centered pedagogy that accompanied the introduction of information communication technology. However, the problems associated with this change must be fully understood and taken into account prior to the transition taking place.

**Conclusion**

Pedagogical and socio-economic forces have driven institutions of higher learning in Asia, United Kingdom and the United States to adopt and incorporate continuously new information and communication technologies into teaching and learning. This is accompanied by the shift from teacher-centered to learner-centered learning means, through mobile technological devices (the mobile phone). The introduction of new technologies in teaching and learning enhances better training of students and an improved mastery of the various courses being taught in the institutions. It provides for the pedagogical needs of students even in the face of fallen standards of education. Students end up being independent in learning, more engaged, have better capability to explore and derive information on various courses they are being taught. They also have the opportunity/access to the course wares of various courses independently, and severally. They are exposed to better communication between them and their lecturers even outside the classroom (Extension). In the final analysis, students are better prepared for the labour market expectations in the nearest future. For private universities to remain unique and take their rightful place in higher education, they have to explore new technologies in teaching and learning, that would improve the understanding and performance of their students and make them comparable (if not better), to their counterparts in the public setting.

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ICT, Gender and the Socio-Economic Dynamics of ODL: A Critical Perspective.

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Abstract

Education is growing at a phenomenal pace. Inclusiveness has been accommodated by the advantages that come with ICT and its link to ODL. The human capital levels of women stand far below that of men in institutions of higher learning. Whereas women (and the youth) are bound to reap abundantly from the much compensation that ICTs and ODL have to offer, it is the presupposition of this article that such an effort is fraught with obstacles. The article seeks to answer three basic questions; is ODL a conceivable socio-economic facility for the empowerment of women in Sub-Saharan Africa?, can the gender knowledge divide be equitably bridged via the ODL process?, and what are the drivers of success in enabling ODL to serve women?. This article assumes a critical-conceptual approach to analyze the setbacks accompanying the exploitation of ICT in particular and ODL in general, while at the same time fronting justification for the use of the programme from an equitable perspective.

Keywords: ICT; ODL; gender, Human Capital; empowerment; knowledge divide.

Introduction

Distance education has variously been defined as a process involving “teaching at a distance” and “is characterised by the separation of teacher and learner and of the learner from the learning group” (Agalo, 2007, p. 197). Guri-Rosenblit, (2009) says that distance learning entails the endeavour of reaching out to students, wherever they live or wish to study without necessarily having them converge in a central location, such as a built-up brick and mortar establishment. According to Slagter van Tryon & Bishop (2009), distance learning is all about “Web-based course offerings and the great promise of anytime any place learning” (p. 291). It is necessary to note early in this discourse that scholars have made distinctions between distance educations and e-learning, with the understanding that e-learning is a platform for improving the delivery of distance education (Agalo, 2007; Guri-Rosenblit, 2009).
Other writers have described distance education as web-based learning (Leary & Berge, 2007), open distance learning (Pityana, 2004) and online learning (Slagter van Tryon & Bishop, 2009).

Distance education represents a crucial facility in enabling access to and participation in higher education (Altbach, et al., 2009; Alhabshi & Hakim, 2006; Juma, 2006). In this light, distance education typifies the promise “for higher education systems around the world struggling to meet the needs of growing and changing student populations” (Altbach, et al., 2009, p. xviii). Discrepancies and inequalities in access are largely related to socio-economic factors of education cost and socio-cultural complexities affecting women in education (Ivosevic, 2008; Kadenyi & Kamunyu, 2007; Mbilinyi, 2000, Jacobs, 1996).

Particularly in Sub-Saharan Africa, studies have shown that access and participation rates in higher education are rather dismal amongst women. This is attributed to societal inculcation of cultural beliefs (Kadenyi & Kamunyu, 2007), resistance to expand boarding facilities to include women with specific gender needs (Mbilinyi, 2000) and blocking or ‘gate keeping’ the career paths of women (Hartmann, 2008). It is similarly argued that while men receive support from within the family to focus on their careers, women often divide their time since they don’t receive the same amount of support, if they receive any family or societal support at all (Ivosevic, 2008). Indeed, Altbach, et al., (2009), in reference to women and other disenfranchised groups, notes that “providing higher education to all sectors of a nation's population means confronting social inequalities deeply rooted in history, culture and economic structure that influence an individual's ability to compete” (p. vii).

It is the argument of this article that the poor access to and participation of women in higher education would most probably find their solution in distance education and the various electronic platforms of ICT. In as much as this is feasible, it is also the line of reasoning of this article that there are perceived challenges that need to be confronted in an effort to ensure the sustainability of the distance education
programme serving higher education in Sub-Saharan Africa. Distance education represents an area of enormous potential for higher education systems around the world struggling to meet the needs of growing and changing student populations. Much of the appeal of distance education is attributed to its ability to accommodate the needs of a wide variety of learners (students located far from educational centres, employed adults, women who are attempting to balance family and school commitments) and even the incarcerated (Altbach, et al., 2009). Women stand to reap greater benefits from distance education that is supported by ICT since ICT’s proliferation would ensure the availability of distance education right in their homes, workplaces and business premises (see for example Agalo, 2007).

**Distance education: the accomplishments**

Distance learning has made higher education significantly more accessible, particularly in rural Africa, and gainfully, women have made important strides in gaining access to higher education (Altbach, et al., 2009; Pityana, 2004). This progress augurs well for women with the aspiration of improving their human resources and business potentials. It is also noted that the pilot phase of the African Virtual University (AVU) project witnessed a large enrolment of African women in specialist programmes (Juma, 2006). The apparent shift of women from traditional courses to specialist programmes such as IT and engineering, for example, is a clear testimony of distance education supporting women in their endeavour to be marketable internationally. With distance education, other benefits follow. In fact in some fields, such as management studies and information technology itself, distance education has become a significant player (Altbach, et al., 2009; Agalo, 2007).

Another accomplishment in distance education is in the spirit of internationalisation of education. It is estimated that more than 2.5 million students are studying outside their home countries and this statistics may rise to 7 million international students by 2020 (Altbach, et al., 2009). The issue of students’ mobility and the restrictions that accompany this mobility, such as visas, should find a
solution in distance education. Even though it is extremely difficult to compute the numbers of students engaged in distance education worldwide, “the existence of nearly 24 mega-universities, a number of which boast (sic) over one million students, speaks to a quantitatively significant phenomenon” (Altbach, et al., 2009, p. xvii). In Africa, efforts by facilities such as AVU are meant to complement and strengthen the ongoing efforts to increase access to tertiary and continuing education in Africa by reaching a large number of students, especially women, and professionals in multiple sites simultaneously (Juma, 2006).

Distance education has been celebrated as a prime facility in improving the quality of education by “tapping the best African and global academic resources” (Juma, 2006, p. 334). Since distance education guarantees access for women, a larger number of women are bound to be part and parcel of this academe, ascending to the top of the faculty and successfully contributing to research and development.

A Window of opportunities: the internet

The Kenyan government appreciates and recognizes that an ICT literate workforce is the foundation on which Kenya can acquire the status of a knowledge economy (Republic of Kenya, 2005b). It is argued that the successful use of ICT in education and training institutions will play a major role in disseminating skills to the wider society and thus create positive impacts in the economy (Republic of Kenya, 2005a). Economies and educational systems should perform and measure up to global standards so as to be sustainable in a world of global competition. For example, to stay ahead, education is shifting from the parameters of pedagogy to accommodate the rapid technological and socioeconomic changes (Agalo, 2007). ICT in education is therefore seen as expanding learning opportunities, facilities, and channels of curriculum delivery (Republic of Kenya, 2005b).
ICT mediated pedagogy in distance education has several implications. First, conventional interpersonal face-to-face communication is being replaced by a personal mode of communication mediated by technology (Agalo, 2007). This implies that ICT use provides new opportunities for teaching and learning, including, offering opportunity for more student centred teaching, opportunity to reach more learners, greater collaborations and communication, enthusiasm in learning and offering access to a wider range of courses (Republic of Kenya, 2005a).

Second, the distance learning landscape has been transformed by ICTs, allowing for real growth in numbers and types of providers, curriculum developers, modes of delivery and pedagogical innovations (Altbach, et al., 2009). Of recent, multimedia communication has come into use in many parts of the world, where distance education students have easy and immediate access to the distributed information and computing services in the media including voice, text, data, sound, graphics, and motion pictures, without the concern of time, location and medium (Agalo, 2007). Apparently, this happens to be a workable solution to the thorny issues of overcrowded lecture halls and insufficient or outdated library resources.

Third, an online education model tailored on the ICT platform will encourage more working class people to register for higher education programmes, because these are convenient, cheaper and of high quality (Alhabshi & Hakim, 2006, p.93). This provides opportunities for all cadres of students. For example, registered full-time students will find time to earn some income through part-time employment; those working full time can take courses on a part-time basis. In this way, lifelong learning is encouraged, and education is customized and provided according to the students’ own pace, so that they can opt to take a heavy course load and graduate early, or a light load and graduate a little later (Alhabshi & Hakim, 2006).
Challenges

Quality

Risks and challenges accompany distance education as a mode of education delivery. The most difficult challenge relates to quality assurance (Altbach, et al., 2009)....With many new providers offering options for postsecondary studies, it is sometimes difficult to distinguish legitimate institutions from diploma or degree mills that make credentials available for purchase. (Altbach, et al., 2009).

The expansion (and acceptance) of distance education providers is an avenue for questionable and fraudulent suppliers of educational credentials (Kimani, 2008 as quoted in Altbach, et al., 2009). The global economy is liberalised, thereby eliminating business and commercial barriers around the world. This has made it increasingly possible for educational providers to operate across borders. Quality-assurance and accreditations agencies are therefore handicapped in tracking fraudulent entities and diploma mills (Mason, 2006). This has the implication that the credentials acquired in distance education programmes are suspect. Yet these credentials are meant to leverage women in their quest for achievement in higher education circles.

The other quality risk revolves around proficiency of teachers in the field of ICT. Universities in sub-Saharan Africa suffer from low numbers of trained faculty in the area of ICT in education (Sagna, 2006). This is further compounded by faculty with non-existent levels of research, outmoded programmes and poor quality of educational materials (Juma, 2006). This means that the design of the learning experience and the student support services are grossly compromised. The upshot is that learning outcomes in distance education will be held in suspect thereby deterring any other would be enrollees from the programme. If those deterred are women, the dilemmas of access and equity will once again crop up.
Costs and Infrastructural constraints

The cost of ICT infrastructure remains an enormous barrier to access in distance education. Some parts of the world, particularly Africa, remain relatively underserved by high-speed Internet access (Altbach, et al., 2009; Leary & Berge, 2007). For example, the technologies in use in most Kenyan DE delivery systems have been print, TV and radio although the use has not been very effective, and in some cases such installations have stalled (Agalo, 2007). Without connectivity, distance learning degenerates into the old correspondence course model of independent study as the student becomes autonomous and isolated (Adegbile & Oyekanmi, 2009). Moreover, the ever-increasing ICT infrastructural cost impedes the use of ICT in teaching, research, and scientific and technical information (Sagna, 2006).

The disparity in ICT’s quality and access is seen also across rural and urban settings within the same country. Phone and Internet access, power supply (and reliability), and requisite infrastructure are often more available in the main urban areas. Rural areas are less likely to have the necessary modern infrastructure, and rural families are unlikely to have the equipment necessary to participate in distance programmes (Usher, 2009). Consequently, rural women seeking higher education opportunities are disadvantaged since they have less income, education, time, mobility, and face religious and/or cultural constraints that restrict their access to, and use of, technology (Odame, 2005). There is also the worry that within the rural setups themselves, children of parents without postsecondary education will not possess the discipline and self-motivation to make distance technology a viable alternative to presentable learning (Altbach, et al., 2009).

Policy misconceptions

Universities have continued to enrol large numbers of students in arts disciplines at the expense of scientific and technical fields, notwithstanding the greater relevance of the latter to development issues (Kadenyi and Kamunyu, 2007). One reason, in particular, why African countries have allowed courses
in the humanities to expand are that they are less costly than those in scientific and technical fields (Sagna, 2006, p. 142). The ratio of women to men tends to be higher in vocational and intermediate degree programmes in many countries, although this appears to be changing (Vincent-Lancrin, 2008). To a large extent, many African universities have failed to remain relevant in a rapidly changing world, as a disproportionate number of their students graduate in the humanities rather than in the fields of science and engineering (Juma, 2006).

Worldwide, women represent roughly half of the enrolment, but closer inspection shows similar unevenness in their distribution across fields of study. For example, women represented 21 percent of the enrolment in engineering, manufacturing, and construction in 2000 and only improved to 23 percent of the enrolment in those fields by 2007 (Ivosevic, 2008). Interestingly, women represented 65 percent of the enrolment in education in 2000, and this grew to 68 percent in 2007 (see for example Altbach, et al., 2009; Malzer, 2008; Kadenyi & Kamunyu, 2007; Kinuthia, W. (2009).

Unregulated access to particular fields of studies can lead to over-enrolment, which, in turn, can adversely affect the quality of programmes and the student experience within them. After graduation, employment prospects can be scarce for those coming out of overenrolled programmes. This is problematic not only for individuals but also for societies facing workforce surpluses in some areas and shortages in others. (Altbach, et al., 2009). Malzer, (2008) adds another twist to this issue by arguing that females are more likely to take up cheaper studies than males. There are also significant differences in the returns of these different areas of studies. It is argued that usually, salaries in the field of the so-called soft subjects (education, social science, etc.) are smaller than for a hard science (engineering, technology, etc.) which also means that females are going to take longer to pay back their student loans than males.
Socio-cultural issues

Wise, et al., (2009) say that despite the promise of distance education, a research reveals that online course discussions often have low levels of interactivity between learners and that developing online learning communities with rich dialogue is extremely challenging. Many factors contribute to the problem of low-quality interactions in online conversations, chief among them being a lack of shared context (Wise & Duffy, 2008). This implies that without a shared context as a reference point, conversations often remain at a superficial level or result in miscommunication, thus resulting in low performance.

Adegbile & Oyekanmi (2009) observe that women, because of their lack of time management skills, form the greater percentage of dropouts among distance learners. They often need to organize more than their academic responsibilities and have high private as well as societal expectations to fulfill in terms of their more traditional roles in families, while their male colleagues have more family support which enables them to focus on their academic career (Ivosevic, 2008). The reasons for the slow progression of women through the academic hierarchy could be two-fold. On one hand, women, especially in the early stages of their careers, have to organise their time between two careers—one in academia, and one with their family (Ivosevic, 2008; Kadenyi & Kamunyu, 2007). Thus, for instance, girls are brought up to become nurturing women, who pay attention to relationships and consensus building, while boys learn to become assertive, task oriented men who are more interested in solving problems than building relationships (Mbilinyi, 2000). Consensus building on distance education platforms is quite tricky thus creating apathy and eventually dropouts among women.

Slagter van Tryona & Bishop (2009) argue that despite the continued growth of Web-based course offerings and the great promise of anytime any place learning, it appears that higher than average attrition rates remain an issue for online learning. Students in online courses continue to report feelings of social disconnectedness, missing the familiar teacher immediacy, and likewise missing the
interpersonal interactions and social cues they more typically have when learning face to face (Menchaca & Bekele, 2008). According to social learning theorists, successful learning takes place in an environment where individuals can construct ideas, culture, histories, and meaning as the result of ongoing social interactions and collaborative functioning.

**Recommendations and conclusions**

In order to ameliorate quality concerns, international mechanisms for quality assurance incorporating higher education institutions and employers are required. Such mechanisms may involve assessing the impact or reception of the graduates of the institution in the workplace, perceptions by industry as well as the progress of the universities alumni (Pityana, 2004). Moreover, secure portals with validated information about the authenticity of online education providers should help online education seekers distinguish legitimate from bogus documents and institutions (Altbach, et al., 2009).

About pedagogy, efforts should be made to align the curriculum and teaching approaches to students’ needs, interests, learning styles, and previous experience, especially if these students are underrepresented (Altbach, et al., 2009). Moreover, there is the need for pedagogically sound integration of ICTs in lecturers’ teaching. This will call for both technical support and professional development for lecturers to use ICTs in their teaching and learning needs.

Since online learners suffer disengagements and lack of interactivity, more time should be allocated to establishing relationships online. Slagter van Tryona & Bishop (2009) suggest that instructional materials that address online group effectiveness, formation, planning, and facilitation be included for students in their course materials. This will encourage collaborative learning environments where students develop networks of communication as they work to achieve learning goals. D’Antoni, (2006) also suggests that students take more responsibility for their own learning and take an active role in the learning process.
Finally, the infrastructural challenges are best approached from the public private partnership (PPP) perspective. Foundations, philanthropists and leading corporations in ICT have the responsibility of creating a steadfast partnership with universities in Africa to reorganize the ICT infrastructure through funding and scholarship. For example, Leary & Berge (2007) say that a consortium of American foundations, including Carnegie Corporation of New York, The Ford Foundation, The John D and Catherine T. MacArthur Foundation, and the Rockefeller Foundation, are now investing 350 million dollars in an effort with 11 African universities (in Mozambique, Tanzania, Ghana, Nigeria, Uganda and 2 education organizations) to significantly increase the Internet bandwidth capacity. This is a single project that will significantly increase numerous universities’ capacity to further develop and integrate web-based training modules into their DE programs.

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GLOBAL DIGITAL REVOLUTION AND AFRICA: TRANSFORMING NIGERIAN UNIVERSITIES TO WORLD CLASS INSTITUTIONS

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Abstract

This study examined the global digital revolution and the transformation of Nigerian universities. The study overviewed university developments worldwide in line with what obtains in Nigeria. The study highlighted the several challenges that face Nigerian universities inclusive of poor funding, poor personnel and the poor exposure to global academic events. The paper used the checklist method to obtain information from Nigerian universities’ administrators to be able to expose areas of strength, weaknesses and threats in the information development foundations of Nigerian universities. The study looked at the global rankings of universities and observed the position of Nigeria in relation to these rankings and presented its findings with tables adapted from works on university rankings. Among others, it was therefore recommended that, universities should be well funded, National infrastructure capable of impacting the ICT in the nation positively should be well rejuvenated and finally, conclusion.

Key words: Global, digital revolution, Africa, world class institutions, Nigerian universities.
Introduction

The term “digital” or “digitalization” has been of essence and significance to the academic world particularly in the last millennium into the present one. The initial thing was automation that had to do with computers, information management, records management and the use of analogue equipment. As the 20th century drew to a close, the last two decades of the century witnessed very rapid changes in the digital environment with automation changing from analogue to digital operations. Again, the arrival of electronic equipment revolutionised the whole industry; these were the Personal Computer (PC) and the internet. Their arrival of into the international scene changed the face of communication. The arrival of the Internet brought in its trail, globalization since communication was made easier. The dissemination of information became electronic influencing all other aspects of life endeavour. Most people have often wondered: ‘where is the position of Africa in the wake of these world explosions in knowledge and electronics?’ The answer though plain, is yet to be too clear but obvious. In recent times, global knowledge has been undergoing comparisons in the form of world universities rankings and accreditations. This is with a view to finding out how each university, compare to her counterparts, and fares in the world. It is clear from foregoing that Africa is behind the other continents especially in the area of higher education. A second problem lies in the fact that African universities have no place in the current global universities’ ranking conducted by Times Higher Education and some other international bodies. In the 2010 world universities ranking, the University of Cairo in Egypt was the first in Africa to be ranked (CISCO, 2010) and it came up at the position of one hundred and seventy four (174th) and appeared between 400 - 500 position when the ranking was made for the best 1,000 universities in the world. The initial universities were from the western world, the Far East countries, and Asia and Australian countries. But Africa only managed to score a position among the first 200 of which when reviewed several gaps could be observed.
Despite the important role Africa plays in global affairs, it is yet to have a pride of place in global educational development and worse still is the positioning of Nigerian universities. Of most concern to this study is the fact that the current number of universities licensed and operational in Nigeria is one hundred and four with forty four of them being Federal government owned. Others are owned by State governments and the private sector. None of these universities was listed among the best in the world but only managed to secure some spaces among the best 100 in Africa. They are universities of Ilorin, OAU - Ife, Ibadan, Jos and Lagos, all first and second generation universities in Nigeria, with none from the states and the private sector (Top Africa, 2010). The results of such rankings often embarked upon by designated global and regional ranking bodies call to question the type of universities and university education being operated and their relevance to global knowledge database. Each year, students pass through harrowing experiences to find places among the few vacancies in our university institutions but the world either seem to be leaving Africa and Nigeria behind or has failed to recognize the challenges of African institutions. The purpose of this study is to attempt to review the African universities’ situation against their counterparts elsewhere and the challenges in other parts of the world. Also, it seeks to find out the educational reparations/foundations in the present global dispensation of technology and the technology driven knowledge resources required to operate effectively by Nigerian universities. It therefore specifically seeks ways of improving on the present situation viz - a viz the performance of their counterparts in the other parts of the world. The study tries to unveil the challenges facing African universities in general and Nigerian universities specifically.

Adekanbi (2008) was able to highlight some of the challenges facing African universities. They include among other things; poor educational infrastructure, poor national planning, poor human resources at the university level, poor leadership that does not recognise the role of good governance in higher education, poor budgetary allocations to education and several other technical aspects of education that need to be addressed. Adekanbi (2008) also traced the origin of university to the tenth
and eleventh centuries citing the establishment of the universities of Bologna in Italy, Cambridge and Oxford in the UK University came into existence in Africa in the 20th century and this may still account for its perceived backwardness, especially, in Nigeria.

**Methodology**

The study employed the survey research design to investigate the availability of ICT materials among Nigerian universities. This is with a view to positioning them for the new ICT global dispensation; especially the first and second generation universities owned by the Federal government of Nigeria. The number of first and second generation universities is 13 out of which 7 were selected for the study. The perception of Administrative staff was elicited through research checklist to find out the ICT infrastructure available to Nigerian universities. The findings were presented in descriptive statistics. The target population were Directors of academic planning, ICT and Management Information Systems in universities. The data collected has been condensed into tables to give true pictures of Nigeria’s ICT preparation at higher education levels. Secondary data were collected from the internet on world rated universities as well as visits to different universities’ websites. The following research questions were raised to guide the study;

**Theoretical Frame Work**

This study will prefer to utilize the information capacity theory as its theoretical frame work. The theory emphasizes the importance of information in management, managerial decision making, and the antecedents that enables decision makers take decisions that include; such antecedents that could be found within the decision maker, environmental factors, sources of information and the purpose for which information is sought. Several scholars who have made use and referred to the information capacity theory include (Okwillagwe, 1995; Aiyekpeku, 1978; Tamiyu, 1990 and Erwat, 2004). The relevance of this theory to this work is its in depth self propelling devices for information. In Nigerian
universities, for example, there is the need to look inwards to become world class universities. Environmental and national factors are inclusive of what make a university unique as universities operate within the frame work of global, regional and national policies. Furthermore, infrastructure and funding that could make universities take decision and become autonomous to face their onerous task of teaching and research are also controlled principally by environmental factors. Nigerian universities are caught in the web of environmental and macro policies from which they have to develop their own policies.

**Research Question 1:**
What are the observable differences between African universities and their world rated counterparts?

**Research Question 2:**
Are Nigerian universities properly positioned for the global digital competition?

**Research Question 3:**
What are the challenges facing Nigerian universities in attaining world class university status?

**Research Question 1:**
This research question enables the study to identify world rated universities and some perceived popular African and Nigerian universities. These African and Nigerian universities have been selected in terms of age and positions occupied in either national or regional education forums while the world rated universities were extracted and investigated from the internet. A look at the table below show some of the universities as displayed in the World Wide Web.
Table 1: showing selected 20 world rated American universities for the years listed

<table>
<thead>
<tr>
<th>S/N</th>
<th>Institution</th>
<th>Continent</th>
<th>2003</th>
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<td>1.</td>
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<td>Stanford university</td>
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<td>University of California, Berkeley</td>
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<td>4.</td>
<td>University of Cambridge, MA</td>
<td>USA</td>
<td>5</td>
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<td>USA</td>
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<td>USA</td>
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<td>19.</td>
<td>University of California, San Francisco</td>
<td>USA</td>
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<td>20.</td>
<td>University of Tokyo</td>
<td>USA</td>
<td>19</td>
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**Table 2:** showing selected 20 European rated world universities For 2009 ranked for open access

<table>
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<tr>
<th>S/N</th>
<th>Institution</th>
<th>Scopus</th>
<th>Scholar</th>
<th>%Score</th>
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<td>2.</td>
<td>University of Cambridge</td>
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<td>8,320</td>
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<td>3.</td>
<td>University of Oxford</td>
<td>99,723</td>
<td>7,800</td>
<td>7.2</td>
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<td>4.</td>
<td>Imperial College, London</td>
<td>91,537</td>
<td>4,720</td>
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<td>University of Manchester</td>
<td>83,024</td>
<td>3,840</td>
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<td>King’s College, London</td>
<td>60,407</td>
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<td>University of Edinburgh</td>
<td>57,473</td>
<td>9,920</td>
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<td>University of Bristol</td>
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<td>50,337</td>
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<td>14.</td>
<td>University of Southampton</td>
<td>44,013</td>
<td>14,000</td>
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<td>16.</td>
<td>University of Cadiff</td>
<td>39,196</td>
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<td>University of Newcastle</td>
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<td>2,530</td>
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<td>University of Leicester</td>
<td>26,883</td>
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**Source:** _CISCO - 2010 Scopus publications_
Table 3: showing selected 20 African rated universities in 2009

<table>
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<tr>
<th>S/N</th>
<th>University</th>
<th>Country</th>
<th>World rank</th>
<th>African ranking</th>
<th>Scholar</th>
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<td>1.</td>
<td>University of Cape town</td>
<td>S. Africa</td>
<td>317</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
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<tr>
<td>2.</td>
<td>University of Pretoria</td>
<td>S. Africa</td>
<td>531</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>63</td>
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<tr>
<td>3.</td>
<td>Stellenbosch University</td>
<td>S. Africa</td>
<td>549</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
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</tr>
<tr>
<td>4.</td>
<td>University of Witwatersrand</td>
<td>S. Africa</td>
<td>688</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>222</td>
</tr>
<tr>
<td>5.</td>
<td>Rhodes University</td>
<td>S. Africa</td>
<td>997</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>567</td>
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<tr>
<td>6.</td>
<td>University of Kwazula Natal</td>
<td>S. Africa</td>
<td>1,014</td>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>681</td>
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<tr>
<td>7.</td>
<td>University of the Western Cape</td>
<td>S. Africa</td>
<td>1,032</td>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>8.</td>
<td>University of South Africa</td>
<td>S. Africa</td>
<td>1,290</td>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>10.</td>
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<td>Egypt</td>
<td>1,614</td>
<td>10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2,554</td>
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<td>Egypt</td>
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<td>11&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>12.</td>
<td>University of the Free State</td>
<td>S. Africa</td>
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<td>12&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>13&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Uganda</td>
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<td>16.</td>
<td>University Cheikh Anta Diop, Dakar</td>
<td>Senegal</td>
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<td>16&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>Ghana</td>
<td>3,527</td>
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</table>

Source: Extracted from CISCO - 2010 publication

The Wikipedia (2010) revealed exclusively that only the university of Cairo was selected among the best 500 universities in the world in 2010 and occupies position between 400 and 500 among the best universities in the world. The question then is what is wrong with African universities? There could be several factors which are core and are referred to in modern world rankings as webometrics. African universities appear to lack the basic tools for webometrics. Apart from webometrics, another popular measure is the G – Factor. It measures the popularity of a university’s website among other websites through the number of visitors that visits the website or scholarly articles from its website using popular search engines like google.
Table 4: Showing of Foundational level of ICT preparedness in Nigeria University for academic planning effectiveness

<table>
<thead>
<tr>
<th>S/N</th>
<th>Item</th>
<th>Level of ICT preparedness</th>
<th>UI</th>
<th>UNN</th>
<th>ABU</th>
<th>ILORIN</th>
<th>UNI PORT</th>
<th>UNIMAID</th>
<th>BUK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Level of computerization and MIS in Nigerian universities</td>
<td>Fully operational in this university</td>
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<tr>
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<td>Availability of full internet access that is accessible to all in and out of the universities</td>
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<table>
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<th>S/N</th>
<th>Item</th>
<th>Level of ICT preparedness</th>
<th>UI</th>
<th>UNN</th>
<th>ABU</th>
<th>ILORIN</th>
<th>UNI PORT</th>
<th>UNIMAID</th>
<th>BUK</th>
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<td>4.</td>
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<td>7.</td>
<td>Use of electronic Smart boards in universities</td>
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<td>UNN</td>
<td>ABU</td>
<td>ILORIN</td>
<td>UNI PORT</td>
<td>UNIMAID</td>
<td>BUK</td>
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**Key:** $x$ shows the level at which each university currently operates.

In Table 4, it can be observed that two out of the 5 Nigerian universities selected among Africa’s best 100 universities are included in this sample study. The five Nigerian Universities selected are the Universities of Ilorin that came 55th in Africa, Obafemi Awolowo University (OAU) 61st position, the University of Ibadan (UI) 63rd position, the University of Jos (UNIJOS) 74th position, and the University of Lagos (UNILAG) in the 79th position in Africa. The ratings showed that 50% of Nigeria’s first generation universities met African ranking and accreditation criteria while only 15% of second generation universities met African accreditation but none of the Nigerian universities met the global accreditations of the five existing global and regional ranking bodies.

In the 2010 global ranking, some key elements were used and these include webometrics. It is not ridiculous to observe that some Nigerian universities were listed in Africa, but it is important to see the
universities listed levels of ICT infrastructure among the 10 items listed in Table 4 of this research finding. The table shows that the universities of Ibadan and Ilorin listed among Africa’s top 100 universities virtually had good foundations in the ten items listed but one of the universities not listed but sampled in this research is the University of Portharcourt that has similar infrastructures and facilities. A look at table 3 shows that apart from a few universities, almost all the universities listed were from South Africa. It implies that those universities have developed their ICT for several years.

**Research Question 2:**
Are Nigerian universities properly positioned for the global digital revolution? The answer to the above research question can not be authoritatively answered now but at the discussion level. Several criteria used for such activities were put forth by the ranking bodies. For example, surveys of the scholastic aptitude of the universities were measured using the quality of papers produced, cited and accessed by other scholars through nominations and peer review, there is also the measurement of a university’s performance using the G-factor, that is a methodology that counts the number of visitors to each university’s website using the search engine ‘google’ etc. Ranking bodies include, HEEACT that uses the bibliometric production of scientific papers at universities. This has to do with the size, scope and quality of scientific papers produced in a university in a particular year. These are presented on such university’s website and sited by other scholars. There is also the Times Higher education global rankings which has just commenced its own global rankings and will be coming up soon with its methodology, there is the QS ranking. There are also regional ranking bodies such as the Africa Top, and Asian ranking bodies, among others. Examples of their activities are shown in Tables 1 - 3 of this study.

Looking at Table 4 of this study and viewing the level of Management Information Systems (MIS) preparation in Nigerian universities, the sampled universities only claimed partial computerization except the University of Portharcourt which claimed to have full computerization and that represents
14% of the universities sampled. All the sampled universities claimed 100% full internet access which is 100% access, only 2 out of the 7 sampled first and second generation universities namely the Universities of Ibadan and Portharcourt claimed fully operational Local Area Network (LAN) and that represents 28.5%. All sampled universities claimed to have 100% ability and currently performs their function of preparation, processing and dissemination of students’ transcripts electronically while availability of fully operational websites and web portals received 86%. Availability of e-learning classrooms got 42% while the use of smart boards by lecturers and students of sampled universities received 14.2%. Training programmes for academic staff on ICT received 57%, training programmes for non academic staff received 85.7% and training programmes for students on ICT received 100% compliance.

The above shows that except for a few lapses, Nigerian first and second generation universities appear strategically placed to have positions among leading universities in the world. This assertion is complemented by (Agyeman, 2007) while complementing the university of Jos for its performance in the field of medical e-ventures and also the OAU, Ife for its good progress in e-learning. Reasons why these universities are listed only in Africa and in such distant positions will be examined in the discussion.

Research Question 3:
What are the challenges facing Nigerian universities in attaining world class university status?
The challenges facing African universities from the angle of ICT are many. According to several scholars in ICT studies such as Adekanbi (2008), Lundu and Mbewe (1993) and Agyeman (2007) these include the following;

1. The unwillingness of most academics to conform to new changes in the ICT except when compelled by circumstances and situation to do so
2. The high cost of ICT equipment and infrastructure in the developing world coupled with widespread poverty that cannot allow the people access the products

3. Poor infrastructure such as electricity and other components that can enable the utilisation of ICT equipment without hindrances

4. Physical obstacles as location, damages done to ICT equipment due to natural factors as rain, wind, fire, storms, and water, among others

5. Personnel shortages and poor maintenance of facilities.

6. The poor funding of ICT education

7. The absence of enabling policy in many countries.

8. The ages of most African universities compared to their foreign counterparts appear to be a factor. While universities such as Oxford and Harvard have been established several centuries before now, giving them several years of operations, the universities in Nigeria started coming to life about 60 years ago.

9. Nigerian universities appear to be lax in the area of developing the capacity for the use of webometrics, a factor used in universities’ rankings.

10. Nigerian universities have not developed their websites and web portals for use in communication with the outside world; in essence, the full potentials of the web sites have not been utilized.

**Findings, Results and Discussions**

This study has been able to observe that Nigerian universities are trailed by several challenges which if not addressed in the next few decades may further deplete their fortunes. One of the challenges includes the fact that, there are enabling ICT policies in Nigeria as a nation and for its education but the problem is its implementation (Nnebe, 2008). Table 4 has also revealed that Nigerian universities are in a vantage position to make use of the potentials of the ICT that they have, since most of them have advanced in computerization, but they need to solidify what they have in existence presently. It
has been revealed that at least, three out of six of Nigeria’s first generation universities are listed among Africa’s top 100 universities while two second generation universities are also listed. The implication here is that African universities are getting closer to their counterparts in other parts of the world.

Again, this study has revealed that none of the private universities or states universities was listed in any of the rankings. This shows some levels of policy inconsistency. While this study does not discard the idea of the global rankings, its methodology of using peer review and citations of papers placed in universities websites through the use of google search engine is being criticized. Most academics see the process as subjective and not a true reflection of what obtains in true situations. The study has also shown that while other regions have progressed radically in the digital field that has been extended to education, the same cannot be said of Nigeria. Much has been done in Nigeria and more still needs to be done.

Policy Implications and Recommendations of the Study

The following policy implications are hereby observed with recommendations if Nigerian universities are to transform to world class universities:

1. The Nigerian National Universities Commission needs to enforce existing policies on universities ICT to ensure compliance with national ICT objectives and alignment with digital global best practices world wide. The evidences advanced so far indicates shortages of manpower, inadequately trained manpower and shortages of infrastructure, for example electricity supply in Nigerian universities. Situations do arise when internet access is unavailable for several months and at times years due to environmental factors. Though most respondents and universities claimed 100% access to ICT, evidences abound that most universities give epileptic ICT services at exorbitant rates.
2. The Nigerian government should take urgent steps to ensure the implementation of its ICT policies. There should be conscious moves to create national databases, networks across all organisations. Infrastructure should also be in place. For example, the Nigerian National Telecommunications Company (NITEL), and Power Holding Company of Nigeria (PHCN) with all their ancillary organizations should be resuscitated and made functional. It is not too expedient for government and all her agencies to be dependent on the private sector.

3. This paper is also of the opinion that if Nigeria is interested in joining the league of educationally ranked universities globally, apart from the induced NUC accreditations, several other criteria should be added to the accreditation of courses and universities in Nigeria. The paper strongly recommends the inclusion of webometrics.

4. Nigeria should move fast to join the league of Nobel Laureate producing nations. To do this, much investments and funding need to go into the areas of Teaching, research and learning. Universities should be encourage to produce scholars who are capable of winning prizes as the Nobel Peace Prize, the Pulitzer prize for academics and Fellowships of world academic bodies.

5. To produce competent personnel for ICT in Nigerian schools, this paper is of the opinion that ICT training is to be included in the curriculum of Nigerian teachers and teacher training institutions as a matter of urgency. It should not be seen a san exclusive preserve for only those who studied computer science in school.

6. Revelations from this study show that Nigerian universities, considering age and methodology, still needs some level of exposure to international academic forums for development. This paper holds that Nigerian academics and university administrators be given adequate affiliation to global events and foras. Where it is impossible to attend as a participant, let them be there as observers and be sponsored by government. In recent time, it has become clear that government’s commitment to education has fallen. For example, let us compare the money
spent on the development of sporting facilities, especially football, and what is spent on the
generality of Nigerian’s. What is the benefit from football that is comparable to the benefits in
education? Government needs to re order its priorities.

Summary and Conclusion
This study has looked into the possibilities of transforming Nigerian universities into world class
after highlighting the several challenges that face them. The study concludes finally that
government need to do more to fund the universities and introduce new policies that will improve
teaching and research in the universities. Government should make universities autonomous and
less dependent.

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THE CHALLENGES OF ICT IN HIGHER EDUCATION: THE MIRAGE IN ICT USE IN HIGHER EDUCATION

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Abstract

The significance of ICT’s influence as the epitome of information cannot be overemphasized. Globalization is multi-directional and interactive in nature masks ICT, and much of its content as a Western orientation and control over communication. The paper sets to show that there are imbalances in the use of ICT in higher education as used in Africa and the industrialized world. Africa is perpetually becoming a consumer in the use of ICT but has very little to show in contributing to this dynamic field of higher education. However, if well harnessed, it is our opinion that Africa has a better chance of incorporating the views of the diverse segments of her people into ICT use in higher education policy deliberations, thereby ensuring a steady growth for the continent in the communication technology.

Key words: ICT, higher education, challenges, mirage in ICT, Policies, Institutions, Education, Development, Learning, Computer.
Introduction

Information Communication Technology has been hailed as a panacea for advancements in higher education leading to research and general development. The instantaneous capturing, processing, storing and disseminating of ideas and information enable exchanges of instructional communication and feedback. Such interactions and applications, in spite of knowledge and skills are carried out in institutions, homes and workplaces. And, the significance of ICT’s influence as the epitome of information superhighway cannot be gainsaid. But this “globalization in the exchange of information”, that is multi-directional and interactive in nature, masks ICT and much of its content as a western-orientation and control over communication.

The type of technology used cannot be separated from contexts of use nor can content and environment of the contexts be separated from the technology. We can adapt ICTs and choose how to employ them but terms of use as change agents are dominated by the West. Hence, the need to be aware that ICT’s use in higher education carries prejudices on sourcing of content that already existed prior to their introduction. This makes Africa and most of the world consumers of what has been written and said about elsewhere. ICTs cannot be divorced from the factors of power and influence in the contents of literacy programmes. An in-depth analysis of the socio-economic issues affecting majority of Africa should be incorporated. Professionals and educators using ICTs are couched in the language, philosophy and social outlook, thereby regurgitating most of the West’s content.

The youth and others, savvy in ICTs, utilize social networks like flixster, facebook and twitter in sexting, discovering their identities, and are fixated on surfing on drugs and alcohol and entertainment postings. In this confusion of western modelling, we have ended up in copy-pasting others’ thoughts and concepts of higher education. The older generation is hard-placed with the former copy typists in the saddle of ICTs. In any case, they mastered the key board and can now fast-type and print or alternatively cut and paste directly from the Internet.
The challenges remain on cultural re-coding of meanings for ICTs to help reposition higher education programmes as a prerequisite, nay, an engine of knowledge and development. ICTs, higher education and development can then be mutually and socially constructed to reflect the grasp of how Africa can utilize ICTs in enhancing expectations on higher education.

**What is this discussion about?**

ICTs offer possibilities for African communities to become vibrant and thriving through learning, considering alternatives and sharing information and experiences. (Song, 2003), but we need to understand some of the positive and negative effects of Cyber communication in higher education.

The challenges remain on cultural re-coding of meanings for ICTs to help reposition higher education programmes as a prerequisite, nay, an engine of knowledge and development. ICTs, higher education and development can then be mutually and socially constructed to reflect the grasp of how Africa can utilize ICTs in enhancing expectations on higher education. The internet electronic mailing lists, discussion groups and forums and social networks, interactive multimedia player games and email). Africa will have to keep up with technological advancement and dynamism or be kept out. We should not remain consumers of ICT and its content.

Computers are the main gadgets in ICT. Computers are used in learning processes through computer programmes for information communication, managing the flood of concepts and general information that flow through these systems, for capturing processing, storing and disseminating information.

The effects of ICT are profound, a must and an integral part of these citadels of research, and excellence leading to development. Higher education all over the world is communicated via e-mail, online and international conferencing. ICT goes beyond classrooms and higher education policy formulation centres. There are digital firms, whose core business are digitally enabled and mandated. Thus ICT has brought about e-commerce where business and companies advertise online. Business and
industries are using satellites to communicate retail inventories and credit verification. Other ICT uses include governments, e-democracy, e-publicanism among other uses to enhance democracy.

We therefore need computer knowledge to be able to make decisions in an educational domain that is universal. Albeit these and other ICT attributes, Africa is disempowered and hapless in its use in higher education. Clearly Africa’s experiences and sensibilities do not matter in the content that goes into and through ICT. To paraphrase Nwuneli (1996), the problem is not insufficient information for the enhancement of higher education by the use of ICT. Sometimes, it may be too much information of the wrong type that can be held accountable for Africa’s negligible input in the use of ICT. How much of the concepts and information exchange that we have do we contribute from Africa?

That Africa is not committed enough to generating high quality local content, financing and providing the logistics required to utilize ICT can be seen in the very low expenditures on research carried out by her universities. The analysis to inform the balance, diversity and quality of content is not well financed and informed. The Stream Consultative Report says that lack of ICT inhibits the expansion of media space for citizens’ participation. There is also limited access to new media technology extent in Africa. The curriculum content and teaching/learning systems essential for today’s labour market obviously call for knowledge in ICT. But these tools of instruction are generally poorly developed. In fact countries like Kenya are yet to harmonize their ICT curriculum, a situation that has given a leeway to the proliferation of pseudo-ICT institutions. Reversing this situation is going to be difficult.

Universities ICT courses are more theoretical than the “hands-on” practicability that middle cadre colleges boast.

As we engage ICT in higher education, we need to appreciate the following guidelines in tandem with the African situation:
i) Higher education must be relevant to our needs. It should give us the knowledge, attributes and skills that will not only make our people employable but also consciously contribute to promoting our societies.

ii) Education is dynamic. It is based on changing requirements in our societies, and as such, requires constant revision.

iii) Education must be generic to support the transfer of knowledge and skills across occupations and learning paths as jobs change and employment opportunities fluctuate (Hobart, 1997). This scholar said such education should avoid the creation of an illiterate, subclass continent in ICT.

iv) The wider concept of ICT in higher education must be supported by governments, enterprises, NGOs and communities.

v) The provision of effective and efficient curricula will lay a foundation in the future use of ICT in higher education.

**Africa’s Threshold in ICT**

The use of ICT in higher education in Africa should be viewed as both empowerment and otiose. Africa, like other emerging economies, is an enormous untapped market for companies struggling to satisfy the demands of shareholders for growth in the mature sluggish first world technology markets (Powell, 2004). ICT use in higher education must focus on investing in people by providing opportunities to improve professional skills. And not just to provide markets for ICT manufacturers. Technically, communication empowerment could enhance speed, accuracy, reliability, consistency and high storage of education content in the capacities of ICT. There is a general feeling that this could bridge the digital divide and enhance higher education in Africa. But ICT is just a medium of manipulation of information and instruction. What is important are policies that guide higher education in Africa. Whereas Africa needs to embrace the dynamics of new technology, there is the need to
channel electronic communications through “ports” or “filters” to ensure the aspirations in higher education are achieved.

When the right higher education policies are in place, ICT can then be utilized to enable stakeholders search for tentative truths. More important is an understanding of the processes and effects of higher education. The structure of the subjects falls on “educational brokers” who should know where to search for information, and what kind, with the help of ICT.

We agree with Fidler in Severin and Tankard Jr. (2001) on media-morphosis, seeing it as the worldwide benefits to be reaped from Cyberspace. These are transformations of communication media, usually brought about by the complex interplay of perceived needs, competitive and political pressures and social and technological innovations. Africa’s higher education calls for a re-think. In striving for wider stakeholder participation, Africa’s contributions in ICTs must be well thought-out. Currently policy formulators on education are more onto what institutions should do and will do. A proactive move to what higher education institutions do with ICT could re-focus future phases and expand infrastructure. This will enable African economies to harness ICT as a way of providing for the continents needs in higher education. We are aware that in almost every service, government or private, technology is essential to improve efficiency and drive profitability which institutions of higher learning too are chasing after.

Right across the continent are resources that the rest of the world needs. Oil in Nigeria, Sudan, Chad, [Uganda]; timber on the West Coast, gold from South Africa and Ghana and an abundance of other valuable minerals (Powell, 2004). Many companies have been established complemented by increasing local ones. The void in the required telecommunications, computers, networks and related software and services is what higher education stakeholders should seek to fill. That this vacuum is real can be seen in foreign organizations being in full control of Africa’s communication establishments.
Lest we forget, Africans are quickly adopting the technology that helps them to improve in all spheres of their lives. In this context, ICT has the potential to create a new market place for ideas, discussions, debates and deliberations; the more and urgent reasons then for higher education stakeholders to show how ICT can enhance Africa’s societal needs. To encourage wider participation in development, ICT in higher education in Africa should assist:

a) Dominant languages used by for societies to construct narratives of sub-cultures and sub-nationalisms. These could amass into master narratives of cultural hegemony and nation-state’s education policies and official documents.

b) People becoming ICT literate in the languages they are proficient in which will help conceptualize complex ICT operations.

c) The key role played by literacy enabled by ICT. The best results are obtained through intergenerational learning. A strategy to inculcate ICT literacy in the older generation is therefore necessary to incorporate non-formal basic education for values and ethical purposes.

d) Those in remote villages who possess very sophisticated knowledge. We need to transmit this wisdom without the need for writing either words or concepts borrowed from foreign languages (Ouane, 1997).

e) African people who are encouraging themselves by building on those gains of ICT.

The way forward for ICT in Higher Education

Africans are becoming literate by the day, with states accommodating public and private institutions of higher learning. This is an indication that good governance is taking root and being strengthened as citizens become informed. Many voices have an avenue to engage in the socio-economic, cultural and political engagements that concern them through ICT. Also, higher education should show the way in ensuring transparency, accountability and responsibility in public and private sectors. ICT use will enhance wider citizens’ participation by broadening diverse means of communication in society.
Indeed, Africa should not “sleep on borrowed mats” but awaken to creating the critical moment necessary to make higher education programmes dictate developments in Africa by the use of ICT.

Africans must pause before plugging in borrowed modernization theories that could be right or wrong. There are proponents of ideas that we must all be part of the global economy or be doomed. There is no doubt that development scholars from Africa have contributed to debates on global economy and digital villages. They have done well in regard to the Center – Periphery Economic Dependency theories but even with these we in Africa remain dependants (Nwuneli, 1996).

Foreign concepts like:

- Structural Adjustment Programmes (SAPS)
- Value Added Goods and Services
- Equity Swaps
- Debt Burden Ratios
- Free Trade
- Privatization, Deregulation and Open door policy and others portrayed how higher education, institutions as citadels to propagate standpoints in society, lost out.

Among other concerns, these western concepts, purportedly to empower Africa economically, have led to dumping of goods, price fixing of ICT component and other inputs. Formulators of higher education know that institutions include other long-lived patterns of behaviour, usually with rules attached like traditions and markets (Mayers, 2003). As it is, Africa is slowly being dragged along changes in ICT without much say in technology and inherent content.

ICT is changing communication in fundamental ways in higher education and society in general. Traditional communication was primarily a one-to-many models of communication. Today’s learners have the means to participate in the learning process. Copy pasting is not the way to go though, the
World Wide Web provides additional models of many-to-one models. With such information bombardment are other challenges, as learners are arguably more knowledgeable in ICT but with little African content to engage in. On the other hand, educators with content and who should find ways of engaging knowledge in ICT are not well grounded in it. There is therefore the need on further programming schemes with prevailing socio-economic, cultural and political circumstances in mind.

The Web offers the potential for communication that is more decentralized and more democratic than was provided in past methods of instruction. Anyone with the know-how can contribute, giving power to the individual audience member to exert control. The problem is that Africa does not feature in these seamless and fastest growing tools of communication used as a global marketplace. There is strength in numbers. Educators and novices in ICT must work together in broaching benefits without sacrificing control over information.

The ever accelerating trend toward “worldwide cultural uniformity”, using English, means that indigenous peoples have little or no control over their education. Africa receives book donations and other hard copy learning materials from the West and Europe. Along with these are soft copy libraries believably prepared for source environments. Yet these are resources mostly relied on in higher education courses; pervasive uses that threaten African innovations in education psyche and research. Interactivity is necessary via the information highway but along with it are challenges on Africa’s definition of community contribution that is being pushed to the backburner.

ICT have blurred spatial and time barriers undermining customs, rules and laws by which Africa has always governed behaviour. This has also challenged social order and law enforcement. It might be hard to enforce standards. But close-knit ICT programmes right from lower levels of education can equip African learners to be aware of intrusions into their psyche that they may opt to ignore.
Africa’s higher education needs educational systems that suit their needs and lifestyles – thoughtful and responsible use of ICT. What we do with ICT in higher education should be better analyzed from contextual variables – demographics of stakeholders as well as the social environment. Higher education policy formulators, educators and learners are influenced by ICT differently.

Internationalization of concepts and information is luckily not as entrenched in Africa as the industrialized world where a “child” is “swimming in an audiovisual ocean, surrounded by computers, cable TV and video games, which provide an endless number of possibilities for learning” (Xavier Gouyou Beauchamps, chairman of France Television).

There is the need to facilitate ICT communication among African scholars to spearhead higher education through a variety of foray. Before breaking through technical and economic barriers that are hindering the expansion of ICT, it is necessary to invest in the kind of programme content Africa wants to stand and be counted on in ICT. Tools of freedom of expression and political mobilization should be embraced along with being an amalgam of concepts and information. These tools must be used with hindsight on where the continent is headed in higher education along with the rest of the world.

African governments could subsidize higher institution link-ups to encourage the construction of information highways. This could stimulate the exchange of experience and the know-how between members, promote cooperation with international agencies and support continental agencies and regional projects. This can be achieved through the provision of technical assistance and advice to decision makers.

**Possible solutions and strategies**

There is the need for higher education stakeholders to assist in the introduction of newer technology. The UN and other international organizations advocate ICTs to leapfrog stages of development and enhance democracy. Advancements in programming and technological designs are increasingly
making sophisticated products easy to understand and use. The latest feat from Africa, bound to be replicated, is Kenya’s money transfer via “M-Pesa” and “M-Kesho”. Higher education formulators should take note that technology should be at the service of Man and find ways to transform and bridge the digital divide. For Africa to emerge on the global stage in education matters for example, E-learning can be extended to other basic services like healthcare that bedevils Africans. ICT-based training means that more people can be trained more effectively and in less time, which is potentially a vital contributor to helping Africans take their rightful place in the global economy. What African needs is the delivery of appropriate and effective learning solutions.

Learners should have access to ICT’s infrastructure and language provisions. Microsoft’s Local Language Program has successfully introduced Swahili to Windows in advertising the language issue. ICT experts should find ways of incorporating other major languages like Fulani and Zulu. E-learning and improved access to information, as enabled by the Internet will play a significant role in helping more Africans learn more about technology and the world. To augment activism and build solidarity networks for local content input, Africans must find a way to adopt technology to assist in overcoming problems. But we must have the attitude of empowerment such that ICTs will offer opportunities, opportunities for the oppressed and marginalized in society to communicate freely. Globally, civil societies have used ICTs successfully to mobilize. Such groups as Greenpeace, Treatment Action Campaign in South Africa for HIV/ AIDS have built mass membership, networks and alliances with unions, employers, religious bodies, women and youth organizations and other interested sections of the community. This is because Internets distribute information quickly across wide database and to bridge spatial distances. We advocate for Africa’s input in ICT use in higher education because:

1) Learning is lifelong, requiring proper coordination and enforcement of legislation and policy implementation. Focus should be on how we utilize ICTs. Even while using donated discarded
computers from America and Europe that are repaired and distributed to Africa, let Africans, also have their content to be utilized and sustained in those gadgets.

2) There should be enactment of a legislation to cover higher percentage of local content and rational utilization of our environment and resources. All of us require ICTs but technology should never cut us from our place in society and its structures. The needs of indigenous people of Africa require education of the enlightened citizens to safeguard against cyberspace clashing with rules of the nation-states.

3) The establishment of continental data repository for genetic and other resources comes with efficient data acquisition and retrieval facilities. Such data could easily be communicated whenever required via mobile telephony. Mobiles are flexible and rapidly evolving communication tools with varied content and convergence with other media such as e-mail, video, sound and instant messaging. They offer a wide range of options for delivering advocacy messages to target audiences (Stein, 2010).

4) Of the need to promote research and inventories on the existing pool of knowledge in different disciplines that should be sustained by the use of ICTs.

5) Of the need to carry out continuous assessment and monitoring of the status of important contributions from Africa in terms of natural habitats and ecosystems but that are never highlighted on as coming from this region of the world.

6) Of the need to seek alternatives and cheap sources of energy as well as adopting suitable technologies like Equity Bank, Kenya money transfer “M-PESA” and “M-KESHO” services using mobile telephony. Nowadays cell phones and computers can be solar charged.
7) Of the need to observe and enhance international conventions and protocols regarding trade, patents, copyrights and safeguard Africa’s interests. Mobile phone companies like Safaricom and Zain have collaborated with banks like Equity to posit firsts in money transfer services. Such technologies must be recognized as originating from Africa. Such firms can then guide on the service use and replication.

8) Of the need to seek effective ways of promoting public awareness and appreciation of the potential value of ICTs for the enhancement of Africa’s welfare.

9) Of the need for sensitization on the cultivation of positive political and goodwill among ICT and higher education stakeholders

Conclusion

This paper has shown that there are imbalances in the use of ICTs in higher education between Africa and the industrialized world. Africa is perpetually becoming a consumer in the use of these imperative tools of communication. As fiber optics, satellites and the Internet have enabled the trade of information instantly across the globe Africa has little to show in contributing to this dynamic field of higher education. Such technology can make consumers vulnerable to exploitations by direct marketing and advertising, as well as having implications for security and privacy. A clear understanding of current and future research and industrial needs is crucial when developing successful academic programmes.

At the heart of this surrealism of technological push to provide seamless communications lays the control of communication. Yet, higher education and human development demands the promotion of democratic participation. As many ICT stakeholders as possible should be brought on board. Freedom of African voices and in their opinion on ICT content and technology is yet to be heard. For example, the spread of the Internet in Kenya is far from equitable though such link-ups are being intensified.
Kenya is yet to harmonize ICT curricular although there is a feeling that technology will help enhance higher education. ICTs cannot be the magic bullet that will streamline curricular in higher education. Deliberate effort must go into issues of what we want to do with ICTs in focusing social-economic, cultural and political paradigms in development.

Africa has a better chance to incorporate the views of the diverse segments of her people in ICT use in higher education policy deliberations. Such participations in content formulation will focus on technology use and expose the medium to the people. But even with willingness to utilize such mechanisms to the full, the challenges of ICT in higher education have more to do with how we utilize them to guide curricula. They remain the educational tools which success or failure in use depends on our manipulations.

**References**


THE EFFECTIVENESS OF WEB-BASED LEARNING ENVIRONMENT: A CASE STUDY OF PUBLIC UNIVERSITIES IN KENYA

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Abstract

Web mining is emerging in many aspects of e-learning, aiming at improving online learning and teaching processes and making them more transparent and effective. Researchers using Web mining tools and techniques are challenged to learn more about the online students’ reshaping online courses and educational websites, and create tools for institutional decision making regarding e-learning. Web Mining is the application of data mining tools and techniques to discover non-trivial, potentially useful and ultimately understandable patterns or structures from data drawn from the Web. The objectives of this paper are to assess online students’ behavior throughout the learning process, examine the effectiveness of web-based learning environments, improve the web-based learning environment and develop and integrate web mining tools into existing learning management shells, for improving instruction. This paper seeks to improve the implementation of Web-supported Learning Management Systems, online courses, and innovative pedagogical practices using the Internet in Public universities in Kenya.

Key words: Effectiveness, Web-based learning environment, Public universities

Introduction

Online learning has become widely popular in academic institutions in the last decade. University leaders and administrators are aware of the pedagogical and economical potentials of using advanced technologies and of their possible roles in changing the structure of academic instruction. They believe that Web-supported instruction should be included as part of a university’s long-term strategy (Bates, 2000; Allen & Seaman, 2005, 2006, 2007). Many lecturers who are now in the process of integrating the Internet in their instruction are using various Web-supported learning environments that facilitate
more flexible and effective instruction. Opinions on the degree of acceptance and effectiveness of e-
learning vary, but well-designed and appropriately used programmes have great potentials. A web-
based programme is a “hypermedia-based instructional program which utilizes the attributes and
resources of the World Wide Web to create a meaningful learning environment where learning is
fostered and supported” (Khan, 1997, p. 6). It is delivered via the computer, using the Internet, making
it capable of instant updating, distribution, and sharing of information (Rosenberg, 2001).

The objectives of this paper are to assess online students’ behavior throughout learning process,
examine the effectiveness of web-based learning environments, improve the web-based learning
environment and develop and integrate web mining tools into existing learning management shells, for
improving instruction. A research framework for the study of web-based instruction using the Web
was described in detail by Nachmias (2002). This framework consists of three levels: (a) the macro
level which focuses on the diffusion process of the Internet in university instruction from the
institutional perspective; (b) the mezzo level which focuses on the emergence of new pedagogies and
learning paradigms in courses that integrate the Web into traditional instruction; and (c) the micro level
which concerns the actual use of the Web in the teaching and learning process of specific courses.

Given its growing popularity, it is important to understand whether or not this delivery medium is
effective, whether it is more effective than other delivery media, and what contextual or
methodological factors moderate its effectiveness. As a form of technology-assisted instruction, online
instruction will have utility to organizations and institutions if it results in learning and retention, is
well-received by users, and is cost-effective to the sponsoring organization or institution. Creating
web-based programmes can present significant challenges. The questions that are considered are as
follows:

1. How effective is online learning as compared to classroom learning programmes?
2. What can online learning programmes do rather easily, which may be difficult to achieve in the
class-setting?
3. How adjustable or adaptable are web-based learning programmes to fit the needs of different
types of learners?
4. How should the assessment of the performance and benefits of online instruction be done
effectively?
5. What strategies are used for selecting and designing learning materials for an effective web-
based programme?
6. What characteristics of the learners should be considered for an effective web-based programme?

7. How should the input about learners be captured in a web-based programme?

This paper seeks to propose ways of improving the implementation of Web-supported Learning Management Systems, online courses, and innovative pedagogical practices using the Internet in Public universities in Kenya to promote its usage among faculty members and students.

**Improving the implementation of Web-supported Learning Management Systems**

Learning Management Systems have emerged from an auxiliary role to a critical one in higher education. Current college students are technologically savvy and demand their faculty to use technology and Learning Management Systems. Learning management system should be designed, using sound pedagogical principles, to help educators create effective online learning communities.

Interoperability is one of the key developments for all learning management systems, particularly open source ones. To reap fully the benefits of a learning management system, institutions must integrate them with identity directories, internal and external web sites, portals, student information systems, library catalogues, multimedia and learning objects repositories, e-portfolios, e-mail, calendar, instant messaging, wikis, blogs, web conferencing, and other collaboration tools.

**Implementation Challenges of Learning Management System**

Embracing a new learning management system has high entry costs because there are few efficient migration tools. Faculty members and educational technology personnel who have invested heavily in one particular system find themselves having to redo much of their work to switch to another one. Academic leaders must consider learning management systems as strategic systems which should not be upgraded annually but changed only every five to ten years.

The unchecked proliferation of learning management systems present some challenges. Many higher education institutions are finding themselves having to support several systems. Some of them are home-grown, others are commercially available, and some are vertical and hosted by information providers.

In these cases, there is clearly an inefficient use of resources committed to supporting a variety of systems. Most systems require one or most of the following resources: educational technology professionals, technical personnel, servers, contract management, training, support, security, and
integration. When many systems are available to them, faculty members must learn to use more than
one system and decide among them. Finally, students are forced to visit several sites to retrieve, work
on, and deliver their course materials.

The Integration of Web-Supported Instruction

Rogers, in his book *Diffusion of Innovation* (1995), defines innovation as an idea, object, or practice
that is perceived as new by the individual or organization. The innovation may be perceived differently
among individuals, and the time it takes for individuals to adopt the innovation may be different.
Diffusion, furthermore, is defined as the process by which an innovation is communicated through
certain channels among the members of a social system over time. Rogers claims that innovations tend
to spread through society in an S-shaped curve, with early adopters selecting the technology first,
followed by the majority, until a technology or innovation is considered common. He explains that
innovations are initially perceived as uncertain and even risky. To reduce the uncertainty, most people
look for others, like themselves, who have already adopted the new id

Rogers (in the latest edition of his book *Diffusion of Innovation*, 2003) argues that the penetration of
the Internet into our daily life has sped up the diffusion of Web-supported learning. Rogers (1995)
presented a classification scheme of potential adopters of innovation based on their receptivity:
*innovators* (2.5%), who are the risk takers willing to take the initiative and time to try something new;
*early adopters* (13.5%), who tend to be respected group leaders and are essential to adoption by the
whole group; *early majority* (34%), who are the careful, safe, deliberate individuals unwilling to risk
time or other resources; *late majority* (34%), who are those suspicious of or resistant to change. Finally
there are those who are hard to move without significant influence and *laggards* (16%), who are
consistent or even adamant in resisting change.

Pedagogical Aspects

It is interesting to educators to understand the pedagogical aspects of this usage and whether, as a
result, novel pedagogical models and approaches are emerging. Our understanding of the emergent
Web pedagogy is twofold: on one hand, we seek illustrations of the feasibility of using the Web in
such a way that its potential benefits and promises are fulfilled. Our questions from this perspective are
as follows: Can we really increase instructional flexibility, improve learning efficiency, and augment
the quality and richness of academic instruction? If the answers are yes, then the questions are in what
ways? On the other hand, we know that not all lecturers are using the Web equally, in terms both of
exploiting its innovativeness and of time investment. Given this situation, the questions are these:
What are the lecturers using the Web for and to what extent?

Cost and Benefit Analysis

The third issue highlighted in this paper is the cost and benefit of Web-supported learning from both the economical and educational perspectives. More and more universities and educational institutions are considering the integration of new information technologies in their instruction. However, not many of them are fully aware of the complexity of this process, nor do they recognize what their decision-making really involves. The relevant considerations are twofold: the long-term policy level and the level of the online instructor. This mission is even more difficult and confusing considering the wide variety of distance and online learning models and strategies implemented in diverse settings, from Web-supported academic instruction through blended learning and up to a fully online model. Therefore, economic planning, costing, decision-making management, cost effectiveness, and cost-benefit analysis are essential components in this process.

According to a study by the Partnership for Higher Education in Africa (PHEA, 2003), strong virtual programmes based in African universities and targeted at Africa as well as at the global market for higher education, would foster the use of local content and demonstrate the potential of South-North collaboration in teaching and learning. Unlike programmes brought in from outside, virtual collaboration from within Africa can not only strengthen the participating institutions but also help build institutional confidence, and contribute to the development of higher education in Africa (PHEA, 2003).

In East Africa, such collaboration currently takes the following forms (Ayoo, 2008):

   It collaborates with many universities and similar higher education institutions in East Africa and outside to provide its courses to learners within the region. These institutions act as learning centers for the OUT programmes.

2. Development of collaborative teaching and research initiatives.
   In this model, Kenya Methodist University, for instance, collaborates with Kenyatta National Hospital and the Kenya Medical Training Council in the development of content and teaching of a nursing and health programme. The same model exists between Moi University and Linchpin and Indiana Universities in the USA (for medicine and information sciences degree programmes).
3. Development and sharing of learning content.

The University of Nairobi collaborates with African Virtual Open Resources and Initiatives based at the University of Western Cape, to develop content for their WEDUSOFT learning management system. The collaboration between Strathmore University (in Kenya) and Massachusetts Institute of Technology (MIT) in order to use the latter's courseware also falls within this model.

4. Other collaborative arrangements exist between East African universities and other institutions such as the University of South Africa, AVU, CISCO Academy, African Medical Research Foundation (AMREF), Open Educational Resources and Kenya Education Network (KENET).

Collaboration with Industry

Apart from the linkages that universities and other research organizations establish between themselves, collaboration between universities with industry is also important. One way of achieving this could be to look into ways in which corporations in the richer countries may be twinned with universities in less developed economies (Lang, 2002). Such an arrangement might benefit both the research and development requirements of the companies involved, while they provide infrastructure, training for research workers and guaranteed positions in the university with which the company is twinned.

Strategies used for selecting and designing learning materials for an effective web-based programme

Research on learner control indicates that most people need training or assistance to plan, monitor, and focus their learning efforts and make related decisions. For example, Jacobson et al. (1995) found that when students had the option of viewing multiple hyperlinked pages containing information relevant to course content, many chose not to view the pages; these students performed poorly on outcome measures. In another study, students who were forced to review multiple pages in a linear format outperformed counterparts who controlled what they viewed (McKeague 1996).

One strategy is to embed questions within the lesson text to focus students’ attention on critical information and persuade them to review notes and readings. Another tactic is to organize Web pages in a linear format, forcing students to view all relevant information.

Research shows that students need skills to plan and evaluate their learning activities and to synthesize the information they garner (Jacobson et al. 1995; Laurillard 1999). In a traditional classroom, the
instructor can model good practices while observing and prompting students. For example, if the topic is how to conduct a good investigation, the instructor can model how he or she would perform the necessary tasks, and then ask students to perform those tasks and advise them on improving their performance. The instructor's actions might include focusing on critical factors/evidence, planning students' investigative steps, outlining alternatives and backup approaches, and monitoring students' progress.

To approximate this modeling process in Web-based learning environments, instructors might create interactions or prompts within their lessons that focus students' efforts on objectives and important skills. When students are unable to reach the goals of learning tasks, experts' advice and practical models should be available on demand. Instructors should note, however, that many students invariably will choose not to request help (Jacobson et al. 1995). It therefore may be advisable to log students' actions and/or provide automatic prompts, hints, or advice rather than waiting for students to request assistance.

While Web-based learning environments can be powerful, their potential is often limited by problems of design and implementation. Instructors should stop assuming that all students have the skills to navigate Web-based learning experiences, and they should reevaluate ineffective online teaching strategies. Even if they are dependent on instructional designers and software producers to create their Web-based courses, educators should still find ways to avoid being constrained by the systems they use. They should also insist that these systems accommodate a wider range of teaching styles and preferences, with sufficient tools suited for different instructional needs.

**Comparison of Web-based Programmes and Classroom Instruction**

Web-based instruction and Class Instruction were equally effective for declarative knowledge when the same instructional methods were used to deliver the two courses, suggesting media effects are spurious and supporting Clark’s (1983, 1994) theory. Clark (1983; 1994) criticized most media effectiveness research on two grounds. First, most studies fail to institute experimental controls sufficient to rule out alternative explanations for group differences. Second, Clark argued that most prior studies have failed to isolate instructional attributes that are unique to a single medium. For example, WBI may provide more opportunities for learner customization than class instruction, but: a) classroom learning can provide some customization in some situations; and b) opportunities for learner customization are not unique to Web-based programmes. Clark argued that if studies fail to isolate
attributes unique to the medium, results of those studies cannot be accepted as evidence of the superiority of the medium. In short, Clark argued that there is nothing uniquely beneficial about any computer-aided instructional medium.

The pro's and con's of web-based learning vary depending on programme goals, target audience and organizational infrastructure and culture. But it is unarguable that online learning is rapidly growing as a form of training delivery and most organizations are finding that the clear benefits to online learning will guarantee it a role in their overall blended learning strategy.

**Benefits of online learning include:**

According to Dwyer, Barbieri and Doerr (1995), Like no other training form, online learning promises to deliver learning outcomes to a maximum number of participants with a maximum range of learning styles, preferences, and needs. Flexibility is one the benefits of online learning.

Most courses are specifically created in a manner that allows trainees to complete work at their own pace and convenience, whenever they have enough time to spare.

Online learning allows more efficient training of a globally dispersed audience; and reduced publishing and distribution costs as Web-based training becomes a standard.

E-learning also offers individualized instruction, which print media cannot provide, and traditional instructor-led courses provide at great cost.

In conjunction with assessing needs, e-learning can target specific needs. And by using learning style tests, e-learning can locate and target individual learning preferences.

Additionally benefits of online learning include that it is self-paced. Advanced learners are allowed to speed through or bypass instruction that they don’t need while novices slow their own progress through content, eliminating frustration with themselves, their fellow learners, and the course.

In addition to everyday obstacles, the benefits of online learning are that it provides a solution for individuals who may be facing political or financial obstacles that might otherwise make education impossible. That the web is in fact world-wide means that a key benefit of online learning is that it is international and a truly egalitarian means of acquiring knowledge.

**Conclusion**

Adaptive online learning systems have significant potential to benefit students and improve learning outcomes. Given the differences in learning styles and abilities, web-based learning programmes should avoid imposing a “one size fits all” philosophy or model. While there is clearly a need for
further research and testing, developments in the design of web-based learning systems generally seem quite promising.

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THE ROLE OF TECHNOLOGY IN CURRICULUM DEVELOPMENT AND DELIVERY

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Abstract

As the world shifts towards a global knowledge economy, education is the gateway through which this is set to be achieved, the quality of higher education, is assessed through the backdrop of technology integration for enhanced performance and achievement. A suitable and sustainable technology should be used to electronically reach out to a large number of students, the general public with quality educational material, so as to address the issues of access to education with equity and quality.

Technology has made search, storing, retrieval, transmission, gathering, dissemination, and reception of knowledge easier, cheaper and faster. Technology is expected to completely change the way the curriculum is developed and delivered hence enhancing the quality of higher education. The paper will provide the approaches to curriculum development through electronic curriculum (E-curriculum) which can be applied to enhance the quality and accessibility of education at affordable cost. Secondly the major obstacles to optimal utilization of information technology and measures to overcome them, thirdly how multi media systems can be used to enhance delivery of the e-curriculum.

Keywords: E-curriculum, Quality education, Technology, Multi-Media
Introduction

The Kenya vision 2030 envisages Kenya to be a knowledge power. To achieve this vision, stakeholders have to play a key role in realizing the goal. Education resources have to reach out to a large number of people through various means in seamless ways.

Technology will help students to acquire the skills they need to survive in a complex, highly technological knowledge based economy, integration of technology into a lecture hall means more than lecturing basic computer skills and software programmes in a computer lab.

Effective technology integration must happen across the curriculum in ways that research shows to deepen and enhance the learning process mostly in support of: active engagement, participation in different groups, frequent interaction and feedback, and connection to the real world experience. It can be achieved when the use of technology is routine and transparent and can support the expected curricular goals at the end of the course.

New technology tools for visualizing and modeling especially in the science, helps students to experiment and observe phenomenon and to view results in graphic ways that aid in understanding. With technology tools and project learning approach, students are most likely to stay engaged through the task.

As electronic information technologies are being transformed from expensive and exotic gadgets into standard classroom equipment, their extraordinary multimedia capabilities are rapidly becoming a routine part of many learning environments (Slawson, 1993). The old text based approach to learning is being superseded by an approach which combines audio and colour video in a much more exciting way (Barker & Tucker, 1990).

Interactive multimedia is one of the most promising technologies of the time and has the potential to revolutionize the way we work, learn and communicate (Staub & Wetherbe, 1989). With interactive multimedia programme, the learning process becomes active, not passive, and it ensures that users are doing, not simply watching. True interactivity implies that the learning process is, in some degree, modified by the actions of the learners, thus changing the roles of both the learner and the teacher (Barker & Tucker, 1990; Slawson, 1993). Interactive multimedia learning is a process, rather than a technology, that places new learning potential into the hands of users. Brooks (1993) argues that, with all the additional capabilities of the growing number of multimedia applications, the design of these
applications has become a nightmare. He listed ugly screens full of multiple fonts, insignificant boxes, irrelevant noises, and confusing webs of possible interactivity among the features of poorly designed multimedia packages. Educators should have access to appropriate ways of designing software packages that will take advantage of multimedia capabilities without losing the focus on the user's needs or the content being presented. In the past many articles have limited recommended guidelines to a single multimedia feature requiring an educator to search many references to obtain a complete understanding for the design and development of the entire multimedia packages.

The scope of this paper is limited to the review of research on numerous educational multimedia features used for instructional purposes. In this article, the effects of screen design (visual elements: colour, text, graphics, and animation), learner control and navigation, use of feedback, student interactivity, and video and audio elements on the development of educationally effective multimedia modules are examined.

**Electronic curriculum**, or E-curriculum refers to computer-based learning, including educational materials available to students by CD or DVD, online courses and web mechanisms used to search the literature; electronic systems used to enhance academic programmes such as email, online testing and course evaluations, and various applications of instructional technology including providing laptops to students, multimedia projection systems, and Internet-compatible, and wireless classrooms. In spite of enthusiasm about the potentials of E-curriculum to enhance higher education, growing demand among learners for improved accessibility and convenience, lower costs and direct application of content to work settings are radically changing the environment for higher education in Kenya and globally.

Growing demand for learning combined with these technical advances is in fact a critical pressure point for challenging the dominant assumptions and characteristics of existing traditionally organized universities in the 21st century. This combination of demand, costs, and application of content and new technologies are opening the door to emerging competitors and new organizations that will compete directly with traditional universities and with each other for students and learners.

Technological change is redefining not only how we communicate, but in turn, is redefining how we need to educate. The ready availability of information will be the main factor to enhance the educational standard but raises new issues in terms of effective searching and the development of an ability to evaluate information. The development of analytical skills and higher order thinking is increasingly an important focus.
The roots of change are on the increase in technological and networking capacity, but what are the ramifications for curriculum development, and interpretations necessary for the lecture halls? Many educators hold the view that computers and Internet connectivity are "tools" for learning and thus, believe an increased grade point average is often the only measure of value for technological resources.

A computer can provide support and contribute in all of the four areas but the most important area to consider is the instructional purpose. "Being able to identify and clearly state your teaching intent is a valuable first step in teaming up with computers to teach." (Geiser & Futrell, 1995, Page 83) The curriculum will serve as a guide and enable you to identify the goals and objectives your students need to achieve. When you are developing a unit plan include an area for technological integration and list specific activities that you can do to support the objectives of the lesson and involve technology. The specific activities might involve accessing the Internet, using a specific component in a software application to enhance a skill, or the development of an end product using technology.

**The Integration of Technology**

The integration of technology should serve to guide, expand and enhance learning objectives. It is understood that teachers and students do need to spend time learning the basics of using a computer. This is necessary in order to move to effectively integrating technology.

Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting. Technology enables students to learn in ways not previously possible.

Effective integration of technology is achieved when students are able to select technological tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions – as accessible as all other classroom tools.

**Role of the lecturer**

Lecturers should strive for two goals when integrating technology. The first goal is to become technology literate. It may be using the computer to manage your students’ information or using a software programme to strengthen a particular skill.
The second goal is to make the computer a lecturing partner rather than an object of study. “The instructional goals of computer-using lectures are in art, science, math, language arts, social studies, or other disciplines, not in computers.” Geisert & Futrell, 1995

Planning to Integrate Technology

Unit planning for your classroom begins with consulting the curriculum guides for that particular grade. Lessons are planned around a set of goals and objectives identified in the curriculum. A visual representation of quality instruction can be viewed. A computer can provide support and contribute in all of the four areas but the most important area to consider is the instructional purpose. “Being able to identify and clearly state your teaching intent is a valuable first step in teaming up with computers to teach.” (Geiser & Futrell, 1995, Page 83) The curriculum will serve as a guide and enable you to identify the goals and objectives your students need to achieve.

The vast movement towards e-learning is clearly motivated by the many benefits it offers. However much e-learning is praised and innovated, computers will never completely eliminate human instructors and other forms of educational delivery. What is important is to know exactly what e-learning advantages exist and when these outweigh the limitations of the medium.

Features Unique to e-curriculum

Like no other training form, e-curriculum promises to provide a single experience that accommodates the three distinct learning styles of auditory learners, visual learners, and kinesthetic learners. Other unique opportunities created by the advent and development of e-learning are more efficient training of a globally dispersed audience; and reduced publishing and distribution costs as Web-based training becomes a standard.

E-curriculum also offers individualized instruction, which print media cannot provide, and instructor-led courses allow clumsily and at great cost. In conjunction with assessing needs, e-curriculum can target specific needs. And by using learning style tests, e-curriculum can locate and target individual learning preferences.
Additionally, synchronous e-curriculum is self-paced. Advanced learners are allowed to speed through or bypass instruction that is redundant while novices slow their own progress through content, eliminating frustration with themselves, their fellow learners, and the course.

In these ways, e-curriculum is inclusive of a maximum number of participants with a maximum range of learning styles, preferences, and needs.

Collaborative Learning

All collaborative learning theories contend that human interaction is a vital ingredient to learning. Consideration of this is particularly crucial when designing e-curriculum, realizing the potential for the medium to isolate learners. With well-delivered synchronous distance education, and technology like message boards, chats, e-mail, and tele-conferencing, this potential drawback is reduced. However, e-curriculum detractors still argue that the magical classroom bond between teacher and student, and among the students themselves, can not be replicated through communications technology.

Advantages of e-curriculum to the Trainer or Organization

Some of the most outstanding advantages to the trainer or organization are:

- **Reduced overall cost** is the single most influential factor in adopting e-curriculum. The elimination of costs associated with preparing the curriculum and can be shared
- **Learning times reduced**, an average of 40 to 60 percent, as found by Brandon Hall (Web-based Training Cookbook, 1997, p. 108).
- **Increased retention** and application to the job averages an increase of 25 percent over traditional methods, according to an independent study by J.D. Fletcher (Multimedia Review, Spring 1991, pp.33-42).
- **Consistent delivery** of content is possible with asynchronous, self-paced e-learning.
- **Expert knowledge** is communicated, but more importantly captured, with good e-learning and knowledge management systems.
- **Proof of completion and certification**, essential elements of training initiatives, can be automated.
Advantages to the Learner

Along with the increased retention, reduced learning time, and other aforementioned benefits to students, particular advantages of e-curriculum include:

- **On-demand availability** enables students to complete training conveniently at off-hours or from home.
- **Self-pacing** for slow or quick learners reduces stress and increases satisfaction.
- **Interactivity** engages users, pushing them rather than pulling them through training.
- **Confidence** that refresher or quick reference materials are available reduces burden of responsibility of mastery.

Disadvantages to the Learner

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

- **Technology issues** of the learners are most commonly technophobia and unavailability of required technologies.
- **Portability** of training has become strength of e-learning with the proliferation of network linking points, notebook computers, PDAs, and mobile phones, but still does not rival that of printed workbooks or reference material.

- **Reduced** social and cultural interaction 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 this potential disadvantage are lessening with advances in communications technologies

Curriculum Delivery

**Multimedia** are the media that use multiple forms of information content and information processing (e.g. text, audio, graphics, animation, video, interactivity) to inform or entertain the user.

Multimedia also mean that computer information can be represented through audio, graphics, image, video and animation in addition to traditional media (text and graphics). Hypermedia can be considered as one type of particular multimedia application.
The Elements of Multimedia in Education

A Multimedia Learning environment involves a number of components or elements in order to enable learning to take place; Multimedia combines five basic types of media into the learning environment: text, video, sound, graphics and animation, thus providing a powerful new tool for education, the Hardware and software are only part of the requirement. As mentioned earlier, multimedia learning integrates five types of media to provide flexibility in expressing the creativity of a student and in exchanging ideas.

John Sculley (1993), former chairman and chief executive officer (CEO) of Apple Computer Inc., states that multimedia allows for individualized learning, making students active participants in the instruction learning process. By enabling the individual to interact with and control the flow of information with the computer, interactive multimedia distinguishes itself from older multimedia formats such as books and video. Learners must process information actively in order to comprehend and remember it (Ausubel, 1960; Weller, 1988).

Any multimedia application consists any or all of the following components:

**Text:** Text and symbols are very important for communication in any medium. With the recent explosion of the Internet and World Wide Web, text has become more the important than ever. Web is HTML (Hyper text Mark-up language) originally designed to display simple text documents on computer screens, with occasional graphic images thrown in as illustrations. Text based information is easy and inexpensive to develop and has minimal computer memory requirements (Kensworthy, 1993). Nugent (1982) in a research pointed out that audio has obvious advantages for presenting simple material to younger children with undeveloped reading skills.

**Audio:** Sound is perhaps the most element of multimedia. It can provide the listening pleasure of music, the startling accent of special effects or the ambience of a mood-setting background. The combination of visual presentation with audio explanation delivers information in an easily understood format (Wright, 1993). For example, audio can be used to explain icon choices with the choices highlighted as they are explained.

**Digital Audio**

Digital audio is created when a sound wave is converted into numbers – a process referred to as digitizing. It is possible to digitize sound from a microphone, a synthesizer, existing tape recordings,
live radio and television broadcasts, and popular CDs. You can digitize sounds from a natural source or pre-recorded.

Digitized sound is sampled sound. Every fraction of a second, a sample of sound is taken and stored as digital information in bits and bytes. The quality of this digital recording depends upon how often the samples are taken.

**Preparing Digital Audio Files**

Preparing digital audio files is fairly straightforward. If you have analogue source materials – music or sound effects that you have recorded on analogue media such as cassette tapes.

(a) The first step is to digitize the analogue material and record it onto a computer readable digital media; (b) It is necessary to focus on two crucial aspects of preparing digital audio files; (c) Balancing the need for sound quality against your available RAM and Hard disk resources; and (d) Setting proper recording levels to get a good, clean recording.

**Graphics**

Multimedia software can easily present information in either text mode or graphics mode, but, when possible, both should be used (Overbaugh, 1994). Students who do not understand information delivered by text quite often will understand it if it is presented or augmented by various visuals (Merrill, 1983). In particular, difficult topics sometimes become easier to understand when augmented by graphic displays (Gropper, 1983).

Photos and scanned images can be used to illustrate almost any fact, concept, or procedure (Sponder & Hilgenfeld, 1994). Learning tends to be strongest when pictures supply redundant information, supplement information that is unclear or incomplete, or supply additional coding stimuli (Jones, 1995; Park & Hannafin, 1993). Information presented in text is often better recalled and retained when supplemented with pictures (Hooper & Hannafin, 1988).

**Images:** Images whether represented analogue or digital plays a vital role in a multimedia. It is expressed in the form of still picture, painting or a photograph taken through a digital camera.

**Animation:** Animation is the rapid display of a sequence of images of 2-D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of persistence of vision, and can be created and demonstrated in a number of ways. Most graphics or
pictures can be animated to illustrate points, teach facts or concepts, motivate students, and demonstrate procedures (Sponder & Hilgenfeld, 1994). Animation can serve motivational and attention getting functions, but no extra learning effects can be attributed to the use of animation (Hannafin & Rieber, 1989).

**Video:** Digital video has supplanted analogue video as the method of choice for making video for multimedia use. Video in multimedia are used to portray real time moving pictures in a multimedia project. Motion video, including commercial tapes, movies, and home videos, is often a major element of interactive multimedia software, but computers need special hardware and/or software to display video. Video presentations are generated from video files that consume a lot more storage space than simple animations. Taylor (1992) has recognized that video is not an ideal medium for presenting detailed material, but is better used for broader, abstract material, possibly with an emotional appeal. An abstract video segment may serve well as the medium for an advance organizer.

**Features of Multimedia Education**

**Multimedia presentations** may be viewed in person on stage, projected, transmitted, or played locally with a media player. A broadcast may be a live or recorded multimedia presentation. Broadcasts and recordings can be either analogue or digital electronic media technology. Digital online multimedia may be downloaded or streamed. Streaming multimedia may be live or on-demand.

**Multimedia games and simulations** may be used in a physical environment with special effects, with multiple users in an online network, or locally with an offline computer, game system, or simulator.

**Barriers for effective Curriculum Delivery**

Although lecturers recognize the value of ICT in education, difficulties nevertheless continue to be experienced within the processes of adopting these technologies and as has been shown in the studies only a minority has so far embedded ICT into teaching. In order to ensure realistic and holistic solutions for policy makers the factors that prevent lectures from making full use of ICT must be identified and understood. The following analysis aims to present the perceived barriers to the use of ICT which were highlighted in the reviewed studies and examine their causes and effects. The barriers are broadly divided into three categories: Lecture-level barriers, i.e. those related to Lecturers’ attitudes and approach to ICT, school-level barriers, i.e. those related to the institutional context and system-level barriers, i.e. those related to the wider educational framework.
Lecture level barriers

Lack of ICT skills

Many lecturers still choose not to use ICT and media in teaching situations because of their lack of ICT skills especially in non ICT departments

Lack of motivation and confidence in using ICT

Limited ICT knowledge makes lecturers anxious about using ICT in the classroom and thus do not feel confident to embrace new pedagogical practices. The 2004 Becta survey on the perceived barriers to the uptake of ICT by 45 lecturers also refers to the lecturers’ fear of admitting to their students their limited ICT knowledge’

Inappropriate lecture training

Unsuitable lecture training programmes fail to engage lecturers in using ICT both during their lessons and also in the preparation of lessons beforehand. The most commonly mentioned cause of this is that training courses focus mainly on the development of ICT skills and not on the pedagogical aspects of ICT. It is interesting to observe that although some lecturers have good ICT skills in terms of their own personal use, they are unable to transfer these skills to using ICT in the classroom (Becta, 2004)

Institution – level barriers

Even after receiving basic and pedagogical training in ICT, some lecturers are still not able to make use of that training since they are hampered by a range of school level factors. Such as:

The absence and poor quality of ICT infrastructure

The availability of technology is not necessarily a factor for the successful implementation of ICT, yet the absence of technology is a crucial hindrance, as analyzed in e-curriculum, for example. The provision of ICT infrastructure does not necessarily mean that use will be higher.

Lack of high quality hardware and suitable educational software are also considered by the majority of ICT coordinators as an important hindrance to further development of ICT in education. Poorly maintained computers are usually unreliable and likely to cause disruption to even the best planned lessons. Similarly, inappropriate software does not enhance a lesson in any way and rather disengages both lecturers and students from the learning process.
Limited Access to ICT equipment

The inability of lecturers and students to access ICT resources is a result of a number of other factors and not only of the lack of ICT infrastructure. Sometimes a school may have high quality ICT resources but these are inappropriately organized and thus not optimally used. In some higher learning institutions for instance, prior booking of the ICT classroom is required, or the internal school network cannot be accessed from outside. As a result lecturers and students do not have the opportunity to use ICT at any time according to their needs.

Many higher learning institutions have limited experience with systematic planning and implementation of development projects and follow-up.

Objectives

The overall aim of this paper is to evaluate the implementation of e-curriculum as infrastructure for the enhancement of quality projects in learning institutions in Kenya with a view to making recommendations on how such projects should best be deployed and supported.

The following are other objectives of ICT implementation in education through multimedia systems and fuzzy logic systems:

1. To implement the principle of life-long learning / education.
2. To increase a variety of educational services and medium / method.
3. To promote equal opportunities to obtain education and information.
4. To develop a system of collecting and disseminating educational information.
5. To promote technology literacy of all citizens, especially for students.
6. To develop distance education with national contents.
7. To promote the culture of learning at school (development of learning skills, expansion of optional education, open source of education, etc.)
8. To support schools in sharing experience and information with others.

Justification

The important contribution of e-curriculum in computer-based education is to provide knowledge-based access to resources. The history of computerized educational measurement system shows that each generation of educational measurement has shown an increased use of multi media systems.
approaches in order to improve educational measurement activities. In Kenya, there are challenges that hinder quality in education such as:

a) Increasing demand for higher education which has contributed to the lack of planning
b) Lack of resource capacity to adequately address the needs of courses in ICT.
c) Lack of adequately trained manpower to deliver.
d) Poor staff development, and the heavy responsibilities caused due to rising student population, and unclear training policy which affects teaching needs.

New advances in communication technologies, which have already begun to have an impact on education at schools, colleges, and universities (O'Sullivan 2000), hold the promise of overcoming such obstacles. The design, development and use of Fuzzy logic Systems plays a key role in achieving these. Collaborative learning, an increasingly utilized educational approach to teaching and learning that builds knowledge through interaction, is supported by new and emerging technology as summarized by Kofi Annan (United Nations, 2003) when he asserted that: “While education unlocks the door to development, increasingly it is information technologies that can unlock the door to education”

The Government of Kenya sees education as the natural platform for equipping their nation with ICT skills in order to create dynamic and sustainable economic growth (Kenya Government, 2004a, p.67). The Kenya Government holds that the use of ICT in education and training institutions will play a major role in disseminating skills to the wider society and thus create positive impacts in the economy (Kenya Government, 2004a, pp.67-68). If this argument holds then I purpose that Fuzzy logic systems will be the right avenue towards an extensive development of academic standards, policies, and final technology transfer as it will answer many of the raised issues. This research will attempt to contribute to the research in this area with an evaluation of current practice in educational institutions in Kenya and with a view to establishing best practice in educational fuzzy logic systems deployment projects.

Also, this paper will present an affordable infrastructure to facilitate transfer of technology, through fuzzy logic systems hence improving quality of learning and teaching. We further try to exploit the e-curriculum’s opportunities to offer Kenyan education for export. According to Paolo Freire, to teach is to move from being a spectator to being an active participant in the democratic process of making decisions, arguing, and discussing ideas (Heaney 2001). Knowledge is a key element in having a powerful voice and control over decisions regarding the implementation of new technologies in education. Although educationalists are fascinated by the applications of e-curriculum techniques in
various courseware developments, *McArthur et al (1993)* claim that the application of e-curriculum in education has somewhat diversified and the approaches are more fractured. Educators are models to students, and to be models of innovation, they themselves need to actively experience educational innovation in their own training.

**Methodology**

This paper includes a practical study of the research element to investigate questions raised in the study, primarily targeted at e-curriculum users across Kenyan Higher Education institutions. Research methods include: Use of questionnaires based on a standard format to obtain mainly qualitative responses from users, complemented by interviews and focus groups. Thus the study was designed using both qualitative and quantitative survey using Interviews and Questionnaires. The research methodology was designed to facilitate a critique of current practice based on the results of these interviews and questionnaires. Transaction logs were inspected to see how students have used a fuzzy logic system, and compared with the logs of non-students (for example, lecturers and other support staff). As far as possible, validated questionnaires will be used for example, to assess students’ perception of the quality of the learning experience. User needs and Demographic factors (age, educational experience, gender, and home support) also need to be considered in the study. For the qualitative data, a qualitative data analysis software package will be used to assist coding, and derivation of themes, from the interview data. Finally orientation training about e-curriculum systems will be conducted by letting the trainer to run the e-curriculum system.

The proposed study on e-curriculum in education will create important opportunities to the educational developers and e-curriculum so as to discuss important challenges, issues and developments of multimedia media application in teaching/learning for various levels of courses to enhance quality.

**Conclusion**

The fusion of all types of media in a digital world captures the ethos of the new technological age. Multimedia: a combination of video, text, still images and sound can provide an effective learning aid. But the adage, “Putting computers into schools will directly improve learning,” is negated by the reality that, “all this expensive technology will yield little educational return until schools and districts address the need for professional development, technical support, the availability of appropriate software, classroom management, and curriculum integration.”
The full potential of using multimedia technologies for learning in primary and secondary schools can only be realized after there has been some re-engineering of the way learning experiences are offered in the traditional schools and colleges. A critical element is for teachers to be familiar with multimedia technologies in order for them to know how to use them within their curriculum areas.

References


