Towards Enhancing Learning with Information and Communication Technology in Universities

Farida Muzaki and Ezra Mugisa

This chapter explores the expansion of higher education institutions in many developing countries and the corresponding increase in the student population. Putting in place adequate facilities to accommodate the increased numbers of students is very costly. This is particularly true in developing countries of the world where universities are constrained by inadequate funding. In this context great expectation lies in using online learning to enable access to learning resources, provision of instruction and guidelines to learners and for communication between learners and instructors without the two being in the lecture room physically. Online learning provides a strategy to respond to the three major challenges in the provision of university education: cost, demographics and quality. Farida Muzaki and Ezra Mugisa look at how online learning can be adopted in universities and a framework for adaptation is suggested. The framework will identify key areas where centrally coordinated national initiatives are required to enable adaptation of online learning. The framework will be based on the Bates ACTIONS model. Specific organisational issues and existing infrastructure will also be considered. The ACTIONS model looks at access, costs, teaching functions, interaction and user-friendliness, organisational issues, novelty and speed of course development as some of the factors organisations should consider before implementing online learning.

Introduction

Delivering courses via online methods has increasingly become an important issue for universities and an area where a call for research on the implementation challenges and problems has been emphasised. Over the last decade there has been a tremendous shift from conventional teaching and learning to modes where the Internet now plays a key role. Online learning is increasingly forming an integral part of course delivery and instruction, and is shaping traditional learning worldwide (Damonse, 2003). This is due to the ever-increasing number of secondary school leavers. The governments of many countries are expected to expand their higher education institutions to absorb these students. However, putting in place adequate facilities such as lecture rooms as a solution to the problem is very costly. This is particularly true with regard to the poorest countries of the world where inadequate funding is the norm (Zarummai et al., 2004).
Why universities in Uganda should use online learning

Globalisation has made the process of planning for national systems of university education very difficult. Any local planning that does not take into consideration global forces is bound to fail. We seem to be living in a borderless world where whatever happens in one corner of the world affects us all.

It is important to note that higher education is part of the engine of the technology that has brought about globalisation (Kasozi, 2003). Universities have to follow and adapt global education trends in technology and innovation in order to produce graduates that are multiskilled and competitive in the modern workplace (Damoense, 2003).

Higher education systems all over the world are taking advantage of online learning in education delivery. Online learning provides a strategy to respond to the three major challenges in the provision of university education: cost, quality and demographics.

Private universities depend entirely on fees collection to offset institutional expenses while financial support for public universities from government is inadequate and reducing every year. This means that there is need to match improved quality with the limited financial resources that are available.

Maintaining/improving quality with increasing numbers of students can only be effected with fundamental changes in academic instruction and learning how to use new tools and methods. Universities are being evaluated against a different set of standards from those of the past. The emphasis is on outcome. Higher education is judged by what students have learnt, not what they have been taught.

A big percentage of university students are working adults. These students are “place-bound”, therefore this dictates that the “classroom” should not be constrained by time and place.

As Bennett et al. (Bennett et al., 1999) points out the “Virtual Campus” may lead to savings in both real estate and teaching costs. Indeed with the ever-increasing advancement and integration of computer and telecommunication technology, online learning can greatly enhance learning by providing access to learning resources, providing instruction and guidelines to learners and for communication between learners and teachers without the teacher and the student being in the lecture room physically.

Challenges to be Addressed

The most serious challenge posed to higher education is the rapid expansion of university enrolments (Kasozi, 2003; Zarummai et al., 2004 ) yet the educational institutions do not have enough funds to acquire the facilities needed to deliver quality education to increased numbers of students.

The system currently in use, especially in universities in developing countries, is that of only face-to-face lectures, because of the rapid increase in the student populations. Lecture rooms, textbooks, and laboratories are not enough. Given the problem of inadequate facilities, online learning can greatly enhance learning by providing access to learning resources, providing instruction and guidelines to learners and for communication between learners and teachers without the teacher and the student being
in the lecture room physically (Zarummai et al., 2004). Unfortunately the majority of the universities have not set strategies/policies to address factors such as resistance to change, inadequate skilled personnel, infrastructure, among others, that are barriers to the implementation of online learning (Tusubira and Mulira, 2004).

Universities must address issues related to the majority of the students being working adults and inadequate facilities with the use of online learning, so that learning can be separated from the current norm of place and time. That is, course materials are made available to students any time, anywhere. But before universities can embark on putting in place online learning there is need for a clear framework, which acts as a basis on which decisions on online learning are made. In dealing with this problem this paper looks at the following:

- What kinds of techniques are used for online learning by other universities?
- How can these techniques be adapted to universities in Uganda?

We then propose a framework for adaptation of online learning in Uganda.

**Literature Review**

In this section we attempt to provide the scope and depth of the literature on online learning. Whereas the focus is enhancing learning with ICT in universities, the phenomena are treated more generally.

Online learning has been used by universities in Australia, the United States, the United Kingdom, Canada and other places to supplement face-to-face teaching and enhance learning (Housego and Freeman, 2000). It has also been pointed out by Bennett et al. (Bennett et al., 1999) that there is growing interest among Australian universities in the use of the Internet and World Wide Web for teaching and learning. The following are some of the universities currently using online learning:

- University of Western Sydney.
- Open University, United Kingdom.
- University of Phoenix.
- University of South Australia.
- Massey University

It should be observed that the need to cope with increased teaching loads and dwindling resources is one of the reasons why universities have begun incorporating online learning in higher education in recent years. This is supported by Zarummai et al., (2004) who argue that in many developing countries government expenditure on university education is reducing every year.

Housego and Freeman (2000), in their case studies on integrating the use of web-based learning systems into student learning, found that integration of web-based learning systems in teaching and learning can be done in a number of ways. These include improving access to information and resources, use of frequently asked questions and announcements to improve administration, providing additional discussion forums for
feedback and social chat, among others. They also found that the most effective uses of technology-supported teaching are possible when underpinned by student-centred teaching practices that encourage students to adopt a deep approach to learning.

Bennett et al. (Bennett et al., 1999) studied staff development options for online teachers and present a model in which a first-hand experience of online learning becomes the basis upon which university teachers can build to form their own ideas about a particular approach to teaching and learning online. They found out this method provided a genuine learning context allowing staff to experience online learning as students would. The success of this approach as a preliminary staff development tool suggests that for academic staff with little experience of teaching and learning using the Internet, learning about online learning should begin at the first point with hands-on experience of an online course. Participating in such a course and having the opportunity to reflect on and critically appraise it enable staff to draw upon their own teaching knowledge and experience in face-to-face modes and make connections to the new medium. This experience can then become the basis for subsequent staff development programmes focusing on technological issues specific to individual contexts.

Zarummai et al. (Zarummai et al., 2004) highlight the deployment of free open source software tools for distance e-learning in African universities. They observe that given the limited financial resources and capabilities, open source software provides a way for African educational institutions to help themselves, not to wait for the First World to provide help. This will help African countries to leapfrog into the information age through reduced costs, less dependence on imported technology and its ability to be customised to local languages. Moreover, by giving users access to its inner workings, open source software could stimulate the local software industry.

In a study by Ladyshewsky (2004) he found that student performance in online learning environments is in some cases better when compared to face-to-face mode of delivery. He emphasises that when a high degree of pedagogical thought goes into the design and delivery of online learning, and is supported by adequate resources, students can achieve positive educational outcomes. But it is important to observe that to ensure that there is a pedagogical focus to a unit that is offered in technologically supported learning environments, a variety of principles should be followed. These principles include: student-teacher contact through email and bulletin boards, active learning techniques which involve problem solving, inquiry, and project based tasks, prompt feedback, both person-to-person and within the group, communication of high expectations by making criteria and learning outcomes explicit, time on task which involves fostering awareness of time constraints and making contributions relevant, respect for diverse learning communities, learners are given freedom to control and explore, and reciprocity and collaboration among students.

Matovu (2003) carried out a study on information and communication technology issues in Uganda’s education sector in the central region. His findings and conclusions were that there are still many challenges facing ICT spread in the education sector. He highlights the challenges as initial capital being prohibitive, high recurring expenditure and inadequacy of technical personnel. However, it should be observed that he
investigated the level of computer literacy and competence among employees in the education sector. He did not investigate online learning in universities. This renders his study of little use for the enhancement of learning with ICT in universities.

Kasozi (2003), in a study of the capacity of African universities to participate in global higher education supply and production, surveyed tertiary institutions in Uganda. He considers computers and Internet access as indicators of the capacity to generate knowledge. The study found that the average computer-to-student ratio for institutions surveyed was one computer to over fifty students. The study also found that the ICT infrastructure of the institutions surveyed was extremely weak. However, the study did not go ahead to investigate staff access to computers, which is very relevant to this study.

Mulira (2004), in an ongoing study, looks at a service approach to information systems implementation in institutions of higher learning. The study highlights that the services-based approach to information systems implementation proposes a solution that will mitigate the socio-economic inhibitors that have led to the negligible efficiency gains in the deployment of automated information systems.

Research Methodology

A descriptive survey design was used for the study. Data was collected through document analysis. We chose this method because, given the nature of this study, it provides valuable information about the problem. According to Krishnaswami (Krishnaswami, 2002) document analysis is a research technique for making inferences by objectively and systematically identifying specified characteristics of contents of documents.

Articles and surveys in the literature of online learning implementation in universities was used to develop the theoretical framework.

This research takes the case of Uganda’s universities and explores how to develop a framework for adapting online learning techniques that are being used elsewhere in the world to enhance learning in Uganda’s university education.

The population of this study consisted of universities in Uganda. These universities fall in two categories listed below:

- Public universities: Universities sponsored, ruled and funded by government. These include Makerere, Kyambogo, Gulu and Mbarara universities.
- Private universities: These include Nkozi, Nkumba, Mukono, Islamic University in Uganda, Kampala International University, Kampala University, Bugema, Namasagali, Ndeje and Aga Khan. These private universities have been founded and are owned by non-governmental organisations mostly religious organisations, or by private entrepreneurs. Most of the private universities are still very small and very fragile. They are not well funded.

Proposed Solution

This paper proposes a framework for the adaptation of online learning to the Ugandan environment.
A framework is a model that can be used to guide policy, decision-making or future strategic planning. It will provide a direction for the adaptation of online learning in Uganda’s universities.

The framework will identify key areas where centrally coordinated national initiatives are required to enable efficient and effective online learning adaptation. It will also include a vision and set of principles for adaptation of online learning in Uganda.

We will develop a framework basing on the Bates ACTIONS model for organisational frameworks for consideration of educational technology. This model discusses access, costs, teaching functions, Interaction and user-friendliness, organisational issues, novelty and speed of course development/adaptation as some of the factors for consideration in the organisational framework for consideration of online learning. The ACTIONS model proposed by Bates (Bates, 1997) also focuses on institutional strategies.

Interim Lessons

Literature analysed in this study indicates that:

Online learning in universities where it has been implemented is not treated as an overnight task. It is accepted that the process takes time and resources and motivation is also an important consideration if the outcomes are to be of appropriate quality. For example, at Massey University in New Zealand, it has been left to individual colleges to decide, the extent to which online services are compulsory or voluntary for students and to what extent the teaching, servicing and communication with students is conducted online.

At Massey University staff training is run by the central computing support and training and development unit, with the help of instructional design consultants. These range from use of WebCT to creating effective online courses. This is because they have realised that providing a tool does not guarantee quality without proper instructional guidance. Lecturers are allowed a certain level of creativity and flexibility required to create courses. This means some online courses may use delivery platforms other than WebCT, or may create particular tools outside the WebCT environment to suit the individual needs. The university provides centralised support for WebCT, but individual colleges and departments can use other solutions as justified by the needs of individual programmes as long as there are adequate resources available to support that solution within the college or department.

Quality assurance in online learning and teaching at Massey University is the responsibility of the centralised online learning-monitoring group. This approach ensures that the rules are the same for all regardless of campus, department or course. The majority of the standards for the development, delivery, support, and assessment of online courses including instructional design still remain the responsibility of various central units. The quality assurance of actual curriculum and content and its adequacy to the overall programme remains with the departments and colleges.

At the University of South Australia they developed a system for online learning called University of South Australia network (Unisanet). This system is available to every staff member and all students. It accommodates as many courses as possible without further
technical development. It involves linking of both existing corporate databases and custom-built data stores to webpages, operated through a standard web interface using web forms and wizards. These are prepared by the Unisanet project team and allow academic staff to create content and shape the teaching and learning arrangements of online subjects without requiring specialist or other necessary support.

At the University of Phoenix, all instruction is organised around a collaborative model that positions the instructor as a learning facilitator. Programmes are developed by faculty teams to ensure that course objectives and outcomes are presented in a sequence that builds both knowledge and confidence. This learner-centric approach is complemented by a customer orientation that places high value on all aspects of customer service.

Each student is provided with a team of specialised counsellors who work together from their respective areas of expertise to ensure accurate and timely assistance with enrolment, finance and academic services. The University of Phoenix offers complete degree programmes entirely online. This includes all administration, registration and acquisition of course materials.

The curriculum is outcomes-based and workplace-oriented. All faculty must be employed in the area they teach. Every student works in a study group or team to develop workplace skills such as critical thinking, teamwork and so on. Testing takes place to ensure that the students are learning and that faculty is teaching what they are supposed to teach. The curriculum is professionally developed on a master curriculum calendar and is assessed every year, ensuring that courses are kept up to date.

At the University of Western Sydney, webCT is the online learning software being used. The university has incorporated the theme of enhanced flexibility into a five-year strategic plan to provide high quality education offerings. The goal is to ensure there is online content for every unit of study by the end of 2005, and that every course would have at least one core unit of study that is completely online. A number of steps have been taken to ensure quick and acceptable implementation of WebCT. They had to ensure that WebCT is supported by the university’s existing information technology infrastructure. A robust interface was developed between WebCT and other enterprise level systems, especially for student administration. The existing learning materials were consolidated from other systems to WebCT as quickly as possible by enabling staff to migrate content themselves.

An online support service for staff and students was established, creating business practices that embed quality improvement and assurance measures.

Staff training addressed diverse needs since some staff had never used online learning before while others were well known online learning innovators. Two members of staff completed WebCT’s certified trainer programme. These conducted workshops on maximising the use of WebCT, as well as identifying the best practices from across all colleges and schools. In particular attention was paid to ensuring that the learning management system is supported by the university’s existing IT infrastructure.
Framework for Adaptation of online Learning

The proposed online learning adaptation framework portrays the issues that need to be considered when a decision on the adaptation of online learning is to be made. A framework is a blueprint or model that can be used to guide policy, decision-making or future strategic planning.

The ACTIONS model developed by Bates (Bates, 1997) will be used in coming up with the proposed framework. The reason for the choice of the ACTIONS model is that it provides room for including the organisational issues, both external and internal, that are specific to a given institution. It also looks at the existing infrastructure of a given country and government initiatives as influencing factors in online learning consideration. However, in the context of a developing country like Uganda, the existing infrastructure, power supply, resistance to change, Internet access and access to computers are important factors that cannot enable us to implement online learning techniques as they exist in the developed world, and this calls for adaptation.

The ACTIONS model looks at the following issues:

Access

The minimum requirement for use of online learning is a computer, communication program and access to the Internet. Therefore issues of access to computers and the Internet both at home and at university should be considered. In Uganda very few university students have access to a computer and Internet at home. Universities must have enough computers on campus to enable students access to online learning materials.

Kasozi (Kasozi, 2003) observes that computers have increasingly become both exercise books and textbooks for University students. For every four students there should be one computer as well as access to the Internet. Students need at least six hours of computer hands-on-practice each day in order to gainfully use them.

In a study by Kasozi (Kasozi, 2003), it was found that in the academic year 1998/99 at Mbarara University of Science and Technology there where 10 computers for the 419 registered students. For about every 41 students there is only one computer. It is also important to observe that there is one Internet user for every 5000 people in Africa in (World Bank, 2000).

Costs

The costs associated with using online learning generally include capital costs for the purchase of equipment and operational costs as instructional development costs, staff costs, and maintenance costs.

It is important that the policy addresses the specifics of how funding will be raised to sustain services and systems. The key recurrent cost elements that should be considered include: cost of bandwidth, cost of maintenance of equipment and applications, recurrent cost of software licences, cost of replacement of equipment. It is important to note that a computer bought today must be replaced in three to five years’ time.
Emoluments for ICT professionals have also to be considered; they are generally at levels that are likely to be higher than the average because of competition for the same human resource by the private sector.

The cost issues also impact on decisions such as whether or not to use freeware and to develop internal capacity for software development. It also impacts on the decisions of whether or not to outsource information resource management services.

**Teaching and Learning**

Bates (Bates, 2000) observes that “the best use of technology occurs when the academic not only has a deep understanding of the subject but also has an imagination and vision of how the subject could be taught differently with technologies”. Technology-based learning is best served through teachers utilising a project management model, a central faculty development office, a problem-based approach, and show and tell demonstrations by peers. For the learner enhanced skills in analysis, argumentation, research and critical thinking as well as collaborative project work, and knowledge building are key educational benefits.

But it is important to note that in Uganda the number of people qualified to teach in universities in the whole country is limited and some staff are not fully or adequately trained to do their job properly.

**Organisational issues**

Online learning will require that a number of organisational arrangements be made and barriers removed.

There is need for such creation of awareness and changing of mindset within the University. Lack of awareness goes along with mindset in that people get stuck to old ways of doing things.

A key to addressing change of mindset is full involvement in the process of creating the online environment and getting key decision-makers to visit other institutions where online learning has been implemented and where its benefits can be seen (Tusubira and Mulira, 2004).

Organising workshops to create awareness can help in addressing awareness and mindset problems.

There is need for ongoing commitment and involvement of top management and the whole team.

It is important to make online learning responsive to the university vision and mission

**Telecommunication Infrastructure**

Online learning requires Internet access, and transmission of multimedia materials requires high bandwidth.

Universities can tackle some issues themselves. They can come together in order to buy bandwidth in bulk so as to reduce costs. To gain this kind of negotiating power, institutional leaders and IT departments must cooperate. Institutional managers should also have policies for using bandwidth sensibly by defining acceptable use. These cover
the kind of data that may be transferred to and from the institution and the type of websites that may be visited.

Summary

Universities in Uganda have the challenge of responding to increased numbers of students leaving secondary school yet there has been no significant increase in funding from government.

This challenge can be resolved through adapting new methods of delivering higher education. Online learning can be used to overcome this challenge. But there is need for a framework that acts as a model in guiding the adaptation of online learning. This study is intended to come up with such a framework.

The findings from this study have not yet been concluded, the framework is not yet complete. However, the interim findings from this study provide universities in Uganda with what other universities in the world have done and this gives them a clear picture of how they can adapt online learning to the Ugandan environment, considering the cultural and economic differences.

References


