ICT Enabled Learning and Teaching Innovations in Higher Education

On

Mainstreaming Information and Communication and Technology in Research, Higher Education Delivery and Management

By

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ABSTRACT

It is overwhelmingly clear today that new age 21st century Information Communication Technology (ICT) has taken over the lesser sustainable old age traditional information communication models and is being incorporated more and more, challenges notwithstanding, into higher education delivery services.

African higher education institutions must therefore tap into the invaluable opportunity that ICT provides towards contributing to the efficient and effective delivery of higher education in today's modern technologically inclined world environment.

However, it is hard to use video materials for the electronic learning contents and provide the video meeting system among members since the Internet infrastructure in these countries is not good enough for applications requiring high speed network.

Despite the opportunities that ICT provides for efficient higher education delivery, several existing challenges seriously impede the full integration of ICT into higher education delivery.

These challenges include the unavailability of adequate ICT resources in higher education institutions, low student to ICT ratios, ICT illiteracy, ineffective curriculum development to suit electronic learning and teaching models, lack of appropriate ICT skills by the higher education stakeholders, limited or no access to power, costly internet access and challenges in the preparation, planning and maintenance of quality in the standardization of locally developed intellectual content.

The objective of this research study paper is to determine the; sustainable development benefit of ICT enabled learning and teaching innovations in higher education, challenges to their integration into higher education and policy recommendations to overcome those challenges.

The research design was of a descriptive survey nature based on a purposive critical analytical literature review methodology sourcing relevant purposively sampled literature on the; sustainable

development benefit of ICT enabled learning and teaching innovations in higher education, challenges to their integration into higher education and policy recommendations to overcome those challenges.

The conclusion arrived at was that efficient ICT enabled learning and teaching innovations' integration into higher education is of critical positive significance to sustainable development of higher education in the developing world, however, it is hard to use video materials for the electronic learning contents and provide the video meeting system since the internet infrastructure in these countries is not good enough for applications requiring high speed network and policy intervention is a prerequisite for remedial action to this challenge among other interrelated challenges to the efficient integration of ICT enabled learning and teaching innovations into higher education.

Key words: electronic-learning systems, higher education delivery, ICT-enabled, monitoring, teaching innovations, streaming, quality

Introduction

Background

This research study paper seeks to support the proactive adoption of current technologies of e-Learning and teaching platforms in the higher education sector of especially developing countries.

Chunwijitra (2012) opines that the recent progress of information and communications technology (ICT) and information of society has made internet-based communication become a popular approach and widely used methodology in delivering various higher educational programs.

Graduate students are continuously in need of learning more advanced knowledge but often times have limited opportunities due to time, location and cost limitations.

To support self-learning in higher education, a Virtual Learning Environment (VLE) is considered.

Moreover, the trend of video-based learning content is increasing since it can increase the students' intention to learn with the attractive content.

Cloud computing system, being a popular technology, is considered to serve the server side services because it can be implemented in a wide variety of architectures and technologies. It can also minimize IT investment costs for the higher education sector.

The implementation of a cloud computing to e-Learning system has its peculiarities and therefore needs a specific approach for the developing countries where the Internet condition is not good enough.

In addition, students today are often referred to as 21st Century learners, primarily because of the ubiquitous access they have to technology. What sets them apart from other generations is the way they process information and choose to participate in the educational experience.

Dr. Sarah Elaine Eaton, an educational leader, researcher, author and professional speaker identifies 21st century learners as often having higher levels of digital literacy than their parents or teachers; not knowing a world without computers; demanding the freedom to show their wild creativity; wanting to connect with others in real time on their own terms; wanting their social media, phones and mobile technology; wanting to be connected all the time in a way that makes sense to them and expecting inter-disciplinary understanding that subjects are inherently interconnected.

Higher education and life-long human resource development are urgent issues to support the sustainable development of a global society.

However, the traditional style of face-to-face education is not able to meet the demands of the society because of the limitations in location, time and cost.

An Internet-based e-Learning system should be utilized to support higher education activities according to current social requirements.

Information Communication Technology (ICT) enabled electronic teaching, learning and quality monitoring systems and innovations enhance higher education service delivery and quality monitoring and evaluation as enviably observed thus far in the developed world that has fully embraced ICT into their higher education service delivery and quality monitoring systems to tremendously good effect, a leaf that the developing world should and must definitively borrow so as to realize the same benefits.

ICT enabled electronic teaching and learning as a part of the existing broader electronic communication platform environment is a more flexible, efficient and effective instrument and tool that can be used to actualize greater efficiency and effectiveness in higher education delivery and quality monitoring as opposed to the pre-existing traditional higher education service delivery and quality monitoring model based limitations characterized by the non-digitally inclined old fashioned traditional higher education service delivery and quality monitoring methodologies.

The growing trend in the adoption of ICT enabled electronic higher education service delivery and quality monitoring models in Uganda such as the electronic Academic Information Management System (AIMS) within institutions of higher learning such as Kabale University has to a relatively greater extent largely enhanced efficiency and effectiveness in higher education service delivery and quality monitoring, challenges notwithstanding.

ICT enabled higher education service delivery and quality monitoring has greatly improved the professional proficiency of academic and administrative staff in relevant up to date 21st century competencies and skills acquisition within universities and other tertiary institutions of higher learning in Uganda.

Higher education academic staff such as those at Kabale University, as an example of ICT enabled electronic professional staff development, join online peer group professional communities to collaborate and share academic knowledge and information electronic resources and subsequently take full advantage of any and all professional development opportunities available therein which ultimately translates into more efficient and effective higher education service delivery and quality monitoring.

Despite the numerous existing sustainable development benefits and opportunities that digital electronic ICT adoption provides for the efficient higher education service delivery and quality monitoring process, several existing challenges still seriously impede the full integration of ICT into higher education service delivery and quality monitoring in Uganda.

Such challenges include the unavailability of adequate ICT resources, low student to ICT ratios, ICT illiteracy, ineffective curriculum development to suit electronic learning and teaching models, lack of appropriate ICT skills by the higher education stakeholders, limited or no access to power, costly internet access and challenges in the preparation, planning and maintenance of quality in the standardization of locally developed intellectual content.

Other challenges include narrow band width internet, poor and insufficient internet network infrastructure for applications requiring high speed internet bandwidth, in-availability of high quality internet service and prevalent lack of educational resources.

Statement of the problem

Several challenges impede efficient integration of ICT enabled learning and teaching innovations into higher education.

Such challenges include the unavailability of adequate ICT resources, low student to ICT ratios, ICT illiteracy, ineffective curriculum development to suit electronic learning and teaching models, lack of appropriate ICT skills by the higher education stakeholders, limited or no access to power, costly internet access and challenges in the preparation, planning and maintenance of quality in the standardization of locally developed intellectual content, narrow band width internet, poor and insufficient internet network infrastructure for applications requiring high speed internet bandwidth, in-availability of high quality internet service and prevalent lack of educational resources.

This is a critical problem that this research study seeks to try to examine and address.

Purpose of the study

The purpose of this research study is to identify challenges impeding efficient integration of ICT enabled learning and teaching innovations into higher education in developing countries, a critical issue that urgently requires sustainable development policy intervention remedial action by any and all pertinent stakeholders for the sole purpose of achieving real time meaningful gain of the sustainable development of the higher education industry sector of developing countries such as Uganda which is the intended critical problem solving focus study area of this research study.

Significance of the study

It is evident now that in future developing countries will definitively play a significantly key role in the global sustainable development discourse more than ever before when opportunities for ICT enabled learning and teaching innovations in higher education were lacking, a worthy cause that must be championed by any and all pertinent stakeholders and development partners.

The beneficiaries of this research study include, but are not limited to, higher education institutions especially in developing countries, graduate students, scholars, academicians, researchers, education policy makers and development partners in the higher education sector, ICT service providers, administrators and the general academic community.

Objectives of the study

General Objective

The general objective of this research study is to determine the sustainable development benefit of ICT enabled learning and teaching innovations in higher education, challenges to their integration into higher education and policy recommendations to overcome those challenges.

Specific Objectives

1. To identify the existence or none thereof of the sustainable development benefits and opportunities of the full ICT enabled learning and teaching innovations' integration into higher education.
2. To identify the existence or none thereof of challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education.

3. To identify policy recommendations to overcome challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education.

Research Questions

1. Are there sustainable development benefits and opportunities of the full ICT enabled learning and teaching innovations' integration into higher education?
2. Are there challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education?
3. **What policy recommendations can be identified to overcome challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education?**

Scope of the research study

Content scope

The content scope of this research study will primarily revolve around the determination of sustainable development benefits and opportunities of ICT enabled learning and teaching innovations' integration into higher education, challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education and policy recommendations to overcome challenges impeding the full integration of ICT enabled learning and teaching innovations' integration into higher education.

Geographical scope

The geographical scope of the research study will be a representative literature review coverage of global, continental (African) and regional (East African) higher education service delivery industry practitioners' best practices and efforts in ICT integration into their profession.

Time scope

On a temporal scale, the research study span over a period of approximately one months' time from its commencement date in order to effectively come up with sufficient data to meaningfully, accurately and precisely realize the research study objectives.

Conceptual framework

The independent variable of the research study is the sustainable development benefit of the full ICT enabled learning and teaching innovations' integration into higher education.

The dependent variable of the research study is the efficiency of the full integration of ICT enabled learning and teaching innovations' integration into higher education.

The intervening variable of the research study is the summation of all the limiting factors and challenges to the efficient full integration of ICT enabled learning and teaching innovations' integration into higher education.
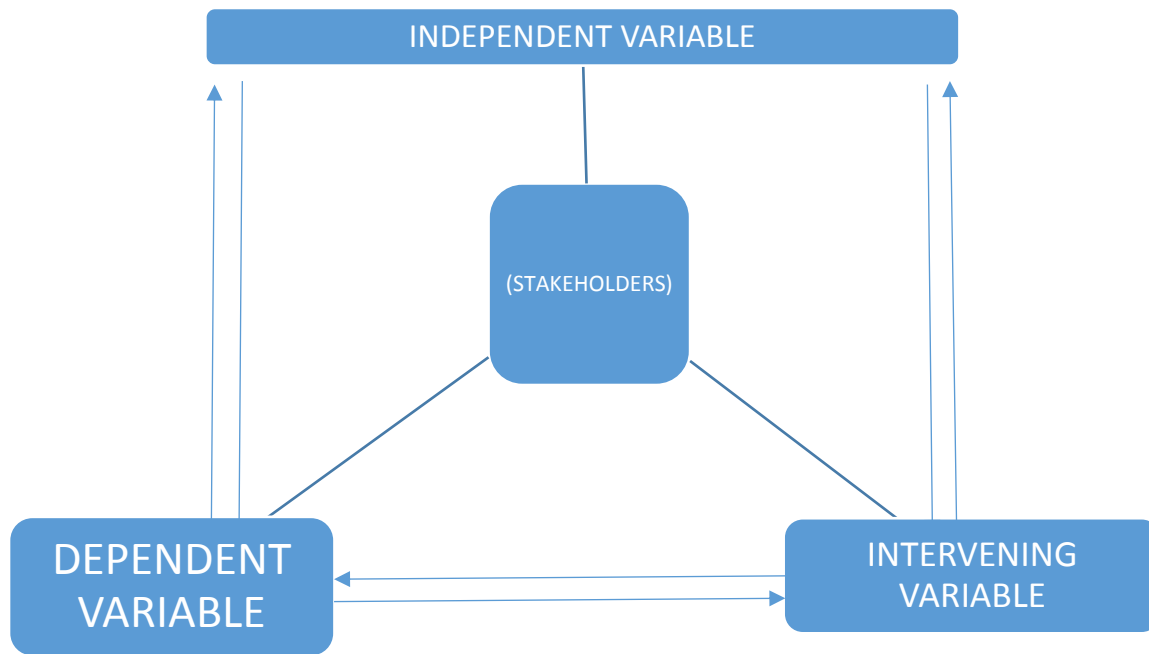
<center>**Literature review**</center>

Sustainable development benefit of ICT enabled learning and teaching innovations in higher education

Video based content format is increasing since it has more attractive visualization than former formats. In fact, streaming video can offer very exciting opportunities for online teaching and learning. Not only the video based content is required to support the new learning environment, but also electronic meeting technology for real time online lecture and meeting. Currently, several electronic learning systems have been established to support academic institutions in rural areas. Likewise, many collaborative projects have the target to increase the number of electronic learning contents based on video materials to be shared within the collaborative developing countries (Chunwijitra, 2012).

In a 2008 article, Rosen and Nelson describe a generation of students who are comfortable with and enthusiastic about using collaborative technologies to proactively and competitively participate in the World Wide Web as creators rather than consumers.

These students gravitate toward group activity, seeking interaction within thriving online communities of generative individuals.

In addition to enabling content creation, collaborative technologies such as video extend and reach beyond the classroom walls. Interactive video can support new learning and teaching experiences across cities, states and even countries.

This proactive competition challenges students to design, deliver and share live interactive content programs for peers and younger students.

The contest takes students out of their classrooms and around the world, using telepresence technology to share their lessons, teach living history and gain proficiency in 21st century skills.

There is a growing trend towards student-teacher collaboration using live video conferencing and telepresence technologies.

The next wave of videoconferencing adoption is expected to consist of increased student collaborative projects and student creation and delivery of content which will include a shift to desktop video conferencing and other collaborative technologies over time.

This growth has been fueled by the obvious benefit of personal face-to-face communications that increases student and teacher participation.

In addition, these technologies reduce travel costs and allow districts to spread scarce resources among many students.

The growing trend toward video seems to substantiate teachers' beliefs that technology devices and web-based systems help them engage students in learning and enable them to do their jobs better.

Schools and administrators can also use video technologies for building professional development programs.

Teachers often join online professional communities to collaborate and share resources with other teachers and take advantage of professional development opportunities (Chunwijitra, 2012).

Challenges impeding the full integration of ICT enabled learning and teaching innovations in higher education

Chunwijitra (2012) opines that the social demand for internationalized educational programs is continuously increasing and that the challenging role of universities is therefore to change the learning environment to an electronic communication approach because the traditional classroom based education cannot respond to this kind of on demand distant learning and social demands.

Unavailability of adequate ICT resources, low student to ICT ratios, ICT illiteracy, ineffective curriculum development to suit electronic learning and teaching models, lack of appropriate ICT skills by the higher education stakeholders, limited or no access to power, costly internet access and challenges in the preparation, planning and maintenance of quality in the standardization of locally developed intellectual content impede ICT enabled learning and teaching innovations in higher education as further opined by Chunwijitra, (2012).

Other challenges include narrow band width internet, poor and insufficient internet network infrastructure for applications requiring high speed internet bandwidth, in-availability of high quality internet service and prevalent lack of educational resources in especially developing countries (Chunwijitra 2012).

Chunwijitra (2012) further goes on to make another compelling argument that aside from the lack of e-learning contents in developing countries, the network infrastructure in these countries is not good enough for applications requiring high-speed bandwidth and that it is hence therefore hard to use the video materials for e-learning contents within and outside the region of these developing countries. He further highlights the existence of several users' technological requirement inadequacies in line with convenience and quick creation and editing content, ability to save editing stages and ability to continue editing in the last saved editing stage, employment of existing raw video files to be re-used as new learning content in suitable method and ability to use applications without software installation.

Recommendations to overcome challenges to ICT enabled learning and teaching innovations in higher education

To efficiently utilize and functionalize ICT enabled learning and teaching innovations in higher education in developing countries, the steadfast availability of high quality ICT services and infrastructure must be able to meaningfully provide advanced higher education environments within long term sustainable operation in the context of appropriately meeting the sustainable development needs and demands of the developing world (Chunwijitra, 2012).

Adoption of ICT in African Higher Education Institutions (HEI) can be better implemented once the following interventions are undertaken.

These include; waivers on ICTs for Education, conducting ICT Integration in Education sensitization and awareness workshops for institutional heads and teachers; strengthening inter sector linkages and collaborations to create synergies for effective integration of ICT in education, encouraging institutions to collaborate while purchasing things like internet, collaboratively procure e-subscription to e-resources, develop more localized content within the African setting, improving access and provision of ICT integrated education to special needs people and institutions of learning and adopting open source learning management system for costs saving purposes (Lubega, 2017).

Integration of ICT within Higher Education Institutions (HEI) in Africa is slowly taking shape with several institutions appreciating its potential to offer ubiquitous teaching and learning to both teachers and students.

The integration has taken a form of use of computers and internet, TV, radio, video conferencing and mobile learning.

This integration of ICT within the educational sector should and must depend on several things such as activity to be undertaken, processes involved, target audience, availability and accessibility of resources as opined by Lubega (2017).

However, it should be noted that integration of ICT in education is not only about educational delivery but includes education management, administration, communication, finance and security. It is therefore important to understand the requirements under which a particular service needs to be enabled using ICT if there is going to be returns on investments (Lubega, 2017).

Methodology

Research design

The research design was of a descriptive survey nature based on a purposive critical analytical literature review methodology sourcing relevant purposively sampled literature from Library and Information Science (LIS) data bases and the world-wide-web for grey literature using a purposively selected higher education academic library service provider target population.

Discussion

The findings of this research study explicitly imply that for higher education to stay relevant by meeting its digitally inclined end user needs in the current age of modernization and industrialization, digitally and technologically inclined transformation and redefinition of the sector to effectively and efficiently satisfy and conform to current global knowledge and information communication trends is obligatory and mandatory, to say the least!

The conclusion arrived at was that efficient ICT enabled learning and teaching innovations' integration into higher education is of critical positive significance to sustainable development of higher education in the developing world.

However, it is hard to use video materials for the electronic learning contents and provide the video meeting system since the internet infrastructure in these countries is not good enough for applications requiring high speed network.

And therefore, policy intervention is a prerequisite for remedial action to overturn this pressing challenge among other interrelated challenges to the efficient integration of ICT enabled learning and teaching innovations into higher education in a bid to realize sustainable development of higher education in developing countries such as Uganda.

The electronic learning system has a positive organizational impact on universities such as improving job performance, assisting academic and administrative staff to think through problems and allowing higher education organizations to provide better and newer products and services to their end users (clients). The main strategic objective for universities should and must be therefore to raise the job performance of their staff through utilizing and using the new educational technologies within the educational process.

With the usage of the electronic learning system provided by universities, academic faculty staff members should be able to utilize a better competitive advantage in order to do their jobs well. Therefore, faculty members are strongly urged to improve their skills in dealing with technologies such as electronic learning in order to do their jobs better and then enhance their performance.

Recommendations

Literature in the field of electronic learning and teaching innovation systems' integration into higher education specifically the evolution of these systems to measure organizational impact, especially in developing countries such as Uganda is still lacking and therefore more contribution by researchers and scholars as well as any and all other pertinent stakeholders is overwhelmingly recommended.

This will motivate researchers to more proactively explore this crucial area of research with the aim of bringing the desired expected positive higher education sustainable development impact and outcome of electronic learning systems' integration into higher education in developing countries.

Educational environments are changing quickly in developing countries as the generation of students grows up with applications such as Twitter and Facebook, technologies such as smartphones, tablets and other devices. Although schools have been broadly adopting laptop computing and wireless technology for the past decade, students increasingly and perhaps unwittingly are accelerating change in teaching and learning. New social media applications and a proliferation of new technologies and devices must be integrated into teaching to engage students as a matter of educational policy in order to keep up with and adapt to the new age of doing things in this 21st digitally inclined century.

Therefore, curriculum reevaluation and development incorporating mandatory ICT inclusion into higher education programs is highly recommended as a matter of higher education policy reform and intervention going forward.

The ICT enabled learning and teaching innovations in higher education, especially for public universities and other tertiary institutions in developing countries such as Uganda, are generally supported and funded by the National budgets. This effort is recognized, commendable and further encouraged and recommended as noted by Kigongo-Bukenya and Musoke (2011).

However, the budgets approved by governments to support ICT enabled learning and teaching innovation integration and development in higher education in developing countries in general are by far and large inadequate for the sustainable development of the sector as noted by Kigongo-Bukenya and Musoke (2011).

Consequently, additional financial and technical support from these governments in developing countries, international agencies and development partners such as NORAD, NUFU, the Carnegie Cooperation of New York, Ford Foundation, Sida/SAREC, the World Bank and the African Development Bank among others is recommended in order to achieve the efficient and fully functional integration of ICT enabled learning and teaching innovations into higher education in developing countries as noted by Kigongo-Bukenya and Musoke (2011).

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