Issues of Adoption: Have E-Learning Management Systems Fulfilled their Potential in Developing Countries?

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ABSTRACT

Despite the potential of learning management systems to support both blended learning and learning that is entirely delivered online, the majority of LMS-supported e-learning initiatives in developing countries do not fulfill their potential; they fail, either totally or partially. To identify the underlying causes of failure, a survey was conducted through interviews with key e-learning personalities directly involved in e-learning initiatives in five universities in Africa. Some of the most probable causes of failure were identified as: high ICT illiteracy rates among the student community; low comfort levels with technology; usability issues of learning management systems; poor marketing strategies; ineffective maintenance strategies and insufficient user/technical support. The dimensions of these causes of failure are discussed, as are the probable interventions likely to avert some of them. The findings are intended to inform further research towards more successful deployment of learning management systems in developing countries.

Keywords: Learning Management Systems, E-learning, Developing Countries

1. INTRODUCTION

E-learning has been defined as the learning supported or enhanced through the application of Information and Communication Technologies (ICTs). E-learning covers a spectrum of activities from supported learning to blended learning and to learning that is delivered entirely online. Blended learning, where e-learning activities and traditional instructor-led learning activities are coupled to facilitate full-time learning for the students is the model of choice for many institutions both in the developed and developing countries. According to Singh [32], blended learning combines multiple delivery media that are designed to complement each other and promote learning and application-learned behaviour. A blended learning program may include several forms of learning tools and mixes various event-based activities, including face-to-face classrooms, live e-learning (synchronous) and self-paced e-learning (asynchronous).

Institutions in developing countries are mimicking the trends of e-learning with the expectations of reaping the same benefits enjoyed by institutions in developed countries [18, 29]. The move towards e-learning can be justified by the numerous benefits associated with it, which include increased efficiency and cost reduction, transparency, scalability, flexibility, accessibility consistency and improved student performance [5, 7, 37]. However, while the majority of these benefits are enjoyed by institutions in the developed countries [25], most e-learning initiatives in developing countries have not been successful [5, 18, 27, 29, 31, 38].

Among the e-learning tools on the market, learning management systems (LMSs) are viewed as the most basic and reliable e-learning tool in blended learning environments, and they are often the starting point of any Web-based learning program [3, 7, 17]. Learning management systems are domain independent, have better administration capabilities, integrated authoring tools, and support the design and publication of reusable learning resources. However, despite their potential, many LMS-supported e-learning initiatives, especially in developing countries, fail, either totally or partially.

While the success and failure factors of ICT solutions in developing countries have been widely studied, there appears to be a gap in trying to sufficiently answer the specific question of why many LMS-supported e-learning initiatives in developing countries do not fulfill their potential. Some studies [11, 12, 13, 21,31] deal with the broader issues of ICT adoption and use by academic institutions, while others [10, 29, 30] mainly focus on policy, regulatory and socio-economic issues facing e-learning adoption in higher education, and give less attention to technological barriers to e-learning. Romiszowski [25] and Saeedikiya [27] generalize the

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success and causes of failure of e-learning without giving any particular attention to LMS-supported e-learning. In addition, most studies on LMSs such as [8, 22, 24] have been drawn from developed countries. In view of the technological digital divide, there is therefore a need to identify the barriers towards LMS-supported e-learning initiatives in respect of developing countries so that specific solutions to avert them can be sought. This is where this study seeks to make a contribution. The study presents some of the answers to "Why many LMS-supported e-learning initiatives in developing countries do not fulfill their potential", based on interviews with experts and literature review to map out the problem space.

2. LITERATURE REVIEW

2.1 E-learning and the Digital Divide

In this study, developing countries are defined as countries operating within ICT resource-constrained conditions and where the populations barely have basic knowledge in using ICT solutions. When compared to the developed countries, the situation is described as the digital divide. According to Khan [18], developing countries are a long way behind developed countries in e-service implementation, and the gap is widening over time. The ever-widening gap can be attributed to several challenges that span from human resources to technical issues. Specifically, as applied to e-learning, digital divide refers to the disparity in availability, skill readiness and ability to access computers and the Internet together with the ability to effectively use this technology to enable full training and learning [4].

2.2 Choosing an LMS for E-learning Implementation

A number of LMSs have been developed, including but not limited to: some popular commercial systems [20, 25] such as Blackboard and WebCT and open source LMSs [1] such as Moodle, Atutor, Ilias, Sakai and Kewl. The open source LMSs have received significant attention, especially from institutions in developing countries because, to them, the ability to acquire educational software without paying license fees is an important advantage [7]. The large number of available LMSs on the market today presents yet another daunting task to the academic institutions – making a choice that will satisfy most, or all, of their requirements [7]. However, selecting any tool or delivery medium for e-learning must fit well within a structured e-learning implementation plan of the institution, as well as the e-learning implementation stages [19, 27]. Saeedikiya [27] suggests six stages named as: diagnosis, decision making, design, development, delivery and post delivery, and three phases (preparation, operation and post operation) in the implementation of e-learning in traditional universities. Khan [19] also suggests six stages, named as: planning, design, development, evaluation, delivery and maintenance, and two phases (content development and content delivery and maintenance). Although the stages are named differently by the different scholars, there seems to be agreement on the activities that happen at each of the six stages. Specific challenges are encountered at each of these stages. Table 1 summarizes the literature about the nature of challenges anticipated at each of these stages of e-learning implementation, and Figure 1 shows the sequencing of the stages.

Table 1: Stages of e-learning implementation and the challenges anticipated at each stage

Stage of e-Learning		Who is Involved	Nature of Challenges Anticipated
According to Khan (2004)	According to Saeedikiya *et al.* (2010)		
Planning	Diagnosis	Institutional Managers, Business Managers, E-Learning Experts	○ Evaluating existing e-learning initiatives and determining critical success factors. ○ Defining pedagogical and financial plans. ○ Identifying the right people, processes and products of the subsequent stages.
	Decision making		○ Estimating the durations and precedence of tasks.
Design	Design	E-Learning Experts, Technocrats/Technicians, Subject Matter Experts, Instructional Designers	○ Defining students' needs and institutional capabilities. ○ Selecting appropriate delivery medium. ○ Reviewing course content for pedagogical soundness.
Development & Evaluation	Development	Technocrats/Technicians, Teachers / Subject Matter Experts, Students, Evaluation Experts	○ Managing timelines and communication breakdowns. ○ Taking care of continually emerging issues demanding new changes. ○ Managing Pilot. ○ Conducting formative evaluation. ○ Procedure for summative evaluation.
Delivery	Delivery	Teachers, Students, Technicians	○ Maintaining access control and information confidentiality.
Maintenance	Post delivery	Technocrats/Technicians, Teachers	○ Monitoring and updating of the e-learning environment. ○ Providing the required technical support to users.

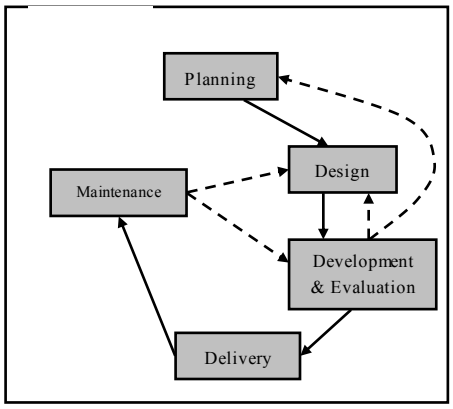

Figure 1: Sequencing of the stages of e-learning implementation

At the delivery stage of e-learning, five stages of online interaction between the students and the teacher are identified: access and motivation, online socialization, information exchange, knowledge construction and development [6, 28]. According to Salmon [28], each stage requires different types of support from teacher, without which learning may fail to take place.

In addition to the anticipated challenges at each e-learning implementation stage illustrated in Table 1, literature further reveals some of the most common pitfalls that academic institutions have to avoid when implementing e-learning initiatives. These include: believing e-learning is a cheaper training alternative; overestimating results; overlooking the shortcomings of self-study; failing to go beyond courses; viewing content as commodity; ignoring technology; failing to involve information technology staff; over-relying on technology; assuming learning transfers; and believing that if you build it, they will come [36].

2.3 Where are the Gaps?

The nature of challenges anticipated at each level of e-learning implementation illustrated in Table 1 above shows that the challenge of choosing an appropriate delivery medium (which in this case is the LMS) occurs at the design stage. This therefore means that investigating the success or failure of the LMS has to start at the design stage. Additionally, Table 1 demonstrates that choosing the delivery medium is the responsibility of the E-Learning Experts and Technocrats/Technicians. The involvement of the Subject Matter Experts and Instructional Designers at the design stage is to take care of defining students' needs and reviewing course content for pedagogical soundness.

Furthermore, the involvement of the E-Learning Experts and Technocrats/Technicians at the planning stage through the design, development, evaluation, delivery and maintenance stages suggests that they are best positioned to know about the success and failure factors of the deployment of e-learning management systems in their institutions. These people, who may be referred to differently in different institutions, are referred to as key e-learning personalities in this paper from this point forward.

3. STUDY APPROACH

Through convenience sampling, five universities from five developing countries in Africa were selected for this study. Countries where English is the official language and where it was relatively easy to find a contact person were considered. The country contact persons were mainly researchers and graduate students studying at the University of Cape Town. These helped in identifying the respondents for this study. The respondents were key e-learning personalities in the participating universities. The participating universities were selected on the basis of their past and current e-learning activities, specifically related to learning management systems. A list of online universities[1] in Africa provides a picture of ICT situations in academic institutions and was very useful in identifying these universities. Due to communication breakdown with a contact person, one of the participating countries was removed from the study. This led to a choice of two universities from one of the four remaining countries. The final list of participating universities is: Makerere University (Uganda); University of Nairobi (Kenya); University of Zambia (Zambia); Nelson Mandela Metropolitan University (South Africa) and University of Cape Town (South Africa).

Upon their acceptance to take part in the survey, a structured questionnaire was sent to the key e-learning personalities through e-mails. Telephone interviews (using skype[2]) were then arranged with them. While the mail surveys eliminated the possibility of interviewer bias, the telephone survey allowed the interviewer the opportunity for some opinion probing [34]. This method of data collection was adopted from similar studies [8, 14, 34, 37]. These studies indicate that such a method is ideal when the sample comes from a wide geographical area, as was the case for this study. Documents, including Web pages, for the sampled universities were also identified and analyzed.

The questionnaire and interviews sought both facts and opinions from the respondents regarding the choice, deployment, maintenance and user support of the LMSs in their universities. The interviews further probed for the respondents' views on the level of success/failure of the LMS-supported e-learning initiatives and the perceptions (extent of use) of the different categories of users. The interviews were recorded and thereafter the data was transcribed and analyzed–these facts and opinions are combined with evidence from literature to answer the study question.

[1] Available at: http://www.chem.ru.ac.za/afuniv.html Accessed on 20/03/2011

[2] Skype's ability to easily record conversations for later analysis made it ideal for this study. http://labnol.blogspot.com/2006/06/how-to-record-skype-conversations.html. (Accessed 30/03/2011)

4. FINDINGS AND DISCUSSIONS

4.1 State of Affairs of LMS Implementation in the Surveyed Universities

4.1.1 Makerere University

At Makerere University, according to the e-learning manager (respondent1), there have been three different LMS-supported e-learning initiatives in the last decade, all yielding minimal success. The first one, with Blackboard[3], did not meet much success beyond having some staff trained to create and upload e-learning content on to the LMS. Later, the university moved from Blackboard to the Kewl[4] LMS because the high license fees for Blackboard were unsustainable beyond the donor funding. Kewl, being open source, provided hope for sustainability. However, less than two years later, with very little success with Kewl, the university decided to move on to Moodle[5]. Moodle has now been customized and branded MUELE[6] (Makerere University E-Learning Environment). However, according to respondent1, the LMS is yet to be utilized to its potential. As Makerere is the leading university in Uganda, it is likely that similar trends in e-learning or even worse are experienced in the other universities in the country, and most probably across the region.

4.1.2 University of Nairobi

The University of Nairobi, according to the e-learning team leader (respondent3), has implemented three different learning management systems in the last five years: Wedusoft[7], Chisimba[8] and Claroline[9]. Wedusoft was specifically developed by a member of staff for the university while Chisimba was adopted and implemented through collaboration with development partners. Currently, the university is using Claroline LMS. However, according to respondent3, none of the LMSs have been utilized to their potential, and the success of LMS-supported e-learning at the university is described as minimal: "currently, there are less than 10 lecturers in the university using the platform".

4.1.3 University of Zambia

The University of Zambia, according to the e-learning coordinator (respondent4), has implemented two learning management systems: Moodle and CMAP (only for its Cisco programme). The university hoped to de-congest classrooms, conduct distance learning and reduce training costs by re-using training materials provided on Moodle. However, according to respondent4, this objective has not been achieved: "the system is only used by a few lecturers and students, mainly from the science faculty".

4.1.4 Nelson Mandela Metropolitan University (NMMU)

At NMMU, according to the e-learning coordinator (respondent5), Share-point[10], a Microsoft content and document management system was used to make courses available for sharing and collaboration in a blended environment. However, the platform was found to be less flexible, and had limited interactivity options. Share-point is now being replaced by Moodle, which was first implemented by individual lecturers in the Faculty of Education. According to respondent5, "through organic growth, Moodle has now come to be accepted by the university fraternity as the LMS of choice for the university, though may not be the ultimate answer".

4.1.5 University of Cape Town

Currently, the University of Cape Town is using Sakai[11] as the major LMS, this has been customized and branded Vula. In the past, the university has deployed Moodle and WebCT as well. According to the respondent from the University of Cape Town (respondent6), the turnover of LMSs at the university has been as a result of usability issues of the LMSs: "Although the turnover has had data migration difficulties and created frustrations among the user communities, it was necessary as we had to continue seeking for an LMS that would satisfy most of our requirements"

4.2 The Identified Barriers to LMS Implementation

4.2.1 Internet Accessibility and Knowledge gap Between LMS Stakeholders

Poor access to the Internet was acknowledged by all the respondents. In addition, a knowledge gap between the three e-learning stakeholders (students, teachers and the managers/institution) was also noted. It was discovered through this study that during the deployment of LMSs in universities, the teachers and managers usually received user training, while the students (demand/consumption side) were often left out as far as user training is concerned. Four out of the five universities noted this concern. This has also been evidenced in literature. For example, in their e-learning guide, "*Facilitating Online",* Carr *et al.* [6] developed an online facilitation course, as an Open Educational Resource for training educators and online community facilitators but the students were not given due attention. Generally, as new e-learning technologies are adopted, attention has mostly been focused on the supply side (teachers and institutions) with less attention to the consumption (students) side. Yet, as also noted by [18], for any society at the nascent stage of ICT application, it is crucial to identify and provide skills needed from the users' (demand/consumption) side. Hameed [15] also asserted that

[3] http://www.blackboard.com
[4] http://www.kewl.uwc.ac.za
[5] http://www.moodle.org
[6] www.muele.mak.ac.ug
[7] http://elearning.uonbi.ac.ke
[8] http://www.chisimba.com
[9] http://www.claroline.net
[10] http://www.sharepointlms.com
[11] http://www.sakaiproject.org

it is important for the teachers and the institution to address any issues to satisfy the third group of stakeholders (students) before deploying any virtual learning environment: "No matter how good the e-learning environment is and what best technology is used to create it, if students are not satisfied then it is of little use". Also according to Shahid [29], a responsive student community is crucial if e-learning is to succeed.

4.2.2 High ICT-illiteracy Rates and Low Comfort levels Using ICT–Solutions

All the seven respondents agreed that the majority of the students in developing countries have not been exposed to many ICT solutions. Consequently, their confidence and comfort levels while using such ICT solutions are always low. This observation is in agreement with Tijdens's assertion that there is a strong correlation between adaptability to new ICT solutions and intensity of ICT use [33].

The high ICT-illiteracy rates and the low comfort levels with technological solutions have led to slow acceptance and use of LMSs by the student communities in the developing countries.

4.2.3 LMS Selection and Usability Issues

According to six out of the seven respondents, while the selection criteria of the LMSs in their universities has always been a subject of many factors, usability of the LMSs has hardly been one of the factors**.** Below are some of the direct quotes from the respondents:

> *"We took on our previous LMS because it was open source so were not required to pay license fees, and yet again we were promised technical support from the proprietors"*

> *"Taking on this LMS was a decision agreed upon between our development partners and university management"*

The respondents further revealed that in some cases the usability assessment of LMSs was not done due to the unclear and/or costly criteria of performing the evaluation. The universities that were restricted by such constraints evaluated the LMSs by modeling themselves on to other universities (mostly in the developed countries) where such LMSs had been deployed successfully, although it was highly likely that the operating conditions in such universities were not closely comparable. Yet, usability evaluation, by definition, emphasizes the use of a product by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use [2]. Below is one of the direct quotes from the one of the respondents:

> *"We did not have resources at the time to evaluate the LMS for usability, more so we were convinced it would work for us because it had been proven successful at the Proprietary University (Witwatersrand).*

As described by [22] and [24], if LMS usability problems are not identified and addressed, they cause disappointments and frustrations during learning, leading to poor perceptions towards the LMS among the student communities. Eventually the students may stop using the system, especially if there are alternative ways to learn, such as the face-to-face sessions. This was the case with two LMSs in the universities surveyed.

4.2.4 Ineffective Maintenance and Inefficient User Support Strategies

As described in the stages of e-learning implementation in Figure 1 above, maintenance starts at the delivery stage, through until the e-learning initiative is retired**.** For the LMS-supported e-learning initiatives, maintenance and user support are very crucial as it is the mechanism through which inefficiencies and other usability problems of the LMS can be identified and addressed. Unfortunately however, three out of the five universities surveyed did not have proper maintenance strategies, which resulted into deterioration of the LMS services. One of the universities did not even have a technical unit to offer support to the users, while those that had them, were reported as either understaffed or insufficiently trained to be able to deal with the task at the level required. One responded was quoted:

> *"…the department of computer science helped in the initial installation of the LMS server, but the day-to-day technical support and maintenance is not binding on to them, so the technical support is mainly through 'peer-2-peer help'."*

4.2.5 High Expectations and Poor Marketing Strategies

Through this study it was noted that the goals set by most universities in developing countries for the e-learning initiatives are usually ambiguous and to some extent very ambitious. It was therefore always difficult to monitor the progress and measure the impact of the initiatives so that timely interventions could be instigated where necessary. In addition, it was also noted that LMS-supported e-learning initiatives that started from the top to bottom met more resistance than those where the initiatives started small in a department and through organic growth spread to other departments.

4.3 Best Practices

Universities where the deployment of the learning management systems took a bottom-up approach seemed to have a relatively more successful and effective implementation. This was presumably because the goals of the smaller units (say department or faculty) were less ambiguous, thus monitoring and evaluation was relatively easy. In this case, success is defined by the level of effectiveness, efficiency and user satisfaction with which the system meets the goals for which it was deployed. This requires that standard usability evaluation techniques are deployed to measure the attributes of usability: effectiveness, efficiency, learnability and user satisfaction.

Once these are satisfactory, then the initiative would then be rolled out to a bigger scale or allowed through organic growth.

Beyond the method of LMS deployment, universities that had functional user-support units were in a better position to handle some of the usability issues and other technical problems reported by the users, thereby encouraging and retaining the users on the system.

Universities that took on LMS-supported e-learning initiatives as funded projects faced sustainability problems after the development partners pulled-out. In many cases, the initiatives could not survive beyond the donors.

It is also important to note that although most universities took on LMS-supported e-learning initiatives with the hope of reducing training costs, this could not be realized in the short run because the initial costs of setting up the initiatives were often so high. These costs often grew out of the need for infrastructure, installation, bandwidth and systems integration, as well as the need for marketing to ensure that intended learners are using the system. In most cases some of these were overlooked. In such instances, the initiatives stalled at some point, while others totally failed to progress.

5. CONCLUSION AND FUTURE WORK

The failure of LMS-supported e-learning initiatives in developing countries has little to do with the technology (whether open source or proprietary) and more to do with how the institutions are using the LMSs to improve, support and facilitate authentic student learning. Thus, the high turn-over of LMSs in institutions that are searching for the most appropriate system may not be justifiable–instead, the institution may run the risk of diverting resources and energy into managing transitions. However, given that a stable learning management system can be a prerequisite for making advances in learning, if the LMS has adverse usability problems, is not stable, or suffers from performance or up-time failures, then such change may be unavoidable.

In all the universities surveyed, LMS-supported e-learning initiatives were justified on the basis of improving the quality of teaching and learning, while at the same time improving access at reduced costs. In most cases, this has not been achieved. The solutions have not satisfied the community for which they were created, which has resulted into high abandon rates. The factors discussed above have been identified by key e-learning personalities in the five surveyed universities as the barriers to the successful deployment of LMS-supported e-learning initiatives in developing countries. If LMSs are to fulfill their potential in the developing world, then future research and development efforts should be aimed at overcoming these barriers.

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