Learning Management System success: Increasing Learning Management System usage in higher education in sub-Saharan Africa

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ABSTRACT

Learning Management Systems (LMS) have been widely adopted by higher education institutions globally for over a decade. Institutions in sub-Saharan Africa now spend a significant proportion of their limited resources on installing and maintaining these systems. This expenditure continues to increase, raising questions as to whether LMS in these institutions are fulfilling their potential. The article investigates this question by analyzing the literature published on LMS usage from across the region. The article concludes by proposing strategies that can help institutions make more effective use of their LMS. The aim is to help institutions to identify effective strategies for supporting increased and cost-effective LMS usage.

Keywords: Learning Management Systems, LMS Success, eLearning, sub-Saharan Africa

INTRODUCTION

Learning Management Systems (LMS) are now installed in the majority of higher education institutions in sub-Saharan Africa. These web-based LMS are intended to support teaching and learning activities. They consist of various features that enable faculty members to share learning materials as well as providing interaction with their students both synchronously and asynchronously (Vovides et al. 2007). The most widely adopted LMS in the region are Blackboard, Sakai, KEWL, and Moodle (Unwin et al. 2010).

Institutions use the LMS to supplement traditional face-to-face delivery where faculty members develop and share digital learning materials via the Internet. In this case, the LMS are used as an electronic repositories of learning materials (Vovides et al. 2007). Other institutions especially those offering distance education, have been combining LMS with traditional face-to-face delivery in order to reach more learners across various geographical boundaries (Andersson & Grönlund 2009).

In light of these benefits, the adoption of LMS by higher education institutions in sub-Saharan Africa has continued to increase in recent years. Adkins (2013) predicted that LMS adoption will grow at the rate of 15% per annum between 2011 and 2016 in Africa. The increased adoption is further facilitated by the support of several international agencies such as the World Bank (WB), Swedish International Development Cooperation Agency (SIDA), United Nations Development Program (UNDP), African Development Bank Group (AfDB), and United States Agency for International Development (USAID) (Farrell & Isaacs 2007). These agencies have been committing various resources to support institutions in adopting and implementing various LMS.

For example, AfDB provided a grant of $15.6 million to African Virtual University (AVU) to support various eLearning initiatives in the region (Adkins 2013). The grant was planned to help 31 partner institutions to build eLearning centers, train content developers, and deploy LMS. Similarly, the Partnership for Higher Education in Africa (PHEA) supported seven institutions in sub-Saharan Africa to implement various eLearning projects including the LMS.

LMS have been successfully implemented in many institutions of developed countries. They have managed to improve students' learning performance, reduce students' dropout rates, and they have increased students' satisfaction with offered courses (Naveh et al. 2012). Institutions in sub-Saharan Africa have been adopting them in a bid to gain similar benefits as their counterparts elsewhere. However, the context of sub-Saharan Africa is different and institutions face different challenges from those faced by institutions in the developed countries. As a result, the adoption and implementation of these systems do not guarantee that institutions will enjoy similar benefits as those institutions in the developed countries.

Therefore, this study aims to investigate whether the adoption of LMS are fulfilling their potential through analyzing the literature published on LMS usage from across the region. The article concludes by proposing strategies that can help institutions make more effective use of their LMS. It is important to ensure that LMS implemented in sub-Saharan Africa are successful given the fact that any failures of LMS implementations are likely to be high on account of the limited availability of resources (Heeks 2002).

MEASURING LMS SUCCESS

Studies of LMS adoption tend to use similar metrics to those used to measure information systems success. Since LMS are a special type of information systems focusing on teaching and learning (Wang et al. 2007), it is not surprising that such metrics are used. In this regard, the success of an LMS adoption at a given institution can be measured in different ways. Some studies have measured the success of LMS through measuring learners' satisfaction with the system (Wang 2003; Shee & Wang 2008; Tella 2012). They have developed various instruments that could be used to evaluate users' satisfaction with the LMS. For instance, Wang's (2003) instrument consists of the learner interface, learning community, and content personalization. The instrument has been widely used in various studies to measure LMS success (Katsidis & Anastasiades 2008; Shee & Wang 2008).

Some studies have adopted other factors such as information quality and readiness, self-efficacy, self-regulated learning, system quality, and service quality to measure users' satisfaction with the LMS (Tella 2012; Eom 2014). Generally, users' satisfaction has held a central role in many studies as one of the measurements for the success of LMS. However, user satisfaction cannot be an appropriate measure of LMS success in situation where the use of the system is not mandatory (DeLone & McLean 1992) such as those in many higher education institutions in the region.

Other studies have used Return On Investment (ROI) in terms of value of technology investments through quantifiable financial measures as a measure of LMS success (Urbach & Müller 2012; Govindasamy 2001). Nevertheless, measuring LMS success in terms of ROI has proven to be difficult due to other associated intangible impacts and intervening environmental variables (Petter et al. 2008). The impact of LMS goes beyond reducing the cost of educational investments to enhancing student learning. Therefore, it is very difficult to quantify such kind of benefits.

While measuring LMS success in terms of ROI has shown to be difficult, usage is normally envisaged as an alternative success measure (Urbach & Müller 2012; DeLone & Mclean 2003). By assessing how users navigate through the LMS, one can get an idea on how successful the system is. In fact, unused systems are failures (Seddon 1997). On the other hand, declining usage is an important indication that the anticipated benefits of the system are not being realized (DeLone & Mclean 2003). Davis, Bagozzi, and Warshaw (1989) insist that information systems cannot improve users' or organizational performance if they are not used.

Studies have also shown that there is a correlation between LMS usage and students' performance in courses offered via the LMS. For instance, Filippidi, Tselios, and Komis (2010) examined Moodle usage on students' performance at the University of Patras, Greece. It was revealed that LMS usage had a positive significant effect on students' performance, explaining 20.2% of variance in their total grade. These findings corroborate with another study conducted by Jo, Kim, and Yoon (2014) at the Ewha Womans University. The researchers found that regularity of LMS usage was a strong indicator on explaining learners' performance for the courses offered via the LMS.

Studies have also linked LMS usage with student satisfaction (Naveh et al. 2012). Increased LMS usage increases levels of students' satisfaction with courses. Similarly, satisfied learners tend to complain less (Tarigan 2011) and have possibilities of taking more courses (Booker & Rebman 2005). According to Palmer and Holt (2009), satisfaction has positive correlation with quality of learning outcomes.

Nonetheless, simply saying that more usage will yield more benefits is insufficient (DeLone & Mclean 2003). Delone and Mclean (2003) suggested that the nature, quality, and appropriateness of LMS use are important outcomes, and measuring time learners have spent on the system is inadequate. Therefore, students need to use almost all features of the system in order to realize the expected benefit. For instance, Jo, Kim, and Yoon (2014) found that learners who more steadily log into the LMS from the beginning of a study to the end and used most of the LMS features showed better academic performance compared to others. In another study, students who used more LMS features such as assignment, forums, questionnaire and glossary were found to have better academic performance (Filippidi et al. 2010). Similarly, students who spent many days and many topic views had better learning results in courses offered via LMS at the Institute of Information Systems and New Media, Vienna University of Economics and Business (Mödritscher et al. 2013).

Therefore, the success of LMS in the region can be measured by assessing how these systems are used in terms of intensity and quality of use. In the next section, LMS adoption and usage in higher education institutions in sub-Saharan Africa is discussed in detail.

LMS ADOPTION AND USAGE IN HIGHER EDUCATION IN SUB-SAHARAN AFRICA

In recent years, there has been an increasing adoption of LMS in higher education in sub-Saharan Africa. Research conducted within the sub-Saharan Africa has also documented these LMS adoption patterns. Ssekakubo et al. (2011) found that 5 of the surveyed institutions in sub-Saharan Africa had installed an LMS of various kinds. Similarly, Mtebe and Raisamo (2014) found half of 11 surveyed institutions had installed LMS while Munguatosha, Muyinda, and Lubega (2011) found that 80% of surveyed institutions in Tanzania were using LMS.

Moreover, the seven institutions that participated in PHEA project were found to have installed various LMS (Hoosen & Butcher 2012). Studies have also shown that several institutions have installed various LMS in countries such as Kenya, Mazambique (Unwin et al. 2010), Uganda (Mayoka & Kyeyune 2012), Sudan (Elmahadi & Osman 2013), and Zimbabwe (Chitanana et al. 2008).
Despite the increased adoption LMS in the region, the actual usage is reported low. For instance, there were only 60 users in LMS installed at Makerere University in Uganda (Mayoka & Kyeyune 2012) and less than 10 users at Kenya's University of Nairobi (Ssekakubo et al. 2011). There were also 103 users at University of Dodoma, 767 users at the University of Dar es Salaam, 81

users at Open University of Tanzania, and 49 users at Institute of Finance Management in Tanzania (Mtebe & Raisamo 2014).

The situation is similar in several institutions in Zambia, Zimbabwe, Mozambique, and Sudan. For instance, only 20% of trained users were using LMS at National University of Science and Technology of Zimbabwe (Dube & Scott 2014). Studies have also revealed low usage of LMS at Maseno University in Kenya, Mondlane University in Mazambique (Unwin et al. 2010), University of Zambia (Ssekakubo et al. 2011), and in four leading universities in Zimbabwe (Chitanana et al. 2008).

Even those described as active and experienced users in institutions mentioned above, many of them use a relatively small number of the features (Unwin et al. 2010). Research has shown that communication tools that are embedded in LMS such as discussion forums, chat, and e-mail are underutilized (Vovides et al. 2007). For instance, only 8% of users used communication tools of LMS at Open University of Tanzania (Bhalalusesa et al. 2013). It was also found that only 28% of users were contributing to discussions on the LMS at the University of South Africa (Venter et al. 2012).

Moreover, LMS have tools with capability to present the learning materials in various forms of multimedia such as audio, video and animations. Studies have shown that faculty members tend to underutilize such tools (Vovides et al. 2007). This is evident from the fact that the majority of faculty members at the National University of Science and Technology of Zimbabwe have been using LMS as a course information transmission tool only (Dube & Scott 2014). Faculty members upload course information in text format for students to download just like any other electronic repository. The same situation was observed at the University of Dar es Salaam in Tanzania in which 30 faculty members who indicated that they were using LMS, used the system for uploading content and files only (South Africa Institute of Distance Education 2013).

Heeks (2002) pointed out that many information systems implemented in developing countries tend to fail partially or totally. The total failure is when the new system is implemented but immediately the system is abandoned. In many institutions in sub-Saharan Africa, users normally do not use the LMS after they have been trained. For instance, although more than 10,000 users were trained to use the LMS at the National University of Science and Technology of Zimbabwe only 20% continued to use it (Dube & Scott 2014). This situation is almost similar in many institutions in the region.

The partial failure of information system is when the system is implemented but the major goals are not being attained (Heeks 2002). Improving the quality of teaching and learning, widening access to education, and reducing the cost of delivery are some of the motives behind LMS adoption. Given the low or non-use of LMS in the majority of institutions in higher education in sub-Saharan Africa, it is unlikely that the expected benefits of the systems is going to be realized. In the next section, strategies to increase LMS usage are discussed in detail.

STRATEGIES TO MAKE LMS SUCCESS

In order for an LMS to produce the expected benefits, institutions should find various ways to maximize LMS usage within their institutions. The following are some strategies that can be used to increase LMS usage:

Improving usability of LMS

Usability is a measure of how users find the LMS easy to learn, easy to use, and user-friendly. This is an important aspect of LMS design as it has direct impact on how users use the system. If the LMS is easy to use and easy to learn, learners will use the system more often. On the other hand, the LMS which is perceived to be difficult to use, and is not user-friendly, learners spend more time learning how to use the system rather than learning the content (Ardito et al. 2005). In this case, users might feel lost, confused, or frustrated with the LMS (Tarigan 2011).

Many institutions in sub-Saharan Africa have been adopting open source LMS (Unwin et al. 2010). However, the majority of open source systems suffer from usability problems (Nichols & Twidale 2003). For example, Martin et al. (2008) found that no LMS reached 80% of compliance of usability heuristics in a study conducted to compare the usability of Moodle, Sakai, and dotLRN. Similarly, Moodle was found to have 75 usability problems in a study conducted to evaluate the usability of Moodle at FON University in Macedonia (Kakasevski et al. 2008). The authors also found that 80% of the students had significant problems with features of online chat and discussion forums.

Therefore, it is not clear whether the LMS are usable to learners in African institutions due to the fact that institutions have been implementing these systems without conducting usability evaluations (Ssekakubo et al. 2011). Since these systems were not developed specifically for African users, some usability problems must exist. For instance, 54% of interviewed Moodle users at the Open University of Tanzania indicated that the system was difficult to use especially in uploading learning materials (Bhalalusesa et al. 2013). Similarly, 84.4% of students and 79% of faculty members indicated that the LMS was not easy to use in a study conducted at Makerere University in Uganda (Mayoka & Kyeyune 2012). In another study, Mabila, Gelderblom, and Ssemugabi (2014) found several usability problems that hindered students from using the LMS at the University of South Africa. The authors gathered evidence from heat maps and gaze plots using eye tracking evaluation method.

Similarly, using heuristic evaluation inspection method Padayachee, Kotzé, and van der Merwe (2011) found that the LMS at the University of KwaZulu-Natal had several usability violations that made it difficult for many users to be able to use it. Generally, institutions should conduct usability evaluations to find out any usability problems that might be hindering users from using these systems. Fixing such usability problems will increase LMS usage due to the fact that many users will find the systems as easy to learn, easy to use and user-friendly.

Developing and uploading quality learning materials

The majority of faculty members in higher education in sub-Saharan Africa lack the tradition and the experience to develop quality materials for their students (Unwin et al. 2010). As a result, it not uncommon to find many adopted LMS do not have enough quality learning materials uploaded in it. It should be noted that learners rely on learning materials as their major source of information during the learning process (Keats 2003). Consequently, they place great value on content that is well-organized, effectively presented, interactive, clearly written, in the right length, useful, flexible, and provide appropriate degree of breath (Shee & Wang 2008). There is also a

strong positive relationship between quality of learning materials and overall learners' perceived satisfaction with the LMS (Ozkan & Koseler 2009; Tarigan 2011).

Therefore, learners tend to be disappointed with the LMS when they find out that uploaded materials are of poor quality and do not provide intended educational objectives (Naveh et al. 2012). At the moment, it seems that learners do not find reasons to access the LMS with poorly designed learning materials. For instance, Bhalalusesa et al. (2013) described one of the main reasons behind low usage of Moodle LMS at the Open University of Tanzania was lack of quality learning materials in the LMS. There is a need for institutions to develop and upload quality learning materials into the LMS in order to maximize LMS usage. This can be done through equipping faculty members with necessary skills to be able to develop such materials. Institutions can also make use of Open Educational Resources (OER) from repositories to improve the quality of existing learning materials or to develop new learning materials and make them available via LMS.

Enhancing support services

The majority of the users in sub-Saharan Africa have not been exposed to many information systems, and therefore their confidence towards these systems is always low (Ssekakubo et al. 2011). To be able to use the LMS effectively, institutions are required to provide reliable, timely, and effective support services to such users. The support services such as training, and several on-going support services are very important in order for users to continue using the LMS installed in the institutions. The on-going support services may include live telephone support, email, instant messaging, informational websites containing documentation or tutorial videos (Moskal et al. 2013).

Studies have shown that many users cannot use LMS effectively due to lack of support services. For instance, a study conducted by Unwin et al. (2010) based on a survey of 358 respondents from 25 African countries found that many respondents (74%) indicated that lack of training and technical support hindered them from making full utilization of LMS features. As a result, they could either not use the LMS at all or used a relatively small number of features.

Similarly, the majority of respondents (77.3%) indicated that lack of training hindered them from using the LMS at the National University of Science and Technology of Zimbabwe (Dube & Scott 2014). The findings of this study corroborate with other studies which found that 50% of the respondents at the Open University of Tanzania (Bhalalusesa et al. 2013), and 76% of respondents in a survey conducted in four universities in Zimbabwe (Chitanana et al. 2008) cited lack of training as the main reason behind low usage of the LMS. Lack of support services also hindered 503 students from using the LMS more effectively at the University of Botswana (Tella 2012).

Therefore, in order to maximize LMS usage institutions should establish functional Information Technology (IT) Units to provide support services to both students and faculty members. For institutions with already established IT Unit, they should equip them with qualified staff with both technical and pedagogical skills to be able to provide quality support services.

Reviewing relevant policies

Policies play a significant role in creating environment that enable faculty members to make use of various eLearning technologies at a given institutions. They provide guidelines and strategies on how a certain technology should be adopted and used. For instance, University of Ghana and the Kwame Nkrumah University of Science and Technology in Ghana developed policies that recognized learning material development as part of promotion considerations the same way as

conducting research (Ngugi 2011). This policy managed to attract several faculty members to develop learning materials and upload them into the LMS.

Many institutions in sub-Saharan Africa have either outdated policies or do not have such polices at all. For instance, nearly half of eleven surveyed institutions in Tanzania did not have eLearning policies (Mtebe & Raisamo 2014). The study also found that some institutions such as University of Dar es Salaam (UDSM) and the Open University of Tanzania (OUT) had outdated policies. The UDSM Information and Communications Technology (ICT) policy was developed in 2006, while that of OUT was developed in 2009. The situation is similar in many institutions in sub-Saharan Africa.

In order to increase LMS usage, Butcher (2011) suggests at least four main policies need to be reviewed. These policies include the intellectual property rights and copyright policy, human resource policy guidelines, ICT policy, and materials development and quality assurance policy. Butcher (2011) further explains that the intellectual property rights and copyright policy will clarify on learning materials developed during the course of employment and how these materials may be shared with and used by others. The human resource policy will explain clearly on whether or not the creation of certain kinds of learning materials constitutes part of the job description for staff and what the implications are for development, performance management, remuneration, and promotion purposes.

The ICT policy will provide guidelines regarding access to and use of appropriate ICT infrastructure for institution's educational resources while the materials development and quality assurance policy will guide users to ensure appropriate selection, development, quality assurance, and copyright clearance of learning materials that may be shared. Generally, these reviewing these policies will not only provide a conducive environment for faculty members to be able to develop and upload learning materials into the LMS, but also, will increase LMS usage.

Increase awareness of LMS

Lack of awareness amongst users on then existence or value of LMS has impact on LMS usage within the institutions. If users are not aware of LMS existence, it is obvious that they are not going to use it. Studies have shown that faculty members in higher education in the region either are not aware of LMS existence or their educational value they provide. For example, 50% of respondents (out of 44) indicated that they were not aware of the existence of LMS at the National University of Science and Technology of Zimbabwe (Dube & Scott 2014). Similar findings were obtained at the Open University of Tanzania where 27% of faculty members were not aware of LMS existence (Bhalalusesa et al. 2013).

The lack of awareness amongst users might be attributed by the fact that many LMS initiatives are normally introduced from top to bottom (Ssekakubo et al. 2011). Such kinds of initiatives face more resistance than initiatives started by departments or small units within the institution. Institutions should find various mechanisms to increase awareness not only on the existence of LMS but also on the advantages of the LMS in teaching and learning. This can be done through conducting awareness workshops within their department, disseminating brochures and flyers that provide information about LMS. Moreover, departmental group emails and information websites can be used.

Making use of mobile applications

While access to computers and the Internet is still a challenge in many institutions in sub-Saharan Africa, the emergence of mobile devices brings a new hope. According to eTransform Africa Report of 2012 produced by the World Bank and the African Development Bank, there were

almost 650 million mobile subscriptions in Africa, more than in the United States or the European Union making Africa the second fastest growing region in the world in mobile phone penetration (World Bank 2012).

Additionally, the most recent report by Ericsson of 2013 indicated that 70% of users in sub-Saharan Africa browse the web on mobile devices, compared with just 6% who use desktop computers. The report also estimated that 75% of mobile subscriptions in sub-Saharan Africa will be 3G/4G by the end of 2019 (Ericsson 2014). More importantly, the price of smartphones has decreased to as low as US$ 30 in many countries in sub-Saharan Africa (Deloite & GSMA 2012; Ericsson 2014).

Given these developments, mobile devices have become an integral part of many users' everyday lives. Taking advantages of advancement of mobile penetrations, Institutions should develop mobile interfaces that enable users to be able to access LMS via their mobile devices. There are already some pilot studies in several institutions in sub-Saharan Africa. Makerere University in Uganda, for instance, has developed the MobiClass application to enable faculty members to interact with their students via mobile devices (Network ICT for Education 2014). The project is funded by Spider organization of Sweden.

A similar study was conducted to present mobile LMS interface designs and ideas achieved through a participatory design process for enhancing the accessibility of the most needed and desired LMS services on mobile phones (Ssekakubo et al. 2013). The ultimate aim of the initiative was to develop the interface that would enable users to access LMS using mobile devices. These projects and other projects provide an alternative for accessing the LMS with devices that users already have.

Complementing with Social Media

There is a growing adoption and use of various social media services by both students and faculty members in higher education in sub-Saharan Africa. A recent eLearning Africa report of 2014 indicated that 70% (of 1,444) of those who were interviewed were using Skype and LinkedIn while 82% were using Facebook (Wainaina et al. 2014). Moreover, 50% of respondents indicated that they were using WhatsApp (Wainaina et al. 2014). However, few of these users use them for academic purposes.

In order to increase LMS usage, institutions could make use of social media services to complement LMS features. For example, faculty members could share learning materials via the LMS while using social media for communication purposes. The majority of social media services have rich and friendly tools for communication. Moreover, integrating LMS with audio and video conferencing features have shown to be difficult (Dube & Scott 2014). Such features can easily be complemented by the use of social media facilities.

CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

This article has provided a snapshot of LMS usage in selected institutions in sub-Saharan Africa. Through literature review, the article has shown that the majority of adopted LMS are underutilized. Studies have consistently described the adoption and use of emerging technologies in education can overcome the challenges facing higher education in sub-Saharan Africa. The evidence from this study suggests that these benefits will not be achieved if institutions cannot find strategies that can increase usage of educational technologies in their institutions. There is evidence that users do not make full utilization of the LMS and other technologies despite massive investment that has been made to install and maintain them.

Nevertheless, there are some exceptions. For instance, the usage of LMS in most of South African institutions is relatively good compared to the rest of Africa. This was evident from a study conducted by Ssekakubo, Suleman, and Marsden (2012) to compare the use of LMS by students from Makerere University in Uganda and the University of Cape Town (UCT) in South Africa. The study found that many students from UCT had high experience on using the LMS compared to their counterparts from Makerere University.

The most important limitation of this study was that the data on LMS usage was obtained from the literature. With studies taken place in last five years, the situation might have changed. It should be noted that today's LMS failure might be tomorrow's LMS success, and vice versa. It would be interesting for future research to investigate the current situation in various institutions in the region. Findings from users who were trained but do not use the system would add a new understanding of the factors that hinder users from using the LMS.

In addition to strategies that have been proposed in this study to increase LMS usage, there are still some other challenges that continue to hinder users higher education from using the LMS. The main barrier described in the literature is the low Internet speed in the majority of institutions in the region (Ssekakubo et al. 2011; Unwin et al. 2010; Lwoga 2012). For instance, a study conducted by Mtebe and Raisamo (2014) found that 9 out of 11 institutions in Tanzania had bandwidth less that 20mbps.

Furthermore, the cost of Internet is still very higher in many institutions in the region limiting access to the LMS. A study conducted by Lwoga (2012) revealed that one institution in Tanzania was paying 104 million TShs (equivalent to 50,000 US$) per year for Internet connection. The finding corroborates with another study conducted by Tedre et al. (2010) that found that one institution was paying 4 million TShs (2140€ = 3100$) per month for a dedicated 704kb/128kb satellite connection for 300 computers. There is an urgent need for institution to increase Internet speed in order to ensure that users access the LMS and other educational technologies within their institutions.

There are already some efforts underway to improve Internet access in the region. For instance, a number of submarine cable backbone projects have been proposed in the recent years with coverage of 70,000 km of coast and an estimated cost of US$6.4 billion (Wainaina et al. 2014). Major fibre projects include the East African Submarine Cable System, SEACOM, and the East African Marine System. These cable marines are expected to increase Internet speed up to 155mbps. Therefore, the current low Internet bandwidth is a short term as we expect to have a reliable and good Internet speed in the coming few years. These kinds of initiatives may not provide overall benefits if institutions do not find strategies to maximize LMS usage.

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