Making Learning Management System Success for Blended Learning in Higher Education in sub-Saharan Africa

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ABSTRACT

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

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

INTRODUCTION

Learning Management Systems (LMSs) are now installed in the majority higher education institution in sub-Saharan Africa. These web-based LMSs are intended to support teaching and learning activities. LMSs support web-based tools that allow students to access learning materials, interact with their teachers and each other synchronously or asynchronously. They also enable teachers to administer assessments and evaluations. Some institutions use LMS to enhance existing distance courses and therefore reaching more learners across various geographical boundaries (Andersson & Grönlund, 2009). The most widely adopted LMSs in the region are Blackboard, Sakai, KEWL, and Moodle system (Unwin et al., 2010).

The adoption of LMSs by higher education institutions in sub-Saharan Africa has continued to increase. Adkins (2013) predicts LMS adoption will grow at the rate of 15% per annum between 2011 and 2016 in the region. As of 2010 almost 52% of the 358 respondents from 25 African countries indicated that they were using an LMS (Unwin et al., 2010).

Research conducted within the sub-Saharan Africa region has documented these LMS adoption patterns. Ssekakubo et al. (2011) found that 5 of the surveyed institutions in sub-Saharan Africa had installed an LMS, mostly Moodle and Sakai. A study conducted by Lwoga (2012) found that all 6 surveyed institutions in Tanzania had adopted Moodle LMS. Similarly, Author and co-author (2014b) found half of 11 surveyed institutions had installed Moodle LMS while Munguatosha, Muyinda, and Lubega (2011) found that 80% of surveyed institutions in Tanzania were using Moodle LMS.

Moreover, the 7 institutions that participated in the *Partnership for Higher Education in Africa* (PHEA) project were found to have installed various LMS, of several types (Hoosen & Butcher, 2012). Studies have also shown that several institutions have installed various LMS in countries such as Kenya (Unwin et al., 2010), Uganda (Mayoka & Kyeyune, 2012), Sudan (Elmahadi & Osman, 2013), and Zimbabwe (Chitanana, Makaza, & Madzima, 2008).

LMSs have been successfully implemented in European and American institutions. They have managed to improve student performance, reduce students' dropout rates, and they have increased student satisfaction (Naveh, Tubin, & Pliskin, 2012). Therefore, institutions in sub-Saharan Africa have been adopting them expecting 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 Western institutions. As a result, the

adoption and implementation of these systems do not guarantee that institutions will enjoy similar benefits as those institutions in the West.

Given the resources committed to install and maintain LMSs, there is a real need to understand if these systems fulfil their potential. This article attempts to find out if LMSs tend to meet intended objectives through the evidence from the literature. It should be noted that the failures of LMS implementations are likely to be high on account of the limited availability of resources in sub-Saharan Africa (Heeks, 2002).The article goes further to suggest and discus strategies that can help institutions to make decisions concerning LMS adoption. The present study aims to help institutions to realize the expected benefits as well as increasing LMS usage.

MEASURING LMS SUCCESS

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

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 (Eom, 2014; Tella, 2012). Generally, user satisfaction has held a central role in many studies as one of the measurements for the success of LMS. However, user satisfaction cannot be appropriate to measure 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 (Govindasamy, 2001; Urbach & Müller, 2012). Nevertheless, measuring LMS success in terms of ROI is difficult due to other associated intangible impacts and intervening environmental variables (Petter, DeLone, & McLean, 2008). The impact of LMS goes beyond reducing the cost of educational investments to enhancing students learning.

While measuring LMS success in terms of ROI is difficult, usage is normally used as an alternative success measure (Delone & Mclean, 2003; Urbach & Müller, 2012). By assessing how users use 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, p. 982) added "computer systems cannot improve organizational performance if they aren't used".

Studies have strongly shown that there is a correlation between LMS usage and students' performance in blended courses offered via LMS. For instance, Filippidi, Tselios, and Komis (2010) examined Moodle LMS usage on students' performance at the University of Patras, Greece. It was revealed that LMS usage had a significant relation with 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 to explain learners' performance for the courses offered via the LMS.

Studies have also linked LMS usage with students satisfaction (Naveh et al., 2012). Increased LMS usage increases levels of students' satisfaction with the system. Similarly, satisfied learners tend to make less complaint (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). Students need to use full functionality of a 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 had more number of active learning days and 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, Andergassen, & Neumann, 2013).

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

LMS USAGE IN HIGHER EDUCATION IN SUB-SAHARAN AFRICA

In review of literature, apparently the LMS usage is reported low across many institutions in sub-Saharan Africa. 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). Moreover, there were 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 (Author & co-author, 2014b).

The situation is similar in several institutions in Zambia, Zimbabwe, Mozambique, and Sudan. For instance, only 20% of trained users were using Sakai 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). For instance, only 8% of users used communication tools of Moodle LMS at Open University of Tanzania (Bhalalusesa, Lukwaro, & Clemence, 2013). Similarly, majority of lecturers at the National University of Science and Technology of Zimbabwe have been using Sakai LMS as a course information transmission tool only (Dube & Scott, 2014). Lecturers upload course information for students to download just like any other digital resource repository. The same situation was observed at the University of Dar es Salaam in Tanzania whereby 30 lecturers who indicated that they were using Moodle LMS, used the system for uploading content and files only (SAIDE, 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 was implemented but immediately abandoned. In many institutions in sub-Saharan Africa, users normally do not use the LMSs after they have been trained. For instance, although more than

10,000 users were trained to use LMS at the National University of Science and Technology of Zimbabwe only 20% were using it (Dube & Scott, 2014). This situation is almost similar in many institutions in the region.

The partial failure of information system is when the major goals are unattained (Heeks, 2002). Improving the quality of teaching and learning, widening access to education, and reducing the cost of delivery are among of the motives behind LMS adoption. Nonetheless, these goals cannot be achieved if users use relative small features of the LMSs or do not use the LMSs at all.

This variability in the quality and intensity of LMS use is likely to have a significant impact on the realization of the LMS benefits. There is an urgent need to help institutions with strategies that will help them to maximize LMS usage, which in turn, will enable to realize the expected LMS benefits. In the next sub-section, strategies to increase LMS usage are discussed in detail.

STRATEGIES TO MAKE LMS SUCCESS

In order for an LMS to bring about 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 simply how the LMS is easy to learn, easy to use, and user friendly. This is an important aspect of LMS design as it has directly impact on how users use the system. If the LMS is easy to use and learn, learners will use the system more often (Author & Co-author, 2014a). On the other hand, an LMS which is not user-friendly, learners spend more time learning how to use it rather than learning the content (Ardito et al., 2005). Naturally, users might feel lost, confused, or frustrated with the LMS (Tarigan, 2011).

Many institutions in sub-Saharan Africa have been adopting open source LMS. However, the majority of open source systems suffer from usability problems (Nichols & Twidale, 2003). For example, Martin et al. (2008) found that none of LMS reached 80% of compliance of usability heuristics in a study conducted to compare the usability of Moodle, Sakai, and dotLRN. Similarly, Moodle LMS was found to have 75 usability problems in a study conducted to evaluate the usability of Moodle LMS at FON University in Macedonia (Kakasevski, Mihajlov, Arsenovski, & Chungurski, 2008). The authors also found that 80% of students had significant problems with features of online chat and discussion forums.

Therefore, it is not clear whether the LMSs are usable to learners in African institutions due to the fact that institutions have been adopting them without conducting usability evaluations (Ssekakubo et al., 2011). Since these systems were not developed specifically for African users, some usability problem must exist. For instance, more than half (54% of 150 respondents) of interviewed Moodle LMS users at the Open University of Tanzania indicated that the system was difficult to use especially in uploading learning materials. 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 the LMS at 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 evaluation to find out any usability problems that might be hindering users from using these systems. Fixing such problems will enable many users to able to find these systems easy to use and attract them to continue using them.

Developing and uploading quality learning materials

Many adopted LMSs in the region do not have enough quality learning materials due to lack of tradition and experience of faculty members in most of institutions to develop such materials (Unwin et al., 2010). Learners rely on learning materials as their major source of information during the learning process (Keats, 2003). As a result, 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, learners do not find reasons to login into the LMS with poor designed learning materials. For instance, Bhalalusesa et al. (2013) described one of the main reason 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 bale to develop such materials. Institutions can also make use of dozens 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 LMSs.

Enhancing support services

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 LMSs installed in the institutions. The on-going support services maybe include live telephone support, email, instant messaging, informational websites containing documentation or tutorial videos (Moskal, Dziuban, & Hartman, 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 fully 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 Sakai LMS at the National University of Science and Technology of Zimbabwe (Dube & Scott, 2014). This study corroborates 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 Moodle LMS. Lack of support services also hindered 503 students from using the Blackboard LMS more effectively at the University of Botswana (Tella, 2012).

Therefore, in order to maximize LMS usage institutions should establish functional IT Units to provide support services to both students and faculty. 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 surveyed institutions in Tanzania did not have eLearning policies (Author & co-author, 2014b). The study also found that some institutions such as University of Dar es Salaam and the Open University of Tanzania had outdated policies. For example, the UDSM 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) suggested that 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.

Increase awareness of LMS

Studies have shown that many faculty members are not aware of the existence of LMS within their institutions. For example, 50% of respondents (out of 44) indicated that they were not aware of the existence of Sakai 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 Moodle 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 kind of initiatives face more resistance than initiatives initiated 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 LMSs in teaching and learning. This can be done through creating brochures, flyers, group emails and by using LMS champions.

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 produced by the World Bank and the African Development Bank, there were almost 650 million mobile subscriptions in Africa in 2012, more than in the United States or the European Union making Africa the second fastest growing region in the world in mobile phone penetration (WB, 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).

Given these developments, mobile devices have become an integral part of many users' everyday lives. Institutions should take advantages of these developments by developing mobile interfaces that enable users to access LMS via their mobile devices. There are already some pilot studies in several institutions in sub-Saharan Africa. For instance, Makerere University in Uganda have 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 organisation 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, Suleman, & Marsden, 2013). The ultimate aim of the initiative was to develop the interface that will enable users to access LMS using mobile devices. These projects and many others provide an alternative for accessing the LMS with devices that users already have.

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 under-utilized. However, 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.

Previous studies have described poor ICT infrastructure and low Internet bandwidth being one of the main barriers to the use of LMS in Africa (Lwoga, 2012; Ssekakubo et al., 2011; Unwin et al., 2010). However, even institutions in countries such as Nigeria and Kenya widely regarded to have reliable ICT infrastructure have been experiencing a low uptake of these systems. Future research could investigate why uses do not accept and use these systems beyond contextual and infrastructural challenges.

In addition, the contextual and infrastructural challenges have been improving very rapidly in Africa, in tandem with penetration of cellular phones. Some examples of initiatives that have been improving Internet access and speed are the SEACOM (see http://www.seacom.mu/) and EASSy (see http://www.eassy.org/) marine cables along the eastern and southern African coast. Therefore, the current ICT infrastructure and Internet challenges are short term. These kinds of initiatives may not provide overall benefits if institutions do not find strategies to maximize LMS usage.

Finally, the findings of this study are based on empirical data from various studies cited in the literature. It should be noted that today's LMS failure might be tomorrow's LMS success, and vice versa. There is a need to conduct new evaluation to find out the extent of quality and intensity of LMS usage in sub-Saharan Africa in order to come with the actual situation at a given time.

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