

Learning Management System Implementation Framework for Higher Education-Case of University of the Witwatersrand

Rabelani Dagada and Paul Mungai

Abstract—The process of implementing a Learning Management System (LMS), especially when this involves the replacement of a legacy LMS is usually risky, frustrating, and expensive. To address the risk involved, this article suggests a seamless framework that could be used by institutions which intend to implement a LMS. The framework is based on a case study at the University of the Witwatersrand, South Africa where the institution migrated from the use of Blackboard a proprietary LMS, to Sakai an open source LMS. It helps in identifying all the key processes and activities involved in the implementation process of a LMS.

Index Terms—E-learning, learning management system, KEWL, Sakai, Moodle, blackboard

I. INTRODUCTION

E-learning is a type of learning that is conveyed through various information and communication technologies aimed at improving the quality of teaching and learning in a given context [1]. Most learning management systems are developed with the notion of “one size fits all” [2]. However, institutions needs and expectations vary and thus, one size cannot fit all.

To successfully identify a suitable learning management system, there is need to focus on; user expectations – not just return on investment, people (learners, managers & executives) not just technology, marketing and change management [3]. This is achieved by involving all the stakeholders including consultation with experts, both within and outside the organisation where necessary [4].

There is also need to develop an e-Learning policy that aligns to the organizational culture and not one that tries to align the organizational culture to policy [5]. The policy should be informed by the pedagogical principles that govern the teaching and learning process within the institution [6].

This article describes the case of the University of the Witwatersrand (Wits) starting from the selection to the implementation phase of a new learning management system. The case is unique as the institution was previously using Blackboard - a proprietary learning management system, but due to various challenges, sought to find an open source learning management system that would fit

their needs. Section two below describes the University of the Witwatersrand context including the motivation to change. This is followed by the learning management system implementation framework, which is derived from the Wits context. The framework helps in identifying most of the processes and activities involved when implementing a new LMS.

II. WITS CONTEXT

University of the Witwatersrand undertook various steps in implementing a new LMS. These included; describing the motivation for change, forming an advisory committee, developing an LMS evaluation criteria & identifying data collection methods. These steps are described in the sections that follow including the challenges encountered during migration and a summary of the implementation process.

A. Motivation

The advisory committee identified the following motivators for the change towards an open source solution: The University can set and determine the pace of implementation based on the available budget; It can also have a long term flexibility shift as it is able to change and innovate in teaching, learning and research based on the University’s strategic direction; It provides the opportunity for the University to engage and connect with other higher education Institutions [7].

B. Advisory Committee

The University constituted a taskforce to oversee the change process. This included; the University management team, the working group, and the project team. The University management team consisted of the vice chancellor, all the deputy vice chancellors and key representatives of the various faculties. The working group consisted of representatives from the various faculties, separate from those in the University management team. The project team constituted of an external consultancy company commissioned by the University management team [7].

The role of the University management team was to oversee the entire process and give approval on various recommendations by the working group.

The working group was tasked with the role of proposing three possible open source learning management system solutions to be evaluated by the project team, report to the management team on the findings by the project team and recommend a solution based on these findings [7].

The working group and the project team worked together

Manuscript received March 11, 2013; revised April 29, 2013.

R. Dagada is with the School of Business, University of the Witwatersrand, Johannesburg 2050 South Africa (e-mail: Rabelani.Dagada@wits.ac.za).

P. Mungai is with the e-Learning Support and Innovation Unit, University of the Witwatersrand, Johannesburg 2050 South Africa (e-mail: wandopm@gmail.com).

in developing the evaluation criteria. The project team was then tasked in evaluating the various systems proposed by the working group. Their role was critical in giving an independent view on the most feasible solution, hoping that they did not have any foreseeable interests that would compromise their recommendation [7].

C. Evaluation Criteria

An evaluation criteria was necessary in selecting the best LMS. This was developed by the working group and the project team and is illustrated Table I below:

TABLE I: WEIGHTED EVALUATION CRITERIA

Evaluation Criteria	Functionality
Functionality (Usability, Course, Content & Assessment management, enrolment, collaboration & communication)	20%
Technology (Security & Auditing, Upgrades & Extensions, management & maintainability)	15%
Costs (Membership, hardware & software, extensions, implementation & Support)	10%
Viability (Vision, track record, installed/usage base, community)	25%
Suitability	30%

Other factors, not included in the criteria above were also considered by the working group and project team during the evaluation process. These include;

1) Academic buy-in

The proposed system should be stable enough with low mean time between failures. It should also be easy to extend in order to accommodate new user requirements that are aimed at improving the teaching and learning process [7].

2) Ability to support large classes

The system should be able to handle traffic emanating from large classes, noting that some classes have an enrolment of more than one thousand students, and that a few of these classes may access the system at the same time [7].

3) Ability to source stable financial support

The proposed open source system foundation should have a stable financial base, where reliance is not primarily from one higher education institution. This guarantees that they are able to access the best skills when necessary, and that their existence is not short lived. This also mitigates the risk of collapse in case the donor decides to pull back [7].

4) User & developer community specialising on HEI's

The proposed system should have a sizeable user and developer community specialising on higher education. This would guarantee continuous innovation on tools that help improve teaching and learning [7].

5) Ability to attract local/global peer universities

The proposed system should be in use by some of the institutions that the University of Witwatersrand collaborates with. This could be valuable as the experience and expertise shared in this network can be shared [7].

6) Ability to continually meet expectations

The proposed system should have a good track record from institutions which have adopted it, especially with respect to technical support and response to recommendations on existing and proposed features [7].

D. Data Collection Methods

The following approaches were used in determining the most suitable solution between Moodle, KEWL and Sakai: literature review; Site visits on institutions using the proposed systems including University of Cape Town (Sakai), University of Kwazulu-Natal (Moodle) and University of the Western Cape (KEWL); Questionnaires to members of the institutions visited and also stakeholders at the University; Interviews with key stakeholders at the University including deputy vice chancellors, library managers, deans, head of departments, lecturers, instructional designers and software developers. After the data was collected, it was analysed using the weighted evaluation criteria illustrated in TABLE I: Weighted Evaluation Criteria.

E. System Selection and Approval

Based on the evaluation criteria described above, the working group recommended Sakai as the preferred system compared to Moodle and KEWL. This recommendation was accepted and approved by the University management team [7].

Following the approval, the University revised its policy to reflect the change that the official LMS will be Sakai as opposed to Blackboard. This implied that the University will only support Sakai and users of any other LMS' such as Blackboard, Moodle or KEWL would need to source for external support once Sakai is fully implemented [7].

F) Migration Challenges

The following challenges were encountered in the migration process;

1) Content migration

Most of the content in Blackboard was migrated however the process was tedious and mostly manual since the migration tools available were not capable of moving content seamlessly from Blackboard to Sakai. Some of the content, such as student submissions and conversations was not migrated due to lack of migration tools.

The content in Moodle and KEWL was not migrated across however provision was made to support where possible, lecturers who wished to migrate their content to Sakai.

2) System integration

It was crucial to integrate the recommended open source solution with the University student, staff and course management systems. This was a requirement in order to ensure authenticity of the learners and instructors. This would also help in giving credibility of the courses taught and the assessment grades awarded through the system.

3) Financial and human resource constraints

The University had to hire and outsource people who had skills on Sakai and Blackboard. This was triggered by the fact that not many institutions had migrated from

Blackboard to the version of Sakai that was being implemented (Sakai 2.8.0). The integration with the University systems was also complex. These required development of custom tools to facilitate in the migration & integration.

F. Implementation

The implementation process involved the following; integration of proposed solution with the University staff, student and course management systems; migration of content from Blackboard; customisation of Sakai to address custom requirements necessary for the change-over; and finally, training of staff and students on the new system.

Three major risks were encountered. Firstly, change management issues where the system was not welcome in some schools. The office of the vice chancellor - academic played a key role in enforcing the policy that the University will only support one learning management system, and that it was a requirement for courses to be made available on the system.

Secondly, the main content migration challenge was identifying tools that could be used to migrate content from Blackboard to the version of Sakai that was implemented. To mitigate this, the license for Blackboard was extended by one year. There was also a difficulty of finding the lecturers to sign off their courses since the eLearning Support and Innovation Unit (eLSI) at the university did the migration on their behalf. The sign off was required to ensure that the lecturers were aware of the existence of the course in the new system, and to also take ownership. For backup purposes, the University ensured that a local Blackboard server was setup containing all the content that was initially hosted in Blackboard servers. This helped in ensuring that all the content was fully migrated, and was still locally available.

Thirdly, the main integration challenge was solved by developing a local module in Sakai that would help in integrating the staff, student and course management systems.

The software developers, content developers and instructional designers at the eLearning Support and Innovation Unit (eLSI) worked together successfully in designing the required integration tools to enable the system to interact with the University student, staff and course management systems.

Trainings were conducted successfully, however, in some occasions there was a timetabling challenge for some of the lecturers and students. To mitigate this, trainings were conducted during off-peak hours including Saturdays.

III. LMS IMPLEMENTATION FRAMEWORK

The LMS implementation framework illustrated in Fig 1. LMS implementation framework helps to identify the key processes and activities required for a successful LMS implementation. It was developed following a careful observation & analysis of all the activities that the University of the Witwatersrand undertook during its implementation process which is described in detail in Section II above.

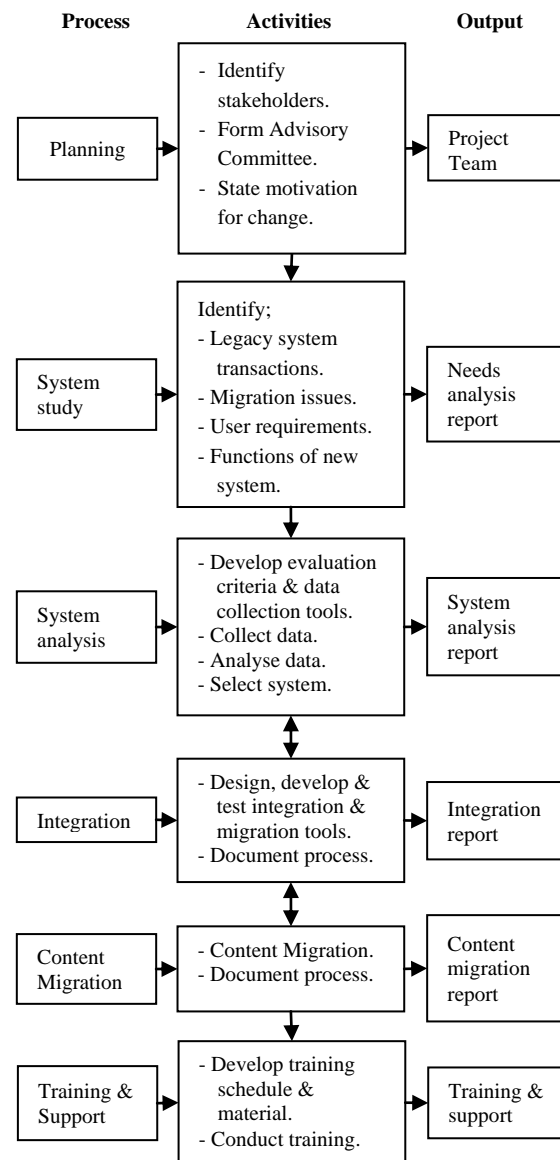


Fig 1. LMS implementation framework.

IV. CONCLUSION

In conclusion, this study demonstrates that LMS implementations can be successful when the process is properly defined, planned and managed. The framework developed in this study could help in the planning process and act as a guide in the implementation process. It helps in identifying all the major processes, and the recommended order of events. It also helps in identifying the activities and output of each process. This is trivial as some of the activities mentioned are often assumed, leading to frustrations, loss of resources and time. These frustrations could create resistance from faculty members in case of future attempts even when such attempts become successful.

ACKNOWLEDGEMENT

The authors would like to thank the office of the Deputy Vice Chancellor – Academic and the eLearning Support and Innovation Unit (eLSI) staff involved in the planning, analysis, implementation and documentation of this process.

REFERENCES

- [1] N. Begicevic and B. Divjak, "Validation of theoretical model for decision making about e-learning implementation," *Journal of information and organizational sciences*, vol. 30, no. 2, pp. 171-184, 2006.
- [2] E. W. Black, D. Beck, K. Dawson, S. Jinks, and M. DiPietro, "The other side of the LMS: Considering implementation and use in the adoption of an LMS in online and blended learning environments," *TechTrends*, vol. 51, no. 2, pp. 35-53, March 2007.
- [3] L. Dublin, "The nine myths of e-Learning implementation: ensuring the real return on your e-learning investment," *Industrial and Commercial Training*, vol. 7, no. 7, pp. 291-294, 2004.
- [4] S. De Freitas and M. Oliver, "Does E-learning Policy Drive Change in Higher Education? A case study relating models of organisational change to e-learning implementation," *Journal of Higher Education Policy and Management*, vol. 27, no. 1, pp. 81-95, March 2005.
- [5] D. Newton and A. Ellis, "Effective implementation of e-Learning: a case study of the Australian Army," *Journal of Workplace Learning*, vol. 17, no. 5/6, pp. 385-397, 2005.
- [6] T. Govindasamy, "Successful implementation of e-Learning Pedagogical considerations," *Internet and Higher Education* 4, pp. 287-299, 2002.
- [7] Wits, "University of the Witwatersrand, Learning Management System Report - Final Version 1.0," *Johannesburg*, 2011.



Rabelani Dagada was born in Alexandria on 23rd July 1971. Alexandria is a township north of Johannesburg, Gauteng Province, South Africa. He holds a Masters of Education from the Randse Afrikaanse Univesiteit, Johannesburg, South Africa and a Masters of Commerce from the University of the Witwatersrand, Johannesburg, South Africa and is currently pursuing a Doctor of Information Systems at the University of South Africa, Pretoria, South

Africa.

He is a lecturer at the Wits Business School of the University of the Witwatersrand, Johannesburg - South Africa where he teaches information technology and knowledge management. He is also the President and Chairperson of the Board of Directors of the Computer Society of South Africa.

He is also the author of two books; *Time, Space and Pace: Computer-Integrated Education in Corporate South Africa* (Pretoria, Gauteng: Unisa Press, 2009) and *Telecommunication Revolution in a Developmental State* (Pretoria, Gauteng: Unisa Press, 2009). His main research interest is developmental economics.



Paul Mungai was born in Nairobi, Kenya on 30th April 1983. He holds a master of philosophy in information technology from the University of Cape Town, Cape Town, South Africa and a Bachelor of Business and Information Technology from Strathmore University, Nairobi, Kenya.

He is a software engineer and researcher at the eLearning Support and Innovation Unit of the University of the Witwatersrand, Johannesburg, South Africa. His main research interests are in ICT for Development with special interest in Med-Informatics and Educational Technology.