COMPARATIVE ANALYSIS OF VARIOUS LEARNING MANAGEMENT SYSTEMS (LMS) FOR ACADEME IN INDIA

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Abstract—*There is a high comparative focus on education and training these days and become more critical to success. Various organizations are struggling to find the right blend of people, protocols, and systems to manage their learning programs. During the past 15 years, learning management systems (LMS) have become important for eLearning providers as platforms to handle course registration, content storage and delivery, assessments, administration, and reporting. The LMS market, however, has remained highly fragmented. This paper gives the comparative study and analysis of various open source learning management systems (LMS). This study compares the various whiteboard/video services, discussion forums both online and offline, file exchange, internal mail communication, online journal mail, and real live chat features of each of the LMS's. There are so many open source LMS out there due to this fact it is a bit tedious looking for a suitable one that will meet the instructors needs. This study always seeks to make it easier for the instructors that want to make the best choice when choosing a learning management system by revealing which learning management system has the best communication tools and giving high efficiency. This study also focuses on 6 popular LMS, ATutor, Claroline, Dokeos, Ilias, Moodle, and Sakai. The comparison of the six-open source LMSs showed that Moodle have the best communication tools with user friendly interface.*

Keywords—*Communication Tools, Distant Learning, Learning Management Systems, Moodle, Open Source.*

INTRODUCTION

There has been an increase in the number of e-learning systems which provide course instructors with a variety of options to choose from, this is often a tedious process to an instructor who is new to the virtual learning environment.

The LMS category includes applications that go by a variety of names, including virtual learning environments, course management systems, and collaborative learning environments. The different commercial and open-source platforms also vary in terms of capabilities and features.

Nevertheless, as per the American Society for Training and Development (ASTD), a robust LMS should be able to at a minimum do the following:

- Centralize and automate administration.
- Offer self-service and self-guided services Rapidly assemble and deliver learning content.
- Consolidate training initiatives on a scalable Web-based platform
- Support portability and standards, such as SCORM.
- Personalize content and enable knowledge reuse.

E-learning is widely adopted by educational centres at all stages, especially in higher education institutions trying to support the life-long learning (LLL) paradigm. It removes time and space barriers. Numerous sites and articles provide reviews of Learning Management Systems (LMS), mostly concentrated in comparative study of their technical features. Disappointment and frustration are common in eLearning, due to poor features, lack of pedagogical guidance, ineffective evaluation procedures and usability issues. A direct correlation has been established between the key aspects in the usability field and their effect on learning.

Common functionalities included in most enterprise-grade LMS solutions today also include

- Content management features that provide control over the storage, aggregation, retrieval, and delivery of learning materials. LMS administrators can also create catalogs and match learners or groups of learners to courses.
- Rebranding and customization options.
- User management tools allowing administrators to categorize users and assign them to roles and groups.
- Assessment creation, grading, and tracking features.
- Collaboration tools, such as email, wikis, discussion boards, and chat.
- Reporting and analytics about system and course usage, learner progress, assessment results, and more.

PURPOSE OF THE STUDY

Communication is an essential part of education. For this reason, this paper looks at the communication tools features in six popular open source LMS to compare findings. A typical LMS should provide all the communication tool features to ensure easy communication and feedback between instructors and learners peers.

It also gives insight to prospective LMS users hoping to select a suitable LMS. The number of LMS's increase periodically, and the existing open source LMS are being modified and upgraded to meet the needs of learners and teachers therefore evaluation of available features is necessary.

THE OPEN-SOURCE LMS

According to an analysis conducted by Epic Performance Improvement (Epic), there are more than 50 open-source LMS platforms available. Of these, however, only a few have the functionality and capacity to be truly considered enterprise-grade solutions. Epic's study also found that open-source LMS are being used in a range of environments, including:

- Large corporate enterprises.
- Small- and medium-sized businesses (SMB). Government and public-sector agencies.
- Primary and secondary education.
- Learning project-specific situations.
- Higher education.

The most popular open-source solutions all started out primarily aimed at and in some cases developed by the higher education market. Both Sakai and Moodle, for example, have their roots in academia, and continue to be dominant players there. The more successful open-source LMS applications, however, have gradually expanded beyond their higher education roots, usually by first making inroads in the government.

METHODOLOGY

The three platforms were set up beforehand using the default layout and configuration (as provided by the stable version in each site) on which we built a class environment with fictitious contents to simulate a real situation. The content was exactly the same on the three platforms. It included a class introduction, class forums and class documents. Five usability experts participated in this study, while three experts are the minimum recommended [5]. These five experts belong to the Cadius community, which stands for Information Architecture and Usability Community (in Spanish: Comunidad de Arquitectura De Información y USabilidad). Cadies is a community of usability, information architecture and interaction design professionals. It is organized by a distribution list and periodic meetings in several cities. It was created in 2001 and nowadays it involves more than 2000 members all over the world, especially in Spain and Latin-America. Each expert evaluated the platforms remotely in a random order. For each platform, they were asked to proceed with a series of tasks. The goal was to test the main features offered by an e-learning platform to support asynchronous student learning.

These tasks frequent or critical for students were as follows:

1. Register to the platform.
2. Sign up to a class.
3. Leave a post in a forum.
4. Download a document.
5. Add a personal event in the calendar.

Each evaluator could take as much time as needed to explore the platform. After completing the tasks, each evaluator filled a data log sheet. This spreadsheet was based on the 10 Nielsen Heuristics which are as follows.

1. Visibility of System Status.
2. Match Between System and the Real World.
3. User Control and Freedom.
4. Consistency and Standards.
5. Help Users Recognize, Diagnose, and Recover from Errors.
6. Error Prevention.
7. Recognition Rather than Recall.
8. Flexibility and Efficiency of Use.
9. Aesthetic and Minimalist Design.
1. 10.Help and Documentation.

These 10 heuristics are detailed into more than 300 usability checkpoints. Irrelevant checkpoints to e-learning platforms were removed to end up with about 200 checkpoints. For each checkpoint, the expert had to decide if it was or not respected or if it didn't apply to the site (NA: Not Applicable). For the data treatment, the NA values were removed and scores were transformed in percentage. If a checkpoint was not respected, the expert had to attribute a severity score: low, medium, serious or critical. The severity scores were attributed per the following definitions: • Critical: This usability problem will make some users unwilling or unable to complete a common task. It should be fixed urgently. • Serious: This usability problem will significantly slow down some users when completing a common task and may cause users to find a workaround. It should be fixed as soon as possible. • Medium: This usability problem will make some users feel frustrated or irritated but will not affect task completion. It should be fixed during the next "business as usual" update. • Low: This is a quality problem, for example a cosmetic issue, a spelling error or a grammatical mistake.

RESULTS STUDIED

ATutor, Claroline, Dokeos, Ilias, Moodle and Sakai, are compared as follows:

Whiteboard/ Video Services

ATutor: AComm an accessible Java based instant messaging and white board tool is used in ATutor. AComm has interesting features such as full keyboard functionality, allowing users to draw without using a mouse, it also consists of peer descriptions where a sighted user types a text description enabling a blind user to listen to it.

Claroline: It contains no whiteboard feature.

Dokeos: It has a video conference available for students to interact and learn from each other. The whiteboard feature is unavailable in the Dokeos LMS.

Ilias: Ilias has no whiteboard feature. It has the video conference and online video conference feature available which instructors and students use to exchange ideas and information.

Moodle: It has the best whiteboard feature amongst the six LMS. There is the Skype whiteboard and interactive whiteboard add one available for learners and instructors.

Sakai: It has no whiteboard and does not provide information on video services.

Discussion Forum

ATutor: ATutor is unique because it provides room for users to develop a network of contacts, set up a network profile, join interest groups, share pictures and discuss.

Claroline: It has a community of users and developers that meet occasionally to discuss on ways to help students and teachers interact using the Claroline LMS.

Dokeos: Discussion forum available.

Ilias: Discussion forums conducted for Ilias users worldwide to enable them exchange information and views on how to better further education using their LMS.

Moodle: It has a very active discussion forum. There are four basic forum types in the Moodle community helping students and teachers exchange ideas through posting comments and organizing workshops.

Sakai: It has a development discussion group also known as "Sakai-Dev". These groups are formed to improve the Sakai LMS.

File exchange/Internal Mail

ATutor: There is an inbox available for users to send and receive private mails from other users. Messages sent are saved in sent messages and deleted after some time. There is however, provision for messages to be exported and externally saved.

Claroline: No information on file exchange or internal mail was obtained from the Claroline website.

Dokeos: It provides tools for managing users, courses, sessions, portal, look and feel, homepage content course categories enabling instructors to work effectively.

Ilias: It has an internal email system available. On logging in, mails can be sent to individuals and participants of learning groups.

Moodle: It does an excellent job in providing easy ways for teachers to present materials to their students. Files are uploaded and accessed via Moodle. All that is required from students is to have the right software to open it.

Sakai: Information on file exchange and internal mail unavailable.

Online Journal Mail

ATutor: There is provision for instructors to upload and manage course related files. It consists of a pop-up file manager opened alongside the content editor or test questions editors. This enables course files to be linked with ease into content pages or test items as they are created.

Claroline: It comprises of an online journal feature.

Dokeos: No information on online journal mail available on the Dokeos website

Ilias: It offers different possibilities of importing and creating content for e-learning. It prides itself as a platform for creating and publishing content.

Moodle: It has a journal module available, providing a text area where students type in, it can also be revisited and updated.

Sakai: No information on online journal mail available on the Sakai website.

Real Time Chat

ATutor: It consists of ATutor chat based on XMPP protocol and WAI- ARIA live regions that introduces more efficient data transfer. This consists of one to one messaging and multi user chat among course members.

Claroline: No information on real time chat available on the Claroline website.

Dokeos: No information on real chat on the Dokeos website.

Ilias: It offers a chat system that is an independent JAVA based chat server that has to be installed before use.

Moodle: Real time chat is available enabling participants to have a real time synchronous discussion in a Moodle course.

Sakai: It offers tools such as wikis, chats and blogs to conduct debates and engage fully with one another.

CONCLUSION

With the increasing number of LMS's, it is becoming increasingly hard to know which one to go for. Researchers have used various methods developed by them to determine which LMs is best to use. Moodle still comes out as the top most among the open source LMS with a user base of over 8.3 registered and verified sites that serves about approximately 70.696.570 users as of June, 2013. The comparison of the six-open source LMS shows that Moodle and ATutor have the best communication tools with user friendly interface. Information is easily accessible on the Moodle and ATutor web pages, Ilias also makes information readily available to potential clients. Claroline and Sakai are the LMS with complex webpages making information difficult to obtain. The good thing about the LMS organizations is they all have discussion forums and work hard to develop better versions of LMS to better serve the learning community, Moodle might not be the best LMS tomorrow.

For this reason, it is best to consistently compare and contrast LMS's using easy to use user friendly LMS algorithms. An example is the Easy way to LMS (EW-LMS) which consists of user friendly steps, takes little time and needs no technical skills. More software like this should be developed to help make choosing the best LMS easy, developed by

Cavus (2010). It is a software that helps users evaluate learning management systems. More software like this should be developed to help make choosing the best LMS easy.

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