

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/275537673>

A Comparison of Open Source Learning Management Systems

Article in *Procedia - Social and Behavioral Sciences* · August 2014

DOI: 10.1016/j.sbspro.2014.07.430

CITATIONS

75

READS

2,481

2 authors, including:



Nadire Cavus

Near East University

114 PUBLICATIONS 2,022 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



NEAR EAST HOSPITAL MOBILE APPLICATION [View project](#)



Learning management systems [View project](#)



CY-ICER 2014

A Comparison Of Open Source Learning Management Systems

Nadire Cavus^{a*}, Teyang Zabadi^b

^a Department of Computer Information Systems, Near East University, Lefkosa 98010, Cyprus

^b Department of Curriculum Instruction, Near East University, Lefkosa 98010, Cyprus

Abstract

This paper focuses on the comparison communication tools of six open source learning management systems (LMS). It compares the whiteboard/video services, discussion forums, file exchange/internal mail, 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 paper seeks to make it easier for 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. It also focuses on 6 popular LMS, ATutor, Claroline, Dokeos, Ilias, Moodle, and Sakai. The comparison of the six open source LMSs showed that Moodle and ATutor have the best communication tools with user friendly interface.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Peer-review under responsibility of the Organizing Committee of CY-ICER 2014.

Keywords: Open source, Learning Management Systems, compare, communication tools, Moodle, distant learning

1. 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 institutions considering the use of a virtual learning system need to know the effectiveness of the available learning management systems (LMS) open to the public and also its strengths and weaknesses (Emelia, 2010). Open source has become a very important tool in education. Open source (OS), is the source code of a software that is readily available to the public for extension and modification depending on the user's needs. 10 items generally accepted by the open source community include; free distribution, source code, derived works-allowing modifications, integrity of authors source code, distribution of license, license should not be specific to a product, license should be technology neutral, license must not restrict other software, there should be no

*Corresponding Author: Nadire Cavus. Tel.: +09-392-675-1000
E-mail address: nadire.cavus@neu.edu.tr

discrimination against persons or groups and against fields of endeavor (Koohang & Harman, 2005). Commercial LMS available in the market for a price, open source LMS are available and at no cost, a functional assessment and evaluation should be carried out consistently (Botturil, 2004). Open source is available in an efficient way promoting learning as well as economic value, and anyone can easily access it with free redistribution privileges (Feller & Fitzgerald, 2000). From the definition open source is open to the public, to modify, and improve the source code to best meet needs. Open source LMS's help institutions to upgrade their education capacities. LMS is mainly aimed at the management of learners (Cansu, 2010). LMS is a software created to manage users learning activities, taking into consideration the features that will make this possible (Emelia, 2010). All these functions are made possible through LMS. E-learning courses should be developed in a way that teachers and students needs are met in the best way possible (Dimitrios et al., 2010). There are so many open source LMS's available to the public now, each having its strengths and weaknesses, for this reason, it is important for a prospective user to be well informed in order to make the best decision. Making the right choice while selecting an LMS is necessary because there are some open source learning management systems that have unclear user terms and unnoticeable costs attached and are not as efficient as they claim to be (Cavus, 2011). This makes it necessary to know the kinds of learning measurement systems that are available, select the best using important criteria to compare. The table below consists of a summary of features LMS can be compared by:

Table 1. Summary of features LMS can be compared by Al-Ajlan (2012)

LEARNER TOOLS	SUPPORT TOOLS	TECHNICAL SPECIFICATION
1. Communication Tools <ul style="list-style-type: none"> • Discussion forums • File exchange/ Internal email • Online journal/notes • Real time chat • Video services/ white board 	1. Administration Tools <ul style="list-style-type: none"> • Authentication • Course authorization • Registration integration • Hosted services 	1. Hardware/ Software <ul style="list-style-type: none"> • Client browser request • Database request • Server software • Unix server • Windows server
2. Productivity Tools <ul style="list-style-type: none"> • Book marks • Orientation/ help • Searching within course • Calendar/ progress review • Work offline synchronize 	2. Course Delivery Tools <ul style="list-style-type: none"> • Course management • Instructor helpdesk • Online grading tools • Student tracking • Automated testing and scoring 	2. Pricing/ Licensing <ul style="list-style-type: none"> • Company profile • Costs • Open source • Optional extras • Software version
3. Student involvement <ul style="list-style-type: none"> • Group work • Self-assessment • Student community building • Student portfolios 	3. Curriculum Design <ul style="list-style-type: none"> • Accessibility compliance • Course templates • Curriculum management • Customized look and feel • Instructional standards compliance • Instructional design tools • Content sharing/ reuse 	

There are certain features a standard LMS should have, in the table above, it can see that the LMS delivery tools are divided into 3; learner tools, support tools, and technical tools. Improving the outcome of a learning management system is important (Faxen, 2011).

2. Related Researches

According to a research carried out by Sabine and Beate (2005) using the qualitative weight and sum (QWS) which is a valid evaluation tool, the following 9 open source LMS were compared side by side namely, Ilias, openUSS, Lon-capa, dotLRN, ATutor, Dokeos, Spaghetti learning, Sakai and Moodle. They were all evaluated based on Adaptability features amongst others, Moodle rated the highest. Graf & List (2005) also carried out a similar research on adaptation issues of LMS. The research carried out by Al-Ajlan (2012) yielded similar results, three comparisons were done by dividing the features into technical tools, support tools and learner tools. 10 LMS were used including Moodle. He divided them into two groups, the first group was the Commercial e-learning systems which includes The Blackboard Learning System (V7), Desire2learn (8.1), Scholar360, Teletop Virtual Learning Environment, Angel Learning Management Suite (7.1) and a second group consisting of OS-LMS namely; Moodle (1.8), dotLRN/ OpenACS, Atutor (1.5.4), LON-CAPA, and Sakai (2.3). His extensive and in depth analyses proved Moodle to be the best overall. Moodle is not without limitations, it in fact lacked some form of *Sharable Content Object Reference Model (SCORM)* support. It was interesting to find that ATutor was found to have the strongest usability but in general lacked other features. Machao and Tao (2007) conducted their research in the California State University only to find that about 75% of the students preferred taking courses that used Moodle as their LMS as opposed to Blackboard which is a commercial Virtual Learning environment. From these researchers findings we can see that Moodle is gaining the preference of users all around the world (Brandl, 2005). This software was used to evaluate a set of LMS and Moodle again emerged as the best LMS to use (Berry, 2005; Reyes et al., 2009).

Claroline an OS-LMS is an effective LMS, imparting knowledge is available in over 30 languages worldwide and is said to be used in well over 80 countries and is the best OS-LMS available (Awanga & Darus, 2011). While Claroline is agreeably a good OS-LMS, Moodle is more widespread than Claroline and has the largest user base. Moodle has been translated into over 86 languages worldwide and over 53,794 Moodle sites from roughly 112 countries have been registered (Al-Ajlan, 2012). Researchers have indeed found many useful ways of comparing open source LMS (Paulsen, 2003; Diana, 2009).

3. The 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 and contrast findings. A typical LMS should provide all the communication tool features to ensure easy communication and feedback between instructors and learners and also learners and 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 this is why evaluation of available features are necessary.

4. Method

4.1. Setting

After searching 40 open source LMS, six of the popular ones were chosen and compared using the criteria of Al-Ajlan (2012). This was based on the learner tools, communication tools to be more specific. The importance of the communication tool features in every LMS cannot be over emphasized, for this reason, the comparison of features such as whiteboard/video services, file exchange/internal mail, discussion forum, online journal mail and real chat for the six chosen LMS namely, ATutor, Claroline, Dokeos, Ilias, Sakai and Moodle was carried out.

4.2. Data Collection Tools

Further research was done looking at the websites of Moodle, Claroline, Dokeos, Ilias, ATutor and Sakai to extract information on their latest stable versions and their user base. To compare and contrast the findings these six were chosen because they have become popular Open source LMS.

5. Results

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

5.1. 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 actually 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.

5.2. 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 through the use of 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.

5.3. 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.

5.4. 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.

5.5. 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.

6. 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.

References

- Al-Ajlan, A. S. (2012). A comparative study between e learning features, methodologies, tools, and new developments for e learning. In E. Pontes (Ed.), *Information system Management college of Business and Economics Qassim University Kingdom of Saudi Arabia* (pp. 191-214). Intech, ISBN: 978953-51-0029-4, Retrieved 14 January, 2014 from <http://cdn.intechweb.org/pdfs/27926.pdf>
- Atutor. Retrieved 13 November, 2013 from <http://www.atutor.ca>
- Awanga, N. Bt., Darus, M. Y. B. (2011). Evaluation of an open source learning management system: Claroline. *Procedia - Social and Behavioral Sciences*, 67, 416–426.
- Bery, M. (2005). An investigation of the effectiveness of moodle in primary education. Retrieved 24 April, 2011 from <http://moodleoot.org/mod/page/view.php?id=19>
- Botturil, L. (2004). Functional assessment of some open source LMS, (e lab report). University of Italian Switzerland. Retrieved 04 November, 2004 from www.instituti.usilu.net/botturil/web/publications/os_review_nov2004.pdf
- Brandl, K. (2005). Are you ready to "Moodle"? *Language Learning and Technology*, 9(2), 16-23.
- Cansu, C. (2010). Open source learning management systems in distance learning. *The Turkish Online Journal of Education Technology*, 9(2), 175-184.
- Cavus, N. (2010). The evaluation of learning management systems using artificial fuzzy algorithm. *Advances in Engineering Software*, 41(2), 248-254.
- Cavus, N. (2011). Selecting a learning management system (LMS) in developing countries: instructors' evaluation. *Interactive Learning*

Environments, 21(5), 419-437.

Claroline. Retrieved 13 November, 2013 from <http://www.claroline.net/>

Diana, B. (2009). A study of virtual learning environments. *WSEAS Transactions on Advances in Engineering Education*, 6(1), 33-43.

Dimitrios, T., Sofia, S., Paraskevi, C., Sultana, K., Triseugeni, R., Maria, S., & Athanasias, T. (2010). An adaptive and personalized open source e-learning platform. *Procedia - Social and Behavioral Sciences*, 9(1), 38-43.

Dokeos. Retrieved 13 November, 2013 from <http://www.dokeos.com/>

Emelia, P. (2010). Methods to evaluate open source learning platforms. In *Proceedings of IEEE Global Engineering Education Conference* (pp. 1152-1161). Jordan: Amman.

Faruque, S. (2012). 10 alternatives to Moodle for e-Learning software, LMS platform using open source/GPL. Retrieved 13 November, 2013 from <http://tektab.com/2012/06/26/10-alternatives-to-moodle-for-e-learning-software-lms-platform-using-open-source/gpl/>

Faxen, T. (2011). Improving the outcome of e-learning using new technologies in learning management systems - and establishing the requirements for an LMS engineering and management. Report N0.2011:001, ISSN:1651-4769. Retrieved 17 November, 2013 from https://gupea.ub.gu.se/bitstream/2077/26730/1/gupea_2077_26730_1.pdf

Feller, J., & Fitzgerald, B. (2000). A framework analysis of the open source software development paradigm. In *Proceedings of 21st International Conference on Information Systems* (pp. 58-69). Australia: Brisbane.

Graf, S., & List, B. (2005). An evaluation of open source e-learning platforms stressing adaption issues. In *Proceedings of 5th IEEE International Conference on Advanced Learning Technologies* (pp. 163-165). Kaohsiung, Taiwan: IEEE Computer Society.

Ilias. Retrieved 13 November, 2013 from <http://www.ilias.uni-koeln.de>, <http://www.ilias.de/index.html>

Koohang, A. & Harman, K. (2005). Open source: a metaphor for e-learning. *Informing Science Journal*, 8, 75-86.

Machao, M., & Tao, E. (2007). Blackboard vs. Moodle of comparing user experience of learning management systems. *Paper presented at the meeting of 37th ASEE/ IEEE Frontiers in Education Conference*. Milwaukee, WI. Retrieved 14 January, 2014 from <http://web.nmsu.edu/~jillhare/portfolio/myportfolio/Moodle%20vs%20Blackboard.pdf>

Moodle. Retrieved 13 November, 2013 from <http://moodle.org/>

Paulsen, M. F. (2003). Experiences with learning management systems in 113 European institutions. *Educational Technology & Society*, 6(4), 134-148.

Reyes, N. R., Candeas, P. V., Galan, S. G., Viciano, R., Canadas, F., & Reche, P. J. (2009). Comparing open source e-learning platforms from adaptivity point of view. In *Proceedings of 2009 EAEEIE Annual Conference* (pp. 62-68). Spain: Valencia.

Sabine, G., & Beate, L., (2005). An evaluation of open source e-learning platforms stressing adaptation issues. In *Proceedings of 5th International Conference on Advanced Learning Technologies* (pp.163-165). DC, USA: Washington.

Sakai. Retrieved 13 November, 2013 from <http://www.sakaiproject.org/>