

WCES 2014

Distance Learning And Learning Management Systems

Nadire Cavus ^{a*}^a*Department of Computer Information Systems, Near East University, Lefkosa 98010, Cyprus*

Abstract

The technology has been advancing rapidly recently and it has become necessary to use technology in the education sector. Because of this it has become necessary to re-organize the education sector. The needs of both students and teachers are also changing. Teachers need to prepare their lecture notes in the most effective way and in the shortest time. For the students the requirement has been to remove the time and space concept and encourage them for self-study. The educational institutions on the other hand are seeking to provide the maximum level of education with minimum level of investment. LMS seems to be at the top of the latest technological advancements that will satisfy all the requirements of teachers and students. The author has prepared this paper with the aim of giving general information about LMS systems, and in addition to describe all the aspects of LMS systems such as their general structure, types, and so on. In particular, the highly popular Moodle LMS system is described in greater detail.

© 2015 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Selection and peer-review under responsibility of the Organizing Committee of WCES 2014

Keywords: Learning management systems, e- learning; Moodle, interactive learning environment

1. Introduction

In this day and age, we can see clearly rapid changes and developments in technology (Cavus, 2009). Technological developments are forcing individuals, and consequently the institutions to become aware of the need to become part of the current era. It may also force them to re-organise themselves if necessary. Specially, a new era has started with the use of internet to reach any kind of knowledge instantly. With the fast developments in the knowledge technologies, new methods have emerged in the generation of knowledge, the presentation of knowledge, and the way we reach the knowledge. Technological developments have also affected teachers' instructional techniques, with technology providing different perspectives to the concept of education (Uzunboyulu,

* Nadire Cavus. Tel.: +90-392-675-1000

E-mail address: nadirecavus@neu.edu.tr

Bicen & Cavus, 2011). Currently, internet has been preferred in education because of the technological possibilities it is providing, and its potential to reach much larger mass of people. The education system is perhaps at the top of the systems affected by technological changes, and is undergoing fundamental changes:

- The learning needs are increasing and becoming more varied, and at the same time it is becoming a service that the individuals may be seeking throughout their lives.
- The learners are demanding more flexible, personalized, and easy to reach learning methods.
- The learners do not want to be dependent upon a certain learning method.
- There is need for student centered education instead of the classical teacher centered education.
- The teacher has become the person who guides the students on how to reach the knowledge instead of giving the knowledge.
- The learners are demanding more and more to learn at the time and place of their choice, and at their own learning speeds.

The education technologies offer many advantages to students and teachers by helping them to learn using interactive and collaborative techniques (Concannon, Flynn & Campbell, 2005). In particular, the internet nowadays is offering many tools and application packages to educators that can be used at all stages of teaching, and such tools increase the effectiveness and efficiency of teaching.

2. Learning Management Systems

Distant education model is the formation of a system for the required delivery of an educational subject or item (Moore & Kearsley, 2004). An LMS provides the virtual platform for the e-learning by enabling the management, monitoring student, delivery, tracking of learning, testing, communication, registration process and scheduling. West, Waddoups and Graham (2007) has pointed out that LMSs include a number of time-saving features that for convenience to instructors. An LMS provides the platform for the virtual learning environment and some common features of LMSs are:

- The guidance of students in the direction of education,
- The delivery of knowledge to students in various forms, such as word, word, power-point, flash, video, audio, and so on,
- The ability of students to do interactive applications,
- Assessment of students via homeworks and examinations,
- Delivery of the results to students,
- Communication between student-student ve student-teacher (e.g. discussion boards, chat, e-mail etc.),
- Interaction between student-lesson content,
- registration process (Cavus & Momani, 2009),
- scheduling,
- class management (Woods, Baker & Hopper, 2004),
- keeping records for students, teachers, and system (i.e. logs),
- entering the examinations and keeping record of the results,
- collecting the homeworks (Ioannou & Hannafin, 2008),
- grade keeping (Morgan, 2003; Malikowski, Thompson & Theis 2006),
- reporting (Cavus & Momani, 2009),
- student tracking (Harrington, Staffo & Wright, 2006),
- tracing student attendance records,
- students seeing their own education times,
- distributing e-learning contents on-line, and
- sharing knowledge and ideas.

There are many LMS systems on the market that can be obtained for free (e.g. Moodle, Claroline, ATutor, etc.) or through payment (i.e. Blackboard, WebCT, and many others) (Cavus, 2010). Moodle seems to be the one of the most efficient and most popular LMS amongst the open source free LMS systems.

3. Moodle

Modular Object Oriented Dynamic Learning Environment (Moodle), is one of the open source LMS systems that can compete with the commercially available LMS systems. A recent survey and investigation has shown that Moodle is the most efficient and most commonly used open source LMS system currently available (Hotrum, Ludwig & Baggaley, 2005; Winter, 2006; Cavus & Momani, 2009).

3.1. The most powerful properties of Moodle

- It is a open source learning management system.
- Its installation is easy both local and on the network.
- It enables educators to create online lessons.
- It has a very wide user group. As a result of this new versions are announced very frequently.
- As of today Moodle is available in 75 different languages. All the languages or only a single language can be used in a given LMS session.
- Moodle is used in over 215 countries around the world, and it has over 1,176,162 registered members in its own web site (Moodle, 2012).
- There is no need to pay any license fee for Moodle. It is distributed free of charge as open source under the General Public License (GPL). The institution using Moodle only has to spend time (and money) for creating the lessons.
- Moodle has been developed with Social Constructionist Pedagogy approach. This is one of the properties that distinguish Moodle from other LMS systems.
- Teachers can easily load their lesson notes prepared in different formats (e.g. SCORM, flash, MP3, RSS, Powerpoint, PDF, word).
- Moodle can compete with the commercial packages (e.g. Blackboard, WebCT) and it has a big share in the education sector.
- It used by very famous establishments.
- Moodle can easily be operated if you have an account with a web service provider.
- There is no need even to write a single line of program in order to use Moodle.
- New features are added constantly and these modifications are distributed free of charge (e.g. blog or module).
- Since Moodle is an open source package, the security issues are dealt with in shorter times as compared to commercial LMS packages.
- Since Moodle is free of charge it has a large user base that can test the system.
- Moodle is a system that is user based.

As can be seen from the above list, Moodle can easily be used by any educational institution engaged in distant education, without having to pay any fee.

3.2. The properties of the Moodle learning management system that interest educators

- Moodle is based and supports the Social Constructivist Pedagogy.
- It can be used for face to face (synchronous education) education and also for completely online education.
- As an interface it requires a simple, effective, compatible, low technology internet search engine (e.g. Internet Explorer, Firefox etc.).
- It sends the lesson lists to the internet over the service provider. The courses can be indexed by using the Google search engine as a guest person.
- The lesson can be divided into several categories and these categories can then be searched as required. Several thousand lessons can be loaded and controlled within the Moodle LMS.
- WYSIWYG HTML editor can be used to edit various items such resources, forums etc.
- Multimedia products such as video, Flash, Powerpoint, Excel, etc. can be used with the Moodle.

Moodle incorporates very reach modules and blocks. All the modules and blocks that are created are free of charge. Some of these modules are loaded automatically during the system installation and start-up. Because Moodle is an open source LMS system and because it is supported by many universities and user groups, new modules are created and added to the system continuously and these modules are distributed to users free of charge. The created modules are available in the Moodle web site (<http://www.moodle.org>) and they can be shared by all interested parties free of charge. The required module is simply downloaded from the Moodle web site to users' server computer and is then used.

3.3. Some learning activities and modules in Moodle

Lesson: Can be reached over the internet and can be saved and reused in later years. All lesson related activities can be shown in weekly format, and a student can easily see and follow all activities that will take place in a semester.

Examination: The most important activity within Moodle is the developed examination module. Using this module it is easy to set-up multiple choice type examinations and also assess such examinations in no time. Thus, the missing points in the subjects taught using the theory can instantly be recognised, and the questions where students had the most difficulty can be examined and the related subjects can be delivered again. Different types of questions can be asked in the examination module. For example, multiple choice where only one answer is correct, multiple choice with more than one correct answer, filling gaps, pairing answers, and true-false type questions. In addition, students can enter the answers to mathematical questions, and the answers can be accepted as correct if they fall within a given region. It is possible to carry out examinations not only during lecture hours, but also outside normal lecture hours. The system can change the order of the questions and answers randomly. Thus, in repeated examination conditions, answering by remembering the order of the questions can be eliminated. Students can learn their marks instantly, can see the correct answers, and then learn where they made mistakes instantly. These examinations can be turned into a learning activity as well. Because of this, students are given the chance of repeating the answers if their first answer happen to be wrong. As a result of this, students can review the questions for which they gave the wrong answers. If desired, a percentage factor can be setup such that for every wrong answer that the student gives, his or her mark can be reduced by the chosen factor.

Assignment: Students are asked questions based on the theory given to them in the classroom, using the assignment module. Students who have completed the applications can load the result files (.doc, .xml, .cpp, .java etc.) to Moodle. The assignments sent by students can either be marked automatically by the system, or the educator can mark the assignments. Students can be sent feedback for their assignments and so that they know how well they have done. It is also possible to send students their results automatically by the system, using e-mail. The hand-in dates of the assignments can be restricted using several criteria. It is possible to find out easily all the activities carried out by a student during a semester, such as which assignments completed, what grades has been given, and so on.

Survey: Using the survey module of the Moodle system it is possible to find out quickly and efficiently what the students' opinions are on certain topics. For example, the way that a lecture was delivered, difficulty of assignments, quizzes and questions, and the ideas that emerged from the students can all be converted into a survey, and then this survey can become a Moodle survey module where all the students can participate and give their opinions. This will help the educator enormously as he or she will have feedback about the overall level and opinions of the class.

3.4. Some communication modules found within Moodle

Some communications modules found within Moodle: Forum, wiki, e-mail, blog, chat, etc.

Forum Module: Using the forum module within Moodle, students can enter their questions on a pre-prepared forum. The fact that students can use these forms inside and outside lesson hours in order to ask questions and get answers, enable them to extend their learning activities outside normal lesson hours. In addition, the forum module can grade the messages. If desired, these grades can be converted into student marks and as a result, a more efficient

and a higher quality teaching environment can be established. All the messages sent by all the students can easily be monitored during a semester. Students who are shy to ask questions inside a classroom can easily use the forms to ask their questions. All the questions and answers sent to these forums can be collected and then compiled under a frequently asked questions heading, which then become an invaluable source of knowledge.

Wiki Module: Wiki is a collection of knowledge pages where everyone can have access and modify as they wish. If the educator prepares the course notes using Wiki, then students have the chance to add or modify these notes as they wish. As a result of this, lecture notes can easily and very quickly be prepared, reviewed, and all the mistakes can be removed. All the modifications done by students can be monitored, and if desired all these modifications can be removed. The pages to be used for each topic can be classified under different keywords. Thus, a link can be established to the pages in Wiki when that keyword is encountered anywhere in the course web site. Students can also be asked to form groups and work on Wiki pages on certain topics. As a result, collaborative study of the students as a team can easily be established. The pages prepared by a group of students can be modified, if desired, by other students. This way any mistakes can easily and quickly be removed and a knowledge environment can be created which can be used in later years as well.

3.5. Distribution of Authorities within the Moodle

Different people within the Moodle can have different authorities and responsibilities:

- a) **System Administrator:** Prepares the server (installs the PHP, Appach, MySQL). Downloads Moodle and install it on the server, adds teacher(s), opens lesson(s); assigns teacher(s) to lesson(s), adds students to the system, can have backup of the system, can restore the system if needed, can attempt to solve problems related to system operation.
- b) **Teacher:** Loads lesson syllabuses to the system, loads assignments to the system, prepares examinations, adds offline sources, prepares communications tools (e.g. chat, forum, blog), adds dictionary to the system, can backup his or her own lesson, can monitor his or her students' progresses and activities from the logs.
- c) **Student:** Enters the system using his or her username and password, can access the lesson contents, prepares the assignments and uploads to the system, takes examinations; checks the results, can see the results of his or her examinations, can establish communication with friends or with the instructor, can download documents offline to his or her own computer or can print them; can see his or her own performance level in the class.
- d) **Guest:** Can search inside the system using the limited areas assigned to them.

4. Conclusion

As a result of the increase in student numbers day by day in the education sector, or the need and importance to obtain knowledge whenever needed has made it necessary to use new technologies. Recently, LMSs has taken place at the front rows of the developing and changing technologies. Thus, educational establishments, teachers, and students should have working knowledge of the LMS systems and should use them before its late. This phase has already started in developed countries and is continuing to expand day by day. It is the author's opinion that, it is clear that if we wish to reach the levels of developed countries, we should start using the LMS systems as soon as possible.

References

- Cavus, N. (2010). The evaluation of Learning Management Systems using an artificial intelligence fuzzy logic algorithm. *Advances in Engineering Software*, 41(2), 248-254.
- Cavus, N., & Momani, A. M. (2009). Computer aided evaluation of learning management systems. *Procedia-Social and Behavioural Sciences*, 1(1), 426-430.
- Concannon, F., Flynn, A., & Campbell, M. (2005). What campus-based students think about the quality and benefits of e-learning. *British Journal of Educational Technology*, 36(3), 501-512.
- Harrington, T., Staffo, M., & Wright, V. H. (2006). Faculty uses of and attitudes toward a course management system in improving instruction. *Journal of Interactive Online Learning*, 5(2) 178-191.
- Hotrum, M., Ludwig, B., & Baggaley, J. (2005). Open source software: fully featured vs. the devil you know. *International Review of Research in Open & Distance Learning*, 6(1), 1492-3831.

- Ioannou, A., & Hannafin, R. (2008). Deficiencies of course management systems: Do students care? *Quarterly Review of Distance Education*, 9(4), 415-425.
- Malikowski, R. S., Thompson, M. E., & Theis, J. G. (2006). External factors associated with adopting a CMS in resident collage courses. *Internet and Higher Education*, 9(3), 163-174.
- Moodle (2012). Moodle Statistics. Retrieved June 25, 2012 from <http://moodle.org/stats>
- Morgan, G. (2003). Faculty use of course management systems in the University of Wisconsin System. EDUCAUSE Center for Applied Research Report. Retrieved June 19, 2009 from <http://www.educause.edu/LibraryDetailPage/666?ID=ERS0302>
- Uzunboylyu, H., Bicen, H. & Cavus, N. (2011). Efficient virtual learning environment: Case study of Web 2.0 tools and Windows Live Spaces. *Computers & Education*, 56, 720-726.
- West, R. E., Waddoups, G., & Graham, C. R. (2007). Understanding the experiences of instructors as they adopt a course management system. *Educational Technology Research and Development*, 55(1), 1-26.
- Winter, M. (2006). Learning management systems for the workplace. Retrieved June 19, 2009 from http://www.tanz.ac.nz/pdf/LMS_Final.pdf
- Woods, R., Baker, J. D., & Hopper, D. (2004). Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction. *Internet and Higher Education*, 7, 281-297.