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Which One, or Another? Comparative Analysis of Selected LMS

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Abstract

This paper deals with the comparative analysis of four types of frequently used LMSs. First, the brief description of each LMS is provided, followed by list of evaluation criteria. Final results of the analysis are presented in the form of table, summarized and discussed in the text, as well as future approaches to LMS developments are mentioned.

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1. Introduction

The ICT-supported education represents one of approaches which are currently considered a common and widely accepted (sometimes even preferred) way of learning. Learning management systems (LMS) consist of sets of tools and partial software applications which are able to simulate a real teaching/learning environment that enables learners to study 365/24/7 from anywhere and in individual pace. The information and communication technologies (ICT) are used for supporting both cognitive processes and psychological education aspects. A teacher/tutor represents an irreplaceable factor in the education process however his/her role has changed. Within the process of instruction the ICT can be used in various ways, e.g. as a tool enhancing the face-to-face process of teaching/learning, as an administration tool, and also for creating an education environment where the process of instruction is managed by ICT system. There are numerous LMSs (software tools) in the market which differ in services provided, technical requirements and price. Above all, some universities have developed their own systems (Mikulecká, 2005).

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2. Selected Learning Management Systems

Below, four LMSs have been selected and their tools evaluated and compared to those used in other systems. Reflecting the availability (free of charge, open source, licensed product), following four LMSs were analyzed:

- A. Claroline,
- B. Moodle,
- C. Blackboard,
- D. Enterprise KnowledgePlatform™.

2.1. Claroline

This open source of LMS system was developed at the Université catholique de Louvain in 2000. Consequently, Claroline Consortium was established in 2007, currently joining 15 universities, mostly from Belgium and France. This is the reason why the starting language of system was French, consequently using English on the second language

Main positive features of the LMS are user-friendliness, coherent implementation of single functions and easy administration. Within the learning curriculum topics are structured into files, presented either separately, or being zipped if more files are uploaded in one folder. This feature is considered the weakness of the system as technical problems may appear in accessing to the materials. Test results on various types and forms reflect the standard requirements comparable to other LMSs. Czech language command is not available, which is considered the strongest disadvantage (Sin, 2013)

2.2. Moodle

Moodle (Modular Object-Oriented Dynamic Learning Environment), been introduced in 2002, has been developed as a tool supporting the social and constructive approach to the education. It can be used for supporting the full-time, part-time and distance form of study. It is provided free of charge as a free and open software under the GNU General Public License and can be run on a common computer, tablet or smartphone equipped with a web viewer connected to the Internet. Its strengths were detected in following features (Manenova, 2013):

- Configuration and Organization, as it is based on a template principle, having intuitive interface with easy navigation. Learning content is structured in small units within wider topics, e.g. on a weekly schedule.
- Course administration where the access to selected files can be time-limited by the administrator, or protected by password. Students activities are automatically tracked, and students can follow their educational results.
- Contents and sources can be displayed in various formats (text, html, graphics formats, video- and audio-formats etc.).
- Evaluation and testing runs in traditional forms (e.g. fill-ins, multiple-choice, true-false, matching, short-answer), which can be time-limited and/or protected by password.
- Cooperative learning, being based on the social-constructive learning theory, runs in groups, pairs, using a/synchronous means of communication, including Wikis. Discussion panels mediate teacher/learner and learner/learner communication.

2.3. Blackboard Learn

The Blackboard LLC Company was established in 1997 dealing with consulting services and technical standards for on-line education. This approach includes an user-friendly environment focusing on presentation of study materials, references, syllabuses etc. In 2005 the BlackboardInc Company merged with the competitive WebCT Company. The current Blackboard is used for on-line education by over 20 million users in more than 60 countries in the world. The system is available in more than 50 languages and it is used by more than 20,000 educational institutions.

Blackboard strengths include following features:

- Increased Availability of the system available on the Internet and easy access were detected in the survey in 2004 (Belander, 2004) formed at Duke University, USA by 85 % students.
- Learning content is structured in items, files, folders of all formats.
- Course of study is managed by calendar.
- Quick Feedback for students in the form of 10 types of tests, either automatically or tutor-corrected, was another strength discovered in the survey.
- Wide scale of communication tools, which cover standard as/synchronous approaches, and the virtual classroom for group communication, are provided to teachers and learners.
- Tracking, working towards obtaining statistical data about students' activities in the course, and displaying their performance (study results) in the Gradebook.

Bradford also presents some disadvantages or limitations of the Blackboard system (Bradford, Porciello, Balkon & Backus, 2007):

- It is more difficult to manage work with the software against expectations.
- This statement was connected with a study performed at the Hampton University School of Nursing (Servonsky, Daniels & Davis, 2005) where the Blackboard had been used in postgraduate studies. Students of that type of study had not mastered technologies and work with them as the students of full-time form of study had done. Because of that work with the Blackboard seemed to have been more difficult for them.
- Some functions (options) can be limited by using a particular Operating System.
- For Blackboard the Microsoft NT should be used.
- Price for using this LMS is considered high, as a yearly license can reach 200,000 - 400,000 U.S. dollars a year if more functions are used.

2.4. *EnterpriseKnowledgePlatformTM*

This LMS represents an education control system developed by the NetDimensions Ltd. Company established in 1999 and having branches in Hong Kong, USA, Great Britain, Germany, Denmark, Australia, China and Philippines. The system has been offered in at least eight languages and available in three versions - EKP Bronze, EKP Silver and EKP Gold. The particular versions differ in availability of diverse functions (Scesny & Gabrhel, 2012).

Main features of the EKP system are as follows:

- Clarity and Simplicity, when all important news and tools (calendar, tests) are presented on the home page, which is a dynamically-generated area containing all specific data about the course along with supporting tools.
- Learning content includes single units organized in catalogues; each catalogue can be available to certain users, e.g. learner, department, faculty. A storage facility is intended for exchange of files, specifications, reports, tutor's training, namely between tutors and students and between students themselves. Files in the storage facility are arranged in the normal directory structure and each user has the access to his/her directories and to shared directories as well. Every directory or file has its owner in terms of safety and there is possible to set access rights for individuals, groups, organization units etc.
- Communication Tools and Sharing Information is held by internal mails, panels, chats, bulletin boards and news which are displayed on the home page of each user. Creating a curriculum vitae, which can be accessible to other users according to the adjustment, belongs to additional forms of sharing information about the user's person.
- Evaluation and Feedback are provided on individual basis reflecting all students' activities (time spent at the course, status of tasks, number and days of accesses, score achieved, results of tests, total and individual answers, etc.). Creating a recommended curriculum belongs to important rating tools. A print-out manager with over 40

pre-defined options is intended for evaluating different activities, but the user can create also his/her own print-out and to obtain required information in his/her own format.

- Content Heterogeneity supports courses generated e.g. in Macromedia Authorware, Macromedia FLASCH with AICC/SCORM support and tools of ToolBook II Assistant and ToolBook II Instructor. The educational content can be stored on a common server with the EKP, but it can be remotely induced from another web server as well.
- Adaptability and Versatility is ensured by options for configurations and adaptability levels without additional interferences of the supplier, i.e. different user roles and access roles for particular functions of the system can be defined. User accounts can be created by a system administrator by means of automated or manual procedures.

3. Evaluation criteria

The analysis focused on comparing the above described four LMS systems reflected following criteria:

- tools intended for generating contents;
- communication tools;
- tools for collecting and evaluating activities;
- tools for co-operation and other possibilities of the system;
- price.

Particular fields and tools had been evaluated by expert teams supported by a long-time experience in work in the selected LMS (in particular, Claroline was evaluated by Krcal team, a teacher of informatics at Bishop grammar school, Hradec Kralove; Moodle was evaluated by Manenova team, Faculty of Education, University of Hradec Králové; Blackboard was evaluated by Poulova team, Faculty of Informatics and Management, University of Hradec Králové; EKP was evaluated by Ligas team, Faculty of Education, Matej Bel University, Banská Bystrica).

4. Results of LMS comparison

There were versions of Claroline 1.10.7, Moodle 2.5, Blackboard 9.1 and EKPSilver 4.6 being available for the comparative analysis.

Following tools intended for generating contents were analyzed and compared:

- Page
- URL
- File
- Folder
- Legend
- Book
- Lecture
- Dictionary (index)
- Syllabus
- Lesson plan
- Video
- Integration (integration with study contents of other LMS)

Another compared group covered communication tools:

- Discussion panel
- Chat
- Reports
- Inquiry
- Comments

- Blogs
- Survey (question-form)

The group of tools for collecting and evaluating activities included:

- Task
 - On-line text
 - Set
 - Off-line activity
- Test
- Workshop (Self and Peer Assessment)
- Safe Assignment

The co-operation tools and other compared options included:

- Group mode
- Wiki
- Virtual classroom
- Calendar
- Internal mail
- Tracking
- Statistics
- Database
- Language adjustment
- Certificates

The occurrence of single features is displayed in table 1.

Table 1. Results of comparative analysis.

	Claroline	Moodle	Blackboard	EKP
Page	-	x	x	x
URL	D	x	x	x
File	D	x	x	x
Folder	D	x	x	x
Legend	-	x	x	x
Book	-	x	x	x
Lecture	-	x	x	x
Syllabus	-	-	x	-
Dictionary	-	x	x	x
Lesson plan	x	-	x	-
Video	-	-	x	x
Integration	-	x	x	x
Discussion	x	x	x	x
Chat	x	x	x	x
Reports	x	x	x	x
Inquiry	-	x	-	x
Comments	-	x	x	x

	Claroline	Moodle	Blackboard	EKP
Blogs	-	x	x	x
Survey (question form)	-	x	x	x
Quick mail	A	x	A	x
Task	x	x	x	x
Tests	x	x	x	x
Workshop	x	x	x	x
Safe Assignment	-	-	x	-
Group mode	x	x	x	x
Wiki	x	x	x	x
Virtual classroom	-	-	x	x
Internal mail	-	x	x	x
Calendar	x	x	x	x
Tracking	x	x	x	x
Statistics	x	x	x	x
Database	-	x	x	x
Language adjustment	x	x	x	x
Certificates	-	x	x	x

x – tool available, - - tool not available, D - Documents and references, A - As announcement

The final criterion was the price. While Claroline and Moodle are available free of charge, Blackboard and EKP have their license policy and their price depends on number of users and the tools used. Approximately the expenses are calculated \$ 10 per user and year with Blackboard Learn and the price for EKP Silver unlimited license is 10 EUR (calculated from the multi license).

5. Summary

The findings can be summarized as follows:

According to the analysis results there are 80 % tools of identical tools in Blackboard and EKP.

Claroline system is simpler and contains fewer tools.

The tools of Syllabus and Lesson Plan contain only the Blackboard as a direct tool. In the other LMSs this tool is substituted by a particular file.

Blackboard also contains Safe Assignment as a specific tool which is intended for protection against a plagiarism and for checking submitted tasks in reference to the central database. The system can maintain a database of before submitted tasks (for an organization or for a bigger association) and perform checking a current submitted work in reference to this database.

Three of examined LMSs include tools for cooperation, i.e. created tasks can be evaluated by students mutually (Moodle and EKP – Workshop, Blackboard - Self and Peer Assessment). Students thus can take part in generating contents (Wiki, dictionaries, and databases). Tools for communication were included in all four LMS as well. There are discussion panels, chat and mails in different forms.

The criterion, which mostly distinguishes the LMSs is the price. Moodle and Claroline are free of charge and LMS Moodle tools do not basically differ from remaining two systems, which are provided for payment. Pappas (2013) emphasized that at the eLearning Industry an increasing number of LMS vendors that continuously strengthen and improve their LMS solutions was detected. However, with some many LMS providers and 1000+ of LMS solutions at the global eLearning market it was really difficult to find the best LMS solution that fits individually specific requirements. He defined 99 LMS features that should be used to compare LMS Vendors. It was also clear what customer's requirements are as important LMS features should reflect them, e.g. if a LMS

solution is successful for an education institution, it does not mean that it will suit the purposes of a large company. The list of features is available on the eLearning Industry web page (<http://elearningindustry.com/>) where also customers' comments are appreciated based on (1) the application of the 99 features and (2) opinions what customers consider important (and why). Papas had an increased interest in cloud-based LMSs; that was why he created the ultimate list of cloud-based LMSs that is continuously updated.

6. Conclusion

The previous analysis showed several LMSs of adequate quality were available on the market which could become a good starting point for e-learning solution. Similarly to traditional approach, the student and the teacher skills to mediate the knowledge are crucial factors, not the size and equipment of the school building. The learner-centered approach, i.e. learning content and teacher support to acquiring new knowledge by the learner, is the core of the process of instruction.

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