

LEARNING MANAGEMENT SYSTEMS AND MOOCS

Diana Popovici*, Gheorghe Donca*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Gh. Magheru St., 410048, Oradea, Romania, e-mail: pdiana@uoradea.ro

Abstract

The use of the Virtual Learning Environment (VLE) is becoming increasingly popular at all levels of formal education (primary, gymnasium, high school, university) as well as complementary / informal (vocational, adult, etc.). VLE systems work under Learning Management Systems (LMS). A large number of LMS, commercial, free and / or Open Source have appeared on the market. The content management side has crystallized in Learning Content Management Systems (LCMS). Massive Open Online Courses (MOOCs) could be considered a species of LCMS. The present paperwork aims to compose a picture of the levels and complexity currently achieved by the software in the field described above.

Key words: eLearning, VLE, CMS, LMS, LCMS, MOOCs

INTRODUCTION

Research has highlighted some benefits of using Information Technology in Education. For example (Benta et al., 2015) compared the proportion of homework solving and the presence at class, between the eLearning platform and the traditional method, finding substantially higher values in the electronic version (82% vs 44% and 98% vs. 83%), thing confirmed by other researchers, such as (Chou & Liu, 2005), who found 4 benefits for students studying in TVL (Technology-mediated Virtual Learning Environment): obtaining better performance, better use of computers, a higher level of satisfaction and a better study climate. As can be noticed from above (TVLE), due to the novelty of the domain, we will still need some theoretical delimitations regarding terminology used in eLearning domain.

MATERIAL AND METHOD

The analysis of scientific literature as well as the studies in the entrepreneurial area highlights the following key issues: VLE develops in a sustained rhythm, appearing new branches and sub-branches of the field. This is a preliminary study. Its objective is to clarify the main directions of the e-Learning Systems domain for the Web.

RESULTS AND DISCUSSIONS

Background

The Virtual Learning Environment (with the Technology-mediated Virtual Learning Environment alternative) is defined (Dillenbourg, 2002) as follows: for software to subsume to the category must have the following properties:

1. to be an informational space created by the contribution of several authors
2. to be a social space that allows educational interactions
3. to be explicitly represented, ie to have a specific interface, starting from text to 3D
4. students to not be only active but also to collaborate in building virtual space by creating and sharing objects
5. is not limited to distance learning, and can also enrich the current classroom activity
6. can integrate heterogeneous technologies and multiple pedagogical approaches
7. overlaps with physical environments, integrating all the non-computerized tools that can be found in a class as well as activities (for example, using Gamebox consoles).

Virtual Learning Environments needs an Learning Management System. LMS is a Content Management System (CMS) sub category, which also contains software for Blogging, News, online Shopping, or Web Development Frameworks. The main purpose of LMS is to manage the students (Cansu, 2010, apud¹ Cavus, 2014), who can be pupils, students or adults in a training. LMS manages the learning activity of users (users) taking into account the characteristics that allow it (Emelia, 2010, apud Cavus, 2014). LMS identifies, records and tracks participating students in the educational process and connects users to their courses (Gaceu, 2009, apud Hampel, 2014). Other functions of an LMS: communication (email, SMS, announcements, alerts), collaboration (forum, questions and answers, discussion groups, wikis), evaluation (tests, mutual evaluation, exams) the school situation (matriculation sheets) and course modules management. It typically doesn't contain the Student Information System, Document Repositories, Analysis Tools, and Learning Content Creation Tools (LCCT). LMS can be commercial, free and Open Souce.

Learning Content Management Systems (LCMS) is a component of Learning Management System (LMS) focused on content management

¹ apud (lat.) indicates indirect quote

(creating lessons from pieces). After (Shaw, 2007, apud Sural, 2010), LCMS is an application designed to facilitate the creation or capture, management and transfer or distribution of learning content.

There is no clear distinction between LMS and LCMS, each having functions from the other category (Sural, 2010).

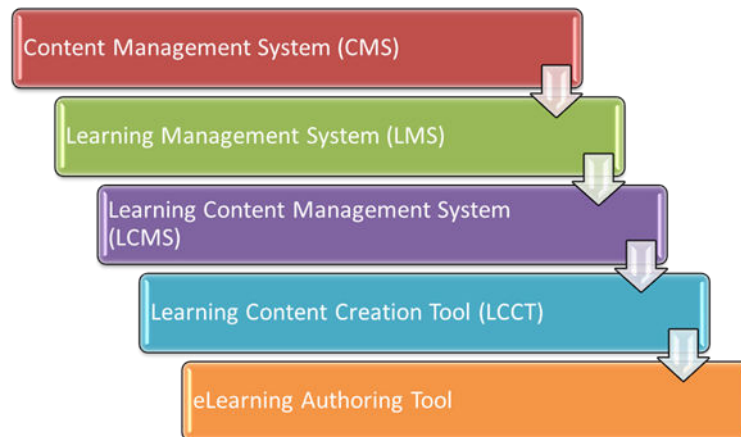


Fig. 1 Relative taxonomy of eLearning terminology

Learning Content Creation Tools (LCCT) is the specific component of LCMS learning objects elaboration, such as text, audio or video editors. Their functions overlap quite a lot with Authoring Tools Software. Some LCCTs can be embedded in the product, or in other cases they are self-contained software, situation in which compatibility issues arise. Because eLearning systems appeared when many editors with their own encodings already existed for use, in order to use them was attempt the standardization of content transfer between the LCCT software in which the learning content were achieved and the receiving LCMS/ LMS.

Standards in the field (Dobre, 2010: 25), (Uta, 2007) come generally from developers and are approved by standardization bodies: the most common e-Learning standards are: Sharable Content Object Reference Model- SCORM from Advanced Distributed Learning Initiative - US Department of Defense (ADL, 2004), Instructional Management Systems Project - IMS from IMS Global Learning Consortium (IMS Project), AICC Guidelines and Recommendations - AGRs from Aviation Industry Computer Based Training Committee (AICC), or Mathematical Markup Language-MathML from the World Wide Web Consortium (W3C, 2014).

A. Learning Management Sysyems

The number of LMS platforms is currently very large, and continues to grow including institutional projects (eg Hampel, 2014) and it is quite

difficult to categorize them. After (Dobre, 2015), LMS could be divided into:

- Commercial LMS (only counter-cost versions)
- Open Source LMS (free, including source code)
- Cloud-based (does not require user's server)
- Mixed

LMS users could also be divided into two big categories: educational institutions (especially universities, but also high schools, secondary or primary schools) respectively economic entities wishing to train their staff (let's not forget that the first LMS come from the Aviation area as well as the AGRs standard).

Hereinafter, will be reviewed the relevant elements for the use of eLearning systems, especially from a university perspective. At the following, the authors add the personal experience of course authors in 2012 to the DidaTec System from the Technical University of Cluj-Napoca (DidaTec) and the author adds the personal experience of using as a student in 2011 of the platform Fronter (Sandnes, 2007), a student of the British Academy of Business and Communication (ABAC) in 2014, as well as Coursera and EdX MOOCs, in the years 2015-2016.

A1. Free/ OpenSource LMSs

A study published by Procedia - Social and Behavioral Sciences (Cavus, 2014) compares 6 LMSs: ATutor, Claroline, Dokeos, Ilias, Moodle, and Sakai, evaluating Moodle and ATutor as having the best communication tools and interface friendly with the user. The criteria they used in the study were: Whiteboard/ Video Services, Forum, File Exchange/ Internal Mail, Online Journal Mail, Real Time Chat.

Modular Object Oriented Dynamic Learning Environment - Moodle, is one of the best-known LMS Open Source and possibly the most used in the world, with a strong community of developers around it. It is also among the few Open Source LMS that can be measured with commercial LMSs (Cavus, 2015). More important features:

- is distributed free of charge under the General Public License (GPL)
- can be installed locally or in the network
- supports multiple formats for content: SCORM, Adobe Flash, MP3, RSS, MS Powerpoint, .pdf, MS Word
- has been developed in the paradigm of the Pedagogy of Social Constructivism, as opposed to other LMSs.

Social Constructivism involves the effort to create through collaborative meanings, having as result a group culture. Constructionism is a theory that states that learning is stimulated when the subject strives to explain (to others), because it has to (re)structure the information.

A2. Commercial LMSs

Docebo LMS; Docebo is a Cloud Learning Management System that enables organizations to manage, track and deliver eLearning courses to its employees, partners, and customers. It offers both formal and informal learning functionalities that engage learners with increasing adoption and retention. According to (Docebo, 2014) Docebo had maximum exposure to the primary and secondary school segment. Other commercially known LMS: BlackBoard, after (Dobre, 2015) the most used commercial LMS, or Edmodo.

Table 1

Synthesis of eLearning Solutions (LMS)

Open Source	Free	Freemium	Commercial	Commercial from Romania
Moodle	ATutor	Docebo + (free up to 5 users)	BlackBoard	AeL SIVECO Romania
Sakai	Claroline	CourseSites (BlackBoard)	Edmodo	
With + systems that offer Cloud				

B. LCMS/ LCCT/ eLearning Authoring

The usual components of an LCMS after (Sural, 2010) are:

- Authoring Tools: used to create reusable learning objects (study material, tests) available in the “warehouse” of objects such as editors (Word, PowerPoint), Flash or DreamWeaver, or other software visually oriented
- The Learning Object Repository is a database accessible locally or through the Web
- The Delivery Interface provides learning objects in accordance with access rights and pre-established sequence; this component also provides user activity tracking and evaluation tools
- The Administrative Application manages student enrollment, launches courses, tracks learner progress as well as other required administrative functions.

Below are some examples.

B1. Free eLearning Authoring Tools/ LCMSs

iSpring Free; iSpring started in 2005 as a simple convertor from PowerPoint to Flash; it is now a complete tool for generating content for all current devices (desktop, tablet, smartphone); is installed as a plug-in to PowerPoint and allows its wedging with video (also has Recorder) and interaction; offers Cloud and for tests uses the QuizMaker plugin; packs the SCORM / AICC content and is compatible with the main LMSs in the market (Moodle, Doces, etc.) for BlackBoard publishing with a distinct option. iSpring Suite is the commercial LCMS (iSpring Free).

B2. Commercial eLearning Authoring Tool/ LCMSs

Adobe Dreamweaver (former Macromedia Dreamweaver) is an iconic product in the industry, known and widely used for about 20 years, and as a WYSIWYG HTML editor (for websites). It supports MySQL, Access, PHP, ColdFusion, Active Server Pages (ASP) and ASP.NET (McFarland, 2007). The CourseBuilder extension provides interactions and SCORM support. It also offers friendly mobile templates for mLearning (ICS Learning Group). Offers a trial of only 7 days.

C. Masive Open Online Course(s) - MOOC(s)

MOOCs are the latest and most spectacular achievements of the eLearning industry, with the potential to change forever how education can be accessed. We could say that they are the purest expression of democracy in education if we take into account the fact that through their inception every person with access to the Internet has the opportunity to train at the most recognized universities in the world (in the moment when the access the Internet will become unlimited). But first we should find its place in the taxonomy of eLearning terminology. MOOCs are not LMS, LCMS or other components of the eLearning system presented in Fig. 1, they are the courses themselves.

After (Baturay, 2015), the main features of MOOCs are as follows:

1. Open means that anyone can enroll in as many courses as they want and can participate in discussions with colleagues and course authors
2. Participatory, that is facilitating collaboration in the creation by students of learning objects and their sharing
3. Distributed: Based on a co-operative approach, any course knowledge can be distributed across a network of participants that are located all over the world; some of the course's activities take place in social learning environments where participants interact

Other features: scalable for a large number of students (hundreds of thousands); capable of running in parallel different stages of the course with different students (in other words, each can start at the desired calendar date and finish the same, following lessons at their own rhythm, even after the course has ended for others); dynamic as content, their granular structure allowing for easy replacement of the "course pieces"; also dynamic as content through the contributions of participants that change from group to group and, last but not least, flexible because MOOCs technology allows authors to receive feedback from participants and adapt the course "in real time" (Nielson, 2015).

After (Swan et al., 2013, apud Baturay, 2015), following a study on 5 MOOCs, they found the following trends:

- are primarily teacher-centered

- focuses on convergent responses
- highly structured
- are rather objectivist than constructivist.

The Objectivism is a trend considered "a version based on realism" (Lakoff, 1987, apud Vrasidas, 2000), with the following features: there is a single world of structured entities that can be categorized based on their properties; the real world is entirely structured so it can be modeled; symbols are representations of reality in so far as correspond to reality; the human mind processes the abstract symbols mirroring nature.

An educator in the objectivist paradigm will believe that there is only one correct reality, that by studying nature we can identify its structure, its entities, their properties and the relationships between them, which we can represent using theoretical models and abstract symbols.

CONCLUSIONS

eLearning systems are about to produce a structural change in education on several levels:

- ❖ increasing the attractiveness and commitment of the participants
- ❖ fulfilling the personalized learning desideratum
- ❖ accessibility in financial and territorial terms
- ❖ temporal and content flexibility
- ❖ lower costs for organizers / participants in terms of increased quality in relation to classical organization.

The widespread use of these learning systems will translate into the emergence of highly skilled human resources communities/countries, widening the gap with those who don't participate in the process of accommodating with these eLearning systems.

REFERENCES

1. ABAC, Academia Britanică de Afaceri și Comunicare, Iași, <https://www.academiadeafaceri.ro/>
2. ADL- Advanced Distributed Learning, <https://adlnet.gov/scorm>
3. Bechina A.A., E. Hustad, 2010, A Framework to Understand Enablers and Inhibitors in a Learning Management System: Experiences from Fronter, The Seventh International Conference on eLearning for Knowledge-Based Society, 16-17 December 2010, Thailand
4. Benta D, G. Bologa, S. Dzitac, I. Dzitac, 2015, University Level Learning and Teaching via E-Learning Platforms, Procedia Computer Science 55 (2015) 1366 – 1373, free at ScienceDirect
5. Baturay, Meltem Huri, 2015, An overview of the world of MOOCs, 5th International Conference on New Horizons in Education (INTE), Paris, France, 2014, Book Series: Procedia Social and Behavioral Sciences Volume: 174 Pages: 427-433

6. Cavus N., 2015, Distance Learning And Learning Management Systems, Procedia - Social and Behavioral Sciences 191 (2015) 872 – 877
7. Cavus N., Z. Teyang, 2014, A Comparison Of Open Source Learning Management Systems, Procedia - Social and Behavioral Sciences 143 (2014) 521 – 526
8. Chou Shih-Wei & Chien-Hung Liu, 2005, Learning effectiveness in a Web-based virtual learning environment: a learner control perspective, Journal of Computer Assisted Learning 21, pp. 65–76, JIF 1.8 in 2017
9. Coursera: <https://www.coursera.org/#umd>
10. DidaTec-UTCluj: http://ctmtc.utcluj.ro/sites/didatec_/SitePages/Platforma.aspx
11. Dillenbourg Pierre, Schneider D., Synteta P, 2002, Virtual learning Environments. În A. Dimitracopoulou (Ed). Proceeding of the 3rd Hellenic Conference "Information & Communication Technologies in Education", Rhodes, Greece. Kastaniotis Editions, Greece, pp.3-18, 2002, full text in <https://telearn.archives-ouvertes.fr/hal-00190701>
12. Doces, 2014, E-Learning Market Trends & Forecast 2014 - 2016 Report
13. Dobre I., 2015, Learning Management Systems for higher education - an overview of available options for Higher Education Organizations, Procedia - Social and Behavioral Sciences 180 (2015) 313 – 320
14. Dobre Iuliana, 2010, Studiu critic al actualelor Sisteme de e-Learning, Academia Română, Institutul de Cercetări pentru Inteligență artificială
15. ICS Learning Group, 2013, Dreamweaver, CourseBuilder and eLearning Templates, <http://www.elearninglearning.com/adobe/dreamweaver/scorm/?open-article-id=4120026&article-title=dreamweaver--coursebuilder-and-elearning-templates&blog-domain=icslearninggroup.com&blog-title=ics-learning>
16. Hampel G., Dancshazy K., 2014, Creating a Virtual Learning Environment, Journal of Agricultural Informatics . 2014 Vol. 5, No. 1:46-55
17. IMS Project, <http://www.imsproject.org/>
18. iSpring Free: https://www.ispringsolutions.com/free_powerpoint_to_flash_converter/why_free.html
19. McFarland, 2007, Dreamweaver CS3, Pogue Press O Reilly
20. Moodle, <http://www.moodle.ro/>
21. Nielson B., 2015, What's the Difference Between a MOOC and an LMS?: <http://www.yourtrainedge.com/whats-the-difference-between-a-mooc-and-an-lms/>
22. Sandnes F.E., H-L Jian, O. Talberg, 2007, Student Evaluation of the Learning Management
23. System Frontier From an HCI Perspective, International Conference on Engineering Education- ICEE 2007, Coimbra, Portugal
24. Sural I., 2010, Characteristics of a sustainable Learning and Content Management System (LCMS), Procedia Social and Behavioral Sciences 9 (2010) 1145–1152
25. Uta Adina, 2007, E-learning Standards, Informatica Economică nr. 1 (41)/2007
26. Vrasidas C., 2000, Constructivism versus objectivism: implications for interaction, course design, and evaluation in distance education, International Journal of Educational Telecommunications, 6(4), 339–362
27. W3C- World Wide Web Consortium, 2014, <http://www.w3.org/TR/MathML3/mathml.html>