

# Moodle and social constructivism

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# Abstract

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Moodle as a learning (or primarily course) management system was elaborated to help teachers managing on-line courses and curricula with opportunities for rich interaction. Its free software (open source and free) license and modular construction facilitate to develop additional functionality. The development of new plugins, modules, themes etc. is undertaken by a globally diffused network of commercial and enthusiastic, non-commercial users.

The declared philosophy of Moodle embraces a constructivist, social constructivist/constructionist approach to education. It underlines that learners and teachers can contribute to the educational experience in many ways. The essence of this method is that the job of “teacher” can transform from being “the source of knowledge” to being an influencer, connecting with participants in a more individual way that addresses their own learning needs, and moderating debates and work in a way that collectively leads the learners towards the learning goals of the group. Despite these aims, numerous social, pedagogical, organizational, technical etc. factors, related to knowledge management issues, impede the predominance of social constructionist pedagogy. Moodle excellently works conforming to traditional pedagogical principles and doesn't force the social constructionist style of learning and teaching, but it is the best at supporting and further improving. Because of the ascending crisis of the “traditional” style of teaching the social constructionist design becomes more and more exciting by seeking alternatives.

**Keywords:** Moodle, virtual learning environment, learning management system, social constructivism

# VLE, CMS, LMS

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The software systems designed to help teachers by facilitating the administrative and learning management of educational courses for their learners, students, are called *virtual learning environment (VLE)*.

The most universities nowadays have VLEs embedded within their usual education activity. The following levels of Virtual Learning Environments, based on a usual pedagogical approach, are well-known:

- virtual educational site,
- virtual center for e-learning,
- virtual classroom,
- virtual library,
- virtual laboratory,
- virtual school,
- virtual department,
- virtual faculty,
- virtual university or virtual campus.

The virtual learning environments by its functions can be classified into four generation (Шереметов, А., Усков, В 2002):

- The first generation of VLEs (the early 90's) can be described by static databases of learning materials, tests, discussion forums etc. with the absence of integration and interaction between separate components.
- Second generation VLEs (from the second half of 90's) are software platforms for e-learning with integrated database and organized learning process. The functions of second generation are extended in some areas: planning, administration, function for creating and supporting learning materials, function for testing student's knowledge and for getting statistics of their results but the use of modern communication and multimedia technologies is scanty.
- Third generation VLEs (nowadays in use) are much more advanced in pedagogical and administrative functions and in communication and multimedia technologies (audio conferences, videoconferences; specialized virtual "centers" and platforms for the development of educational courses, library and administrative functions, interactive environment for asynchronous and synchronous communications and online collaboration).
- The main "leitmotif" of fourth generation (nowadays in use) is intellectualization, personalization and adaptation of learning materials to the needs of each user; orientation to new learning paradigms (connectivism, social constructionism).

Present-day VLEs can be seen as software tools or platforms constructed with different types of applications. Moreover, there is a widespread, "traditional" division into content authoring/content development tools and

course/learning management systems. In spite of the fact that there are very popular, sophisticated authoring tools, the most course/learning management systems more and more integrate the functions of the two types of that development tools. Because of the spreading new pedagogical paradigms the division may be unneeded.

The synonyms of VLE make the content of the term more complicated. VLEs are sometimes also called *Learning Management System (LMS)*, *Course Management System (CMS)*, *Learning Content Management System (LCMS)*, *Managed Learning Environment (MLE)*, *Learning Support System (LSS)* or *Learning Platform (LP)*. A more accurate term may be a *virtual environment for learning*, rather than virtual learning environment; because it identifies that it is the environment which is virtual and not the learning. (Wikipedia 2008)

“Moodle is a course management system (CMS) - a free, Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities.” (Moodle Docs 2008a). The abbreviation and technical term that describes the Moodle as a CMS (course management system) is acceptable, but it can be confused with the term of *content management system*, based on a similar structure, therefore the use of term “LMS” seems to be more expedient.

Most LMSs offer the following functions, or in other terms live up to the following expectations (McIntosh, Don, 2007):

#### **Tools for educators:**

- course development tools - a web platform for uploading, managing, creating, modifying resources (text, multimedia materials, simulation programs, etc.) embracing calendar, course announcements, glossary, and indexing tools,
- course syllabus development tools with the ability to structure learning units,
- quiz or survey development tool for creating tests, course evaluation etc.
- grade book,
- administrative tools to track student activity both as individuals and in groups.

#### **Tools for students:**

- password protected accounts for access to course materials,
- course content bookmarking and annotation,
- personal webpage publishing,
- accounts for access to the collaborative tools (email, discussion groups, collaborative webpage publishing),
- access to grades and progress reports,
- group work areas for collaborative webpage publishing
- self-assessment tools.

#### **Administrative tools:**

- management of student and instructor accounts and websites,
- monitoring and reporting activity,

- e-commerce tools for sale of courses,
- communication and survey tools.

**Some rarer features:**

- learning object management (course content management for reusability),
- e-portfolios,
- file and workflow management,
- streaming audio and video,
- access to electronic libraries,
- e-commerce module, online paying systems.

Compared to the list above, the present learning management systems often offer more sophisticated functions. Moreover, the spread of systems, based on constructivist, social constructionist or recent connectivist learning theories, attacks the mentioned functions and expectations usually based on “traditional”, behaviorist principles. Learning management systems must also increasingly support common problem search and knowledge construction. Moodle lives up to not only the traditional expectations but the support for new directions of e-learning.

# Development and characteristics of Moodle

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Martin Dougiamas, an Austral software developer and research worker, at the end of '90s was very unsatisfied with the functions offered by learning management systems (WebCT, First Class, Lotus Learning Space etc.) that were widespread in those days. "I try to present a different perspective, based on developing new tools for teachers and learners to enable richer forms of dialogue combining content and communication through which teaching and learning can occur. The tools allow both teacher and learner to construct environments in their computer within which they can construct representations of their understandings of the subject and share them with others in a variety of ways." (Dougiamas, Martin, 1999)

The prototype of a new system, based on that new pedagogical approach, was trialled in 1999. "The results suggest that Moodle as it stands is relatively successful as a tool to produce structured content with work-book-like responses. Two areas needing the most improvement are internet knowledge and student interaction. This encourages me to continue development on two fronts: firstly the Internet Overview course as a tool for students to learn about the Internet; and secondly, functions within Moodle to encourage and manage educational discourse among a class of students within its content-based framework." (Dougiamas, Martin 2000) On 15 November 2001 the start of Moodle was announced. Its all-conquering success began. (Moodle Docs 2008b)

## I. Pedagogical antecedents

A declared, primary source of the pedagogical creed of Moodle is *Deschooling Society* written by Ivan Illich in 1971. In this provoking book, Illich proposes radical and exciting reforms for the education system. In Illich's opinion schools don't answer our individual needs, supporting faked and deceptive notions of progress and development cherished by the belief that increasing production, consumption and profit are real measures for the quality of life. The universities have become recruiting centers for the members of the consumer society, certifying them for service, for the competitive rat race. Illich says the deinstitutionalizing education may be a starting point for a deinstitutionalized society.

Particularly interesting and a theoretical antecedent of Moodle is his call (in 1971!) for the use of advanced technology to support "learning webs".

"Educational resources are usually labeled according to educators' curricular goals. I propose to do the contrary, to label four different approaches which enable the student to gain access to any educational resource which may help him to define and achieve his own goals:

1. Reference Services to Educational Objects--which facilitate access to things or processes used for formal learning. Some of these things can be reserved for this purpose, stored in libraries, rental agencies, laboratories, and showrooms like museums and theaters; others can be in daily use in factories, airports, or on farms, but made available to students as apprentices or on off hours.

2. Skill Exchanges--which permit persons to list their skills, the conditions under which they are willing to serve as models for others who want to learn these skills, and the addresses at which they can be reached.

3. Peer-Matching--a communications network which permits persons to describe the learning activity in which they wish to engage, in the hope of finding a partner for the inquiry.

4. Reference Services to Educators-at-Large--who can be listed in a directory giving the addresses and self-descriptions of professionals, paraprofessionals, and free-lancers, along with conditions of access to their services. Such educators, as we will see, could be chosen by polling or consulting their former clients.” (Illich, Ivan 2008)

The concrete details of plan proposed by Illich in 1971 reflect the technical level of those days, so seem to be technically outdated. However the four points of this proposal can be interpretable as important antecedents of constructivist, social constructionist philosophy preferred by the developers of Moodle.

*Constructivism* asserts that people actively build new knowledge as they interact with their environment. Everything you perceive is tested against your prior knowledge and if it is viable within your mental world, may form new knowledge you carry with you. *Constructionism* extends the ideas of constructivism and maintains that learning is particularly effective when constructing something for others to experience. *Social constructivism or constructionism* extends the above “isms” into a social group building things for one another, collaboratively creating a small culture of shared artifacts with shared meanings.

## 2. Features of Moodle in short

Moodle has more features than you would expect from an average learning management system. Because of its free software (open source and free) license and modular construction it can readily be extended by creating plug-ins for specific new functionality. Moodle supports many types of plug-ins:

- Activities
- Resource types
- Question types
- Data field types (for the database activity)
- Graphical themes
- Authentication methods
- Enrollment methods
- Content filters

PHP is usable to author and contribute new modules. Moodle's development has been accelerated by the work of open source programmers. It has contributed to its fast development and rapid bug fixes. Hundreds of sophisticated modules created by enthusiastic developers can be downloaded from <http://moodle.org>. The most popular core modules:

- Assignment module
- Chat module
- Choice module

- Database module
- Forum module
- Glossary module
- “Hotpot” module
- Lesson module
- Quiz module
- Resource module
- SCORM module
- Survey module
- Wiki module
- Workshop module

Moodle runs without alteration on Unix, Linux, FreeBSD, Windows, Mac OS X, NetWare and any other systems that support PHP, including most webhost providers without those offer free webhost services. Data is stored in a single database (MySQL, PostgreSQL, Oracle or Microsoft SQL). The newer versions of Moodle were released with improved roles management.

Moodle has a significant user base with over 38,200 registered sites with 16.7 million users in 1.69 million courses. There are 84 registered Moodle sites with more than 20,000 users. The site with the most users is moodle.org with 43 courses and 322,176 users. The site with the most courses is *E-learning na VUT v Brně* with 19,223 courses and 41,305 users. (As of February 8, 2008)

According to *Alexa Web Traffic for LMS Suppliers* the market share of Moodle is only below Blackboard, above all other VLE, CMS, LMS. (Packt Publishing 2008) The *OSS Watch 2006 Survey* showed that 56% of further education (FE) institutions use Moodle as a Virtual Learning Environment. In short, Moodle is the most popular among free, open-source LMSs and one of the most popular LMSs in general. (OSS Watch 2008)

The Moodle has rich dimensions to interoperability for e-learning systems:

- Authentication, using LDAP, Shibboleth, or various other standard methods (e.g. IMAP)
- Enrollment, using IMS Enterprise among other standard methods, or by direct interaction with an external database
- Quizzes and quiz questions, allowing import/export in a number of formats: GIFT (moodle's own format), IMS QTI, XML and XHTML (NB although export works very well, import is currently not complete)
- Resources, using IMS Content Packaging, SCORM, AICC (CBT), LAMS
- Integration with other Content Management Systems such as Postnuke (via third-party extensions)
- Syndication using RSS or Atom newsfeeds - external newsfeeds can be displayed in a course, and forums, blogs, and other features can be made available to others as newsfeeds.

Moodle also has import features for use with other specific systems, such as importing quizzes or entire courses. (Wikipedia 2008b)

### 3. Moodle support to Social Constructionist views

The declared social constructionist features in Moodle are the following (Moodle Docs 2008c):

*“All of us are potential teachers as well as learners - in a true collaborative environment we are both”*

Lots of activities in Moodle are constructed to allow students to control the shared, common content of courses, such as forums, wikis, glossaries, databases, messaging etc. This stimulates students to share course experience for others.

*“We learn particularly well from the act of creating or expressing something for others to see”*

Moodle has a lots of ways in which people can create representations of their knowledge and share them:

- The course structure itself is an important way to construct a shared representation of the learning “path” that everyone can go through.
- Forums are spaces for discussion and sharing of media and documents (media plug-in filters, attachments, hyperlinks).
- Wikis are outstanding tools for group work and other discussions.
- Glossaries are collaboratively-built “cyclopedias” that can then appear throughout the course.
- Databases allow participants to enter structured media of any type.

*“We learn a lot by just observing the activity of our peers”*

The participants’ page, the “online users” block, the “recent activity” block are the main places where you can see everyone’s activity in your course.

*“By understanding the contexts of others, we can teach in a more transformational way (constructivism)”*

There are many different ways to find out about the participants:

- The user profile includes fields where participants can provide information about their background.
- Blogs allow people to express thoughts in a public but reflective way.
- Activity reports show all the contributions from a participant in a course.
- Log reports show detailed logs of every action taken by a participant in Moodle.
- The survey modules provide a variety of questionnaire tools.

**“A learning environment needs to be flexible and adaptable, so that it can quickly respond to the needs of the participants within it”**

You can create flexible and easily adaptable courses in different ways:

- The course page itself allowing the teachers to structure and restructure activities if necessary.
- The roles from Moodle 1.7 can be applied individually in every context.
- Preferences of appearance and behaviour allowing educators to fine-tune the behaviour of Moodle in many ways.
- External systems can be integrated into Moodle, to maintain authentication, enrolments etc.

## 4. Social constructivism does really work?

Moodle is designed to constructivist, social constructivist, social constructionist learning theories, but the predominant majority of courses created by Moodle is based on “traditional” learning and pedagogical methods. What is the reason for it? Comfort, laziness, conservatism, incomprehension, socialization patterns, institutional barriers, or maybe the insufficiencies of these theories? It’s hard to answer this question shortly.

The successful adaptation of learning methods with assistance of Moodle in some institutions shows that the social constructivist learning with Moodle is more than a fancy, it’s a real alternative. But it would be a mistake to avoid the theoretical critics and to suggest that problems are attributable exclusively to the enumerated “subjective” factors. Constructivism is criticized on various ground (Thirteen Ed Online 2008):

- Constructivism and other reformist educational theories have been most successful among children from privileged social backgrounds who have excellent teachers, committed parents, and wealthy home environments. The disadvantaged children, lacking such backgrounds, benefit more from more explicit, more traditional instruction.
- The collaborative aspects of constructivist courses tend to produce autocracy of the majority, in which a few students' voices or interpretations dominate the group's conclusions, and dissenting students are forced to conform to the consensus.
- There are few hard evidences that constructivist methods really work. Constructivists, by rejecting evaluation by testing and other external criteria, have made themselves unaccountable for their students' progress. Critics also say that studies of various kinds of instruction have found that students in constructivist classrooms lag behind those in more traditional classrooms in basic skills.

The assertions above are refuted by lots of theoretical and practical examinations. There are numerous arguments on the both sides, but it would be the theme of a more detailed, theoretical essay.

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