

Do you Moodle?

Experiences with a Virtual Learning Environment

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Abstract. *The authors follow up on their long-standing interest in Virtual Learning Environments (VLE's). They sketch out connected terms and definitions, taking into account the framework conditions of a design studio context as well as regular teaching. Subsequently, they describe the MOODLE-platform and supply arguments for selection along with alternatives. They particularly focus on enriching interaction targeted towards learning effects and discuss the connected pedagogical models. The selective use of features is also taken into consideration. The contribution concludes with a discussion of the pros and cons of MOODLE.*

Keywords: *VLE; Course Management System (CMS); e-learning platform; MOODLE.*

Introduction

Previous CAAD-related conferences have shown a wide-spread interest in virtual design studios and collaborative working environments. Different online course management systems have also been in use for several years. There seems to have been a fascination with the technology itself and the possibilities of emerging web technologies. Which alternatives (software solutions) do exist nowadays? Through the development of several web-based technologies, the contours of integrated online digital design environments are slowly becoming visible. Based on our experiences and those of other researchers and teachers, we outline a (pedagogical) framework that takes advantage of the possibilities offered by online

(distance) learning systems.

This contribution will focus on working experiences with MOODLE (an acronym for 'Modular Object-Oriented Dynamic Learning Environment'). The name of this open source software has a playful aspect, as 'moodling' can be interpreted as a verb which points to improvisational processes that have the potential to enhance creativity. The experiences with the MOODLE environment stem from different university locations in Europe, which share a common interest in possible lines of future development. It has to be noted that this topic has not yet been addressed in the eCAADe-community.

The first section deals with the working context of a VLE. As MOODLE is not the only solution available at the moment, related efforts are explored.

The subsequent section elaborates on how to get started with MOODLE and on possible development options. Special attention will be paid to the pedagogical models available. The paper concludes with an examination of the current (dis-) advantages of MOODLE.

What is a Virtual Learning Environment?

At the outset, it might be of interest to take a closer look at the definition of what a VLE actually embraces. In a wider sense the question arises as to the specific differences between e-learning and VLE's. The former can be regarded as an umbrella term, for which the latter offers the technical solution within which e-learning can take place. The commonality lies in the learning component, which cannot rely on face-to-face interaction between, for example, instructor and student. There is a 'gap' between them in terms of time and/or space. e-learning establishes a bridge over the gap of asynchrony and/or dislocation between the teacher and those taught. One has to take into account, however, that the materials delivered must be adequately prepared for the exchange of information and related tasks. Hence, a distinction has to be made between e-learning – where the course material can be 'consumed' independently from any form of tuition based on presence – and learning issues in the framework of design-oriented education. In the latter context, 'blended learning' seems to be of interest, which involves a mix of presence and virtual interaction 'in between'.

When a course is delivered to a large number of students – unless personal resources are ubiquitous (which is hardly ever the case) – a VLE will generally offer an even greater advantage. The team responsible for the delivery of the teaching work can rather easily keep track of the amount of information consumed. On top of this, straightforward feedback mechanisms can be provided as well as forms of self-assessment etc.

Lecturing has been in existence for ages, being both indispensable and irreplaceable at times where

no recording and playback media were available. Indeed, in the sense of the 'here and the now' the spirit of reality is hard to replace. Furthermore, the idea of ownership and sharing information has become a worthwhile discussion topic in recent years. Web-based teaching tools may offer students the opportunity to see the work in progress of their peers (van Leeuwen et al., 1998) or even use it and follow up on it (Wenz and Hirschberg, 1997). This provides a completely different stimulus for peer learning than traditional means.

In order to distinguish between the scopes of educational tools, we refer to Kolb's experiential learning cycle (Kolb, 1984). According to Kolb, a learning activity consists of a number of steps: (1) concrete experiences, (2) observations and reflection, (3) formation of abstract concepts and generalizations, and (4) testing concepts in new situations. Accordingly, we may define a Virtual Learning Environment as any kind of computer system that supports a learner in all four steps of Kolb's learning cycle. In concrete terms, we can ask the following questions:

1. Does it offer a way to acquire hands-on experience, for example by means of exercises, tasks, or instructions?
2. Does it provide an opportunity for elaboration, for example by teacher feedback, required reflection, peer reactions, or questionnaire?
3. Does it assist in extracting meaningful information, for example by offering additional information or discussion with the teacher?
4. Does it encourage further application of the concepts learned, for example by offering a variety of follow-up exercises, tasks, or instructions?

Additionally, we need to define the technological scope in order to determine what kind of system we are confronted with (see Table 1). On the lowest level we may identify technical components such as e-mail, web pages, ftp, and blogs. Functional components combine a number of technical components to create a more comprehensive system. A Course Management System for example, links a course

Table 1
Overview of the technologies
involved

Technical components	E-mail, web page, ftp, blog, database, whiteboard
Functional components	CMS, LMS, up/download facility, chat
Educational tool	VLE, CAI, CBT, ILS, ODT, TBL, TEL, WBT

database with a student database to facilitate assignments; an up/download facility enables student (groups) to share files and assignments and have an overview of work submitted so far, etc. In conclusion, an educational tool integrates student databases, course databases, and feedback.

The scope should perhaps be narrowed down even more, as the working context addressed in this paper is related to a design studio environment (Bradford et. al, 1994). It is rather unlikely, that the desired amount of exchange will take place within the context of lecturing and a subsequent written exam. Contrariwise, students working on their design task first of all involves developing concepts out of which architectural designs gradually emerge. The studio leader will therefore directly react to a certain design, and this will be done in the context of a set programme and other designs created by other studio students. Pros and cons are explored; problems are identified as well as the potential for further development. While it is therefore hardly imaginable that the whole trajectory of support could be fully replaced by a VLE (Gavin, 2000), certain parts would allow for alternative ways of communication.

All in all, an impressive catalogue of acronyms has been established, including CAI (Computer Assisted Instruction), CBT (Computer Based Training) CMS (Course Management System), ILS (Integrated Learning Systems), LMS (Learning Management System), ODT (On Demand Training), TBL (Technology Based Learning), TEL (Technology Enhanced Learning), WBT (Web Based Training). This may be slightly confusing given the often subtle differentiations.

MOODLE vs. alternative VLE options

In the previous section, we have outlined the general requirements for educational tools. As a matter

of principle, any web space could be identified as a basic form of VLE, if it gives access to information that one party is supplying in chunks and pieces to a system and enables a subsequent process of exchange by letting users deliver input based on what they find. The key issue is whether this would lead to learning activities and to what extent it would produce significant learning effects.

A rather low-profile solution would consist in an ‘intelligent’ file storage system. All the end user can do is download a file. Any reaction, such as, for instance, submission of a completed task by the end user might already cause problems. While this does not mean that such a procedure would be useless, it seems rather limited (postbox-function) in the context of learning activities. Therefore, it can be assumed that sooner or the later users will be looking for an extension of the features.

Why would anyone develop this from scratch all by themselves? A quick search would confirm the assumption that others have already developed workable solutions. A main criterion for distinction is the question as to whether the software package is proprietary, involving (costly) licenses, or Open Source (i.e. ‘free software’). WebCT, originally developed by a university, is an example of the former, whereas eFront, Dokeos, ILIAS, MOODLE, Sakai, etc. are examples of the latter type. Nowadays, the advantages of any Open Source package are rather crucial. They include the financial aspect and, even more importantly, the presence of a supportive community of developers.

A similar situation would arise for a conference organizer who needs to handle the submission of abstracts, subsequent reviewing steps and notifications, which also requires a functioning web-based environment. While an interface of this type is not targeted towards learning, the expected behaviour

The screenshot displays the TUWEL 253.120 Tools and Media (VU 4,0) course interface. The top navigation bar shows the course title and the user's login status (Bob Martens). The main content area is divided into several sections: 'People' (Participants), 'Section Links' (a list of numbers 1-10), 'Activities' (Assignments, Feedback Activities, Forums, Resources), 'Search Forums' (with a search bar and 'Go' button), 'TUWEL Toolbox' (containing links to tutorials, course creation, and various tools), and 'Administration'. The central 'Topic outline' section lists course activities: 'News forum', 'Assignment 1' through 'Assignment 5', 'Course feedback', 'File for Rhino session 2', 'Files for Rhino session 1', 'Files for Mathematica session', 'Files for MS Excel session', 'Files for MS Visio session', 'Submission of Tools and Media Assignments' (with a due date of Friday, 15 February 2008, 11:55), 'Preparation for T&M WS 08/09', and 'File upload zone for preparation T&M 08/09' (with a due date of Friday, 15 February 2008, 10:55). The right sidebar contains a 'Calendar' for April 2008, 'Online Users' (showing Bob Martens), 'Messages' (no messages waiting), and 'Latest News' (including a link to 'Add a new topic...' and a reminder about the T&M assignment submission).

Figure 1
Screenshot of a topic outline within a course - the options in light gray at the bottom are not yet available to the student users.

of users involves a set of similar conditions. CAAD-associations occasionally relied on 'homemade' solutions. Since approximately a year ago, there has been a move towards the OpenConf platform, which worked out well. A handful of Open Source alternatives would exist in this context as well. Finally, a related technology can be seen in Wikipedia, which allows the group-based creation, verification, and elaboration of information. Apart from the technical point of view, Wikipedia has developed an intricate set of rules to guard against bias, overexposure, and single-mindedness in its entries.

From the above, from the growing number of users, downloads and, for example, the existence of second party books etc. we may conclude that these systems, for learning, conferences, or information, are approaching maturity. The distinction of whether MOODLE is to be interpreted as either a plain Course

Management System or a VLE would depend on the 'depth of use'. The former would apply if the system only involved storing files and making them available to a certain user group. In all cases, MOODLE supports the four steps of Kolb's experiential learning cycle. In the authors' opinion, evolution in the sense of a VLE is manifest and transitions between the depth of use are fluent. The 'environment' element contained in 'VLE' would in principle suggest a wider scope (MOODLE, however, only looks and feels like a web-browser), and there have been a number of attempts to represent the 'real world' in a VE (Brown et.al., 2007).

Starting up with MOODLE

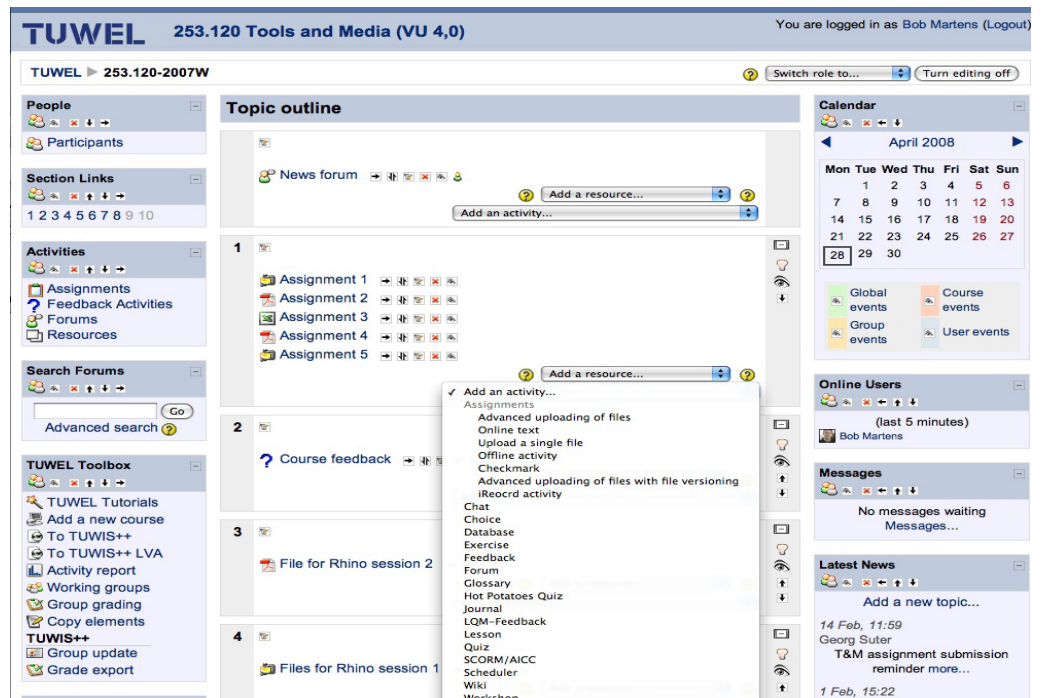
By now, MOODLE serves a growing set of users (over 42,000 registered sites with roughly 1.8 million cour-

ses and nearly 20 million users [according to <http://moodle.org/stats> - 27-4-2008]). The installation as such does not require tremendous human resources. A working situation can be created quite quickly and the first course can be entered. Instead of having users sign in on an individual basis, existing authentication services can be implemented. A course leader will have to decide whether the course is accessible to all users or only to a certain group of users (provision of a key to sign up for this course). Once a user has signed in for a course, his/her attention will be predominantly steered by the available content. This has to be seriously taken into account by the provider. Staggered access over time would also be an option, i.e. content is prepared and stored, but will only be made visible gradually over the duration of a course. Role assignment would make it possible

to hide certain parts from certain users (such as students). A course leader can temporarily switch to this role in order to verify what students are able to see. The behaviour of regular users can be easily monitored in order to study progress and share insights among a group of participating students. Although a variety of features is built in the web-based user interface, there is no obligation or need to use all of them at the same time (Rice, 2006; Rice, 2007; Cole and Foster, 2006). It seems to be wise to start with some of the features to build a sense of achievement and expand gradually.

At an initial stage of use, archiving and making data available is likely to be the first step, as the wealth of features might create a distraction. Both learning material providers and consumers may need some time to get used to the interface.

Figure 2
Screenshot of the same course in editing mode, with the features displayed in the pull down menu.



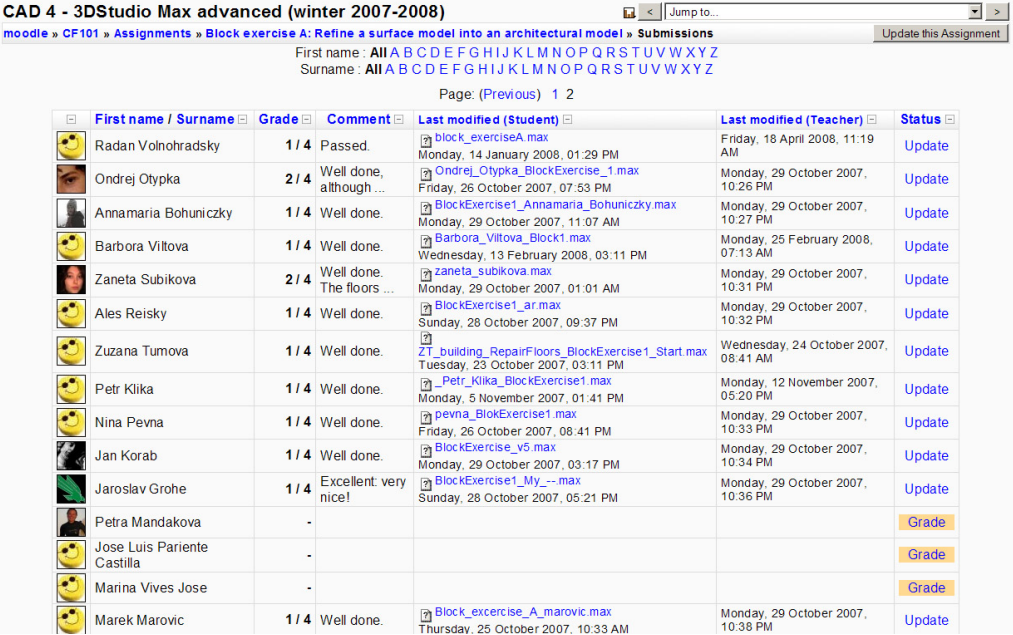


Figure 3
Screenshot of exercises uploaded by students, grades, and comments.

Expanding the range of features from course to course seems recommendable. The submission and tracking of tasks is extremely practical, for example, and goes beyond file management. It may even be disadvantageous to students in a certain sense, as they will have no excuse in case of late submission of their work, because any successful submission can be viewed immediately. In the meanwhile a plug-in has also been developed to connect to a plagiarism-checking software.

Students may be assessed in various ways. There

is no limit to the number and type of assessments that a teacher can add to a course. Students can be given ‘assignments,’ which consist of a task that has to be fulfilled and submitted to the MOODLE; they can be given ‘multiple-choice questions’; more comprehensive self-study material is available through ‘lessons’; ‘quizzes’ deliver a comprehensive set of questions that is automatically marked by the system. Most of these modules make it possible for the teacher to react personally to a student so that feedback is available.

	Bachelor programme	Master programme	PhD programme	Design studio
05-06	157 (4 courses)	73 (3 courses)	-	3 (1 studio)
06-07	469 (8 courses)	81 (6 courses)	7 (1 course)	12 (1 studio)
07-08	882 (8 courses)	207 (7 courses)	7 (3 courses)	21 (2 studios)

Table 2
Amount of registered users and courses in study programmes at CVUT (Faculty of Architecture)

Pedagogical models applied in MOODLE

A variety of teaching methods have been developed at both institutions represented in this paper. MOODLE is integrated in regular course teaching and in the design studio.

Table 3
Amount of registered users and courses in study programmes at TUW (Architecture and Regional Planning)
**Start in summer term*

	Diploma Studies	Design studio
05-06*	897 (7 courses)	62 (6 studio)
06-07	459 (10 courses)	67 (3 studio)
07-08	2840 (31 courses)	114 (7 studios)

MOODLE in regular course teaching

In regular course teaching, MOODLE has been used to provide information about courses in a number of ways: (1) weekly structure, and (2) thematic structure. The weekly structure simply follows the semester build-up. It outlines the current topic of teaching and provides the assignments for the students. Since the 2005/2006 educational year, we have been teaching courses in this manner to a total of approx. 1,900 registered students in Prague at the Faculty of Architecture (see Table 2).

In Vienna, the number of moodling students amounts to about 4,500 registered users in the same period (see Table 3). The growth of the MOODLE user community in courses related to the design studio is not yet in line with tendencies in the area of diploma studies. Furthermore, the total number of courses at the Vienna University of Technology has meanwhile exceeded the threshold of 300 courses, with more than 13,000 participating students.

In our experience, the weekly structure is the most successful way of offering course materials and exercises to students, simply because it follows most closely the flow of a regular semester.

MOODLE in design studio teaching

In design studio teaching, MOODLE has been used to provide: (1) background information, (2) the goal of the design studio, (3) themes of the projects, (4)

files required for the projects, (5) organizational matters, and (6) news updates about the studio. At CVUT, MOODLE was not used to support work groups for (collaborative) design. In the latest instalment of a novel experimental design studio, students were granted access to the MOODLE page and could upload pages of interesting architecture or discuss matters. At the Vienna University of Technology, we have an interest in exploring a higher level of interaction. The virtual environment could serve as a structured log book, where the stages of development are both documented and discussed.

In our experience, MOODLE works very well for the purposes of design-studio teaching as a source of reference for all kinds of information related to a design project. The thematic structure goes particularly well with a more open approach to information.

Conclusions

An interesting set of software solutions is now available and there is no real urge to invent/develop a homemade solution. Moreover, some Open Source environments provide customization options. The question as to whether MOODLE is to be regarded as a CMS or a VLE is tricky. As we have seen above, this question can be answered more precisely using Kolb's experiential learning cycle. A file storage system fulfils the function of archiving, but further guidance seems to be beyond its scope. As a matter of principle, tuition materials are not necessarily self-explanatory and may require annotation. A software package like Captivate makes it possible, for example, to attach a voice record to the individual sheets. The user of the resulting product receives a similar amount of information as if he/she were attending the lecture. While it is true that questions cannot be answered immediately, the playback can be interrupted at any time or repeated, if the need arises. What is of significant importance, however, is the impact on 'learning' - or better 'studying' - in a general sense, as the goal is not to replace human input, but to support personal development and exploration.

Furthermore, substantial parts of architectural education depend on close interaction. There is no doubt that a design studio context depends heavily on reviews, which could only in part be replaced in a virtual environment, be it MOODLE or something else. Nevertheless, a VLE makes it possible to maintain live 'in-between' crits in the studio. Eventually, the circle of 'visiting' critics may be extended in a VLE, as it only requires some time input, but no travel, etc.

Are we in need of an environment, which gives the user an impression as if it were a representation of the physical world? Whereas the playful aspect of such a simulation might, for the time being, be an incentive for users, previous research has shown that it is hard to deliver a workable solution, which can function adequately as a substitute of physical reality.

Worldwide, a great deal of experience has been gathered with delivering live or recorded classes (see for example Baggaley and Hoon, 2005; Kukulska-Hulme et al., 2004), but this is quite different from a design studio setting. In the future, we will certainly see an increasing integration of VLE-technologies in the educational setting.

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