Moodle utilization at University of Defence

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Abstract: *Nowadays the word "e-learning" is used and pronounced very often, and it seems that e-learning or the learning management systems are very modern and progressive method, how to increase or optimize quality of teaching and education at all of schools over the world. It is more often used at universities and for whole life education. At the University of Defence in Brno were also installed learning management systems called Moodle. This article is specialized to the first one. The goal of this paper is to show possibilities of on-line course at Communication and Information Systems Department. It involves experiences and effects of pilot course Net-Trainers, differences between e-learning and classic type of education and few words about new creating modules. The courses which are creating in our department are for students of the bachelor degree study programme of Communication and Information Systems Department.*

Key-Words: Moodle, e-learning, distance learning, Net-trainers, on-line, course, tutor, LMS

1 Introduction

E-learning is a new and very popular form of education at universities. It is very suitable for modules, where are rapid progressions and we need to change studying materials very often. The knowledge about how to create and how to tutor on-line course went from Net-Trainers and Moodlinka on-line courses. On-line course Moodlinka was the second experiences "how to prepare on-line course" and lots of aspects of education by this form of education. Moodlinka (Moodle-link) is LMS (Learning Management System) at Masaryk University in Brno and the tried to explained principles of using this LMS and its advantages. Moodle is the LMS which was installed for support the education at our department.

This paper deals with e-learning utilization for education supporting at communication and information systems department. It involves experiences and effects of pilot course Net-Trainers and few words about preparing course Optical Communication Systems and Support of Software for Communication Technologies. There are mentioned the differences between classic type of education and e-learning. It is concentrated on positives and negatives in e-learning utilization as a support of education and e-learning utilization at University of Defence. The knowledge about how to create and how to tutor on-line course went from Net-Trainers on-line course.

2 Distance learning characteristics

2.1 Advantages of e-learning

There are lot of advantages for using e-learning as a support of education: saving in transfer, accommodation and other travelling expenses, saving in classroom rentals, lectors, materials printing …; saving time in transfer, organization of training, possibility of choice pudding time for education and another advantages associated with internet education; possibility of made-to-measure course; junction formal and autonomic access to training, multimedia utilization, collection enhancement; making groups of specialists of same sight, discussion in discussion forum; …

2.2 Disadvantages of e-learning

I would be happy if I can say that there are no disadvantages, but they exist: teachers have to learn how to teach in e-learning course, teachers do not know the faces   of students (only names or nicknames). The second problem can be solved by face – to – face meeting during the course. We had three face – to – face meeting during the course Net – Traines. First was on the beginning, second in the middle of the course at last in the end.

2.3 Moodle characteristics

The design and development of Moodle is guided by a particular philosophy of learning, a way of thinking that you may see referred to in shorthand as a "social constructionist pedagogy".

Hardware claims are very low. Moodle can be installed on any computer that can run PHP, and can support a SQL type database. It can be run on Windows and Mac operating systems and many flavors of linux (for example Red Hat or Debian GNU). This is typical moodle installation for the latest version:

- Software web-server. Administrators usually use Apache, but Moodle can run on every web-server with PHP.
- PHP 4.3.0 or higher.
- Database-server. Recommended is MySQL 9.0, PostgreSQL 8.0 or Oracle 9.0.
- LAN or internet connectivity

Due to this fact, moodle is a very powerful and dynamic tool for education activities. It is based on internet standards. As a client you only need a computer, laptop or PDA with internet connectivity. Moodle can operate on closed intranet university sites as well as on open internet.

2.3.1 Basic installation

At the University of Defence, Faculty of military technologies, Department of information and communication systems, we decided to install and test the world-wide known and recognized application Moodle three years ago, in September 2006.

Server is provided by the communication and information system department of the faculty of military technologies. The complete installation pack was downloaded from the official web pages moodle.org. It was version 1.8 for OS Microsoft Windows.

This year our department decided to buy a new server to makes Moodle application more effecting for all students and teachers of the University of Defence. We use the latest version of Moodle Nr. 1.9.5 for OS Microsoft Windows.

The new server, in configuration Dual-Core Intel® Xeon® Processor 3200 GHz, 4048 GB RAM, 2 x SATA hard drives 300 GB connected as Raid 1, was selected for installation of this software pack. The computer we were equipped with installation OS Microsoft Windows Server 2003 with service pack 2. The whole installation took about half an hour. During the installation a web server Apache supporting PHP 5 was installed on the computer, as well as the complete MySql database in version 9.0. The installation process also created a complete structure of tables necessary for basic initialization and the run of the application. For our installation we chose a mode where the web server Apache and MySql database run on one computer only. The possibility of running these two subsystems separately is also available.

2.3.2 Advance configuration

After the installation it was necessary to perform a basic configuration of the whole system. One of the first actions was setting up the administrator's account. This is a user who has supreme powers in the application and is allowed to change all kinds of settings. One of the major requirements was setting up the administrator's password. Great attention was paid by the faculty's department to the security of the system. As a result, the whole system was tested against real kinds of attacks and network abuse. The thorough, in deed detailed, set up of administrator's account took about 3 hrs.

The next step was a detailed set up of the graphic interface of the application. The whole system had to be adjusted to match the orientation of the faculty and at the same time to appear balanced and compact. We made a new graphic user interface to better correspond to Military University and chose light and dark shades of green in combination with blue colour. Also the logo of the application was re-designed. The logos of the University of Defence, Faculty of Military Technologies, Department of Information and Communication Systems were placed on the initial screen. This part of system configuration was most time demanding out of the whole process. The creation of the graphic layout and the designs of the initial and log-in pages consumed three more days of intensive work.

As the next step it was necessary to make the so called Heart of Moodle beat. This is a PHP script cron.php which needs to be launched in regular intervals. This script performs a routine maintenance of the application and ensures the above mentioned heart beat. Typically, it controls discussion forums, distributes regular emails and reports, erases inactive user accounts etc. It is recommended to run this script every 5-10 minutes. In OS Linux is a feature called "cron" used to run this script. Unfortunately, OS Windows is not equipped with such a feature. Although a function "Task scheduler" can be used, its capabilities and reliability are quite limited. As a substitute for cron feature in OS Windows an application MoodleCron, has been developed specially for Moodle. Installation of this feature lasts only about 5 minutes. The only thing left to configure is the interval between running the cron.php script and the path where the script is located. This feature is very reliable and indifferent to the user logged in the system and its requirements to the processor are minimal.

2.3.3 User's accounts

At the beginning of our installation we supposed that it takes much more time for testing and for becoming acquainted with Moodle. It was selected the option of manual creation of user's accounts. Presently we had only minimal operation of this application and only trial courses for a limited number of students and teachers of University of Defence. It changed very soon. The possibilities of this application are wilder then we supposed. For verification and logging of users almost any database or commonly used and also more elaborate systems like LDAP servers can be used. User accounts can also be created using emails and POP3 or IMAP protocols, including their safer variants based on SSL/TSL. All these methods are more practical for a bigger group of users. For safety's reasons we chose an option where even teachers can't create users accounts for their students, only request their set up. The reation is then realised by the Moodle administrator. This part of Moodle configuration lasts about 2-3 hrs.

Fig. 1 Basic screen of our Moodle installation at Communication and Information Systems Department

3 Moodle in practice

So far Moodle has been successfully running at the University scale for a limited group of students and teachers. It was in the end of year 2006. Only some basic types of courses were being offered. The teachers themselves were only getting acquainted with the application and with what this software pack offers and what were the possibilities of a real life with Moodle. Our future plan was to enlarge Moodle

as standard learning support and using of Moodle as support for subjects and especially NEC, which is mentioned very often in Czech armed forces. These plans had 3 steps:

- provide easy updateable study materials about NEC problems;
- provide discussion between all students and teachers in NEC themes;
- after this we were ready to create standards learning courses with NEC problems which were accessible for all our students and teachers;

By the author's idea, it was appropriate for NEC to be supported by modern and standard information systems. These points were necessary to be solved:

- all participants and students should have own login and password to connect to the central source of information support for NEC (CSIS NEC)
- CSIS NEC should be divided into preparation of students and preparation of employees of University of Defence (UoD)
- CSIS NEC should support using various study materials (images, texts, audio files, video files, etc …)
- CSIS NEC should be ready to save and actualize all non secret materials
- CSIS NEC should provide discussion forum for students and teachers (asynchronous communication)

Because of the great experiences with LMS Moodle by various Czech universities, authors devise Moodle as primary system for NEC support at our university.
In nowadays the number of students is rapidly increased.

The number of courses was increased in more then twenty courses related with information technologies. The grate progress was made in cooperation with teachers at department of foreign languages and department of mathematics-physics science at University of Defence where many interactive courses were developed. Success of these precisely prepared interactive lectures about any issues, are examined by help of interactive tests. This experience showed us that e-learning is powerful tool and database of knowledge for students because they can learn at any time, when they need. Thus teachers have more time for resolving other special problems in a consultation with students and for preparation of learning materials and their own education.

4 The beginning of e-learning

E-learning is very efficient usage of information technologies in education. It is also modern method of education and it has more and more promoters. The efficient of e-learning utilization in educations is different for specific groups or individuals. It is very hard to say what is really efficient and what is not. The information technology utilization may become the most effective. The opposite side is very impossible in nowadays. The technology like internet makes the education cheaper and faster. Whence it follows that globally education become better and better. The electronic education utilization is one of possibilities by whole-life education. The whole-life education is one of the most important priorities for each of us.

4.1 The Net-trainers on-line course

The Net-trainers on-line course is European on-line course for future authors and tutors about e-learning courses. It was developed within a Leonardo da Vinci project guaranteed by the European Union [4]. It is very proper for future tutors and for person creating on-line courses. We (three persons from Communication an Information Systems Department and two persons form Centre of language preparation) were students of the pilot course. The duration of the course was 7 month (about 160 hours) divided into five modules. Each module was divided into few smaller parts.

To be a student of on-line cours is the best way how to understand the role of student in that type of course.

The knowledge about how to create and how to tutor on-line course go from seminar "Online Course Drafting and Constructivism in Online Learning" in Brno on 30th May 2006 and from [5], [6].

5 Education by e-learning

It was mentioned, that it will be prepared some modules as e-learning courses for its flexibility. The other point of view is an access to the students. Students want to study by using modern methods of education. We live in 21.century, so we have to adapt modern methodology into education form. It will be much more attractive and with lot of advantages.

We try to create e-learning support for all subjects we are teaching, because it is more comfortable for us (We can change studying materials together with progress). We have lots of projects for Moodle utilization as a new form of education. There are projects for teaching Signals and Systems and Modern Communication Technologies and Matlab and Matcad as a support for education with utilization of Moodle. I am responsible for two new subjects: Optical Communication Systems and Matlab programme for education [4].

6 Communication and Information Systems Department

Communication and Information Systems Department is one of the departments of Faculty of Military Technology. It is focused on education in computers systems, networks, securities and communications. This department is interesting for all young people, because computers, mobile phones etc. became necessary for our lives.

There is very big progress in this field of research and education. Situations, new systems and new development are daily changing. This was the reason for preparing new modules as e-learning courses. It makes easily availability by these subjects. It is much more flexible than an old type of education.

6.1 Matlab programme for education

Mathematical modeling has become an important part of the research and development work in engineering and science. Retaining a competitive edge requires a fast path between ideas and prototypes, and in this regard mathematical modeling and simulation provide a valuable shortcut for understanding both qualitative and quantitative aspects of scientific and engineering design. To assist you in gaining this edge, COMSOL Multiphysics offers state-of-the art performance, being built from the ground up with a Java3D interface and C/C++ solvers.

COMSOL Multiphysics offers a complete modeling environment that allows you to perform all the steps in a modeling process. COMSOL Multiphysics' graphical user interface includes functions for CAD modeling, import of drawings and images, physics or equation definition, mesh generation, equation solving, visualization, and post-processing. The parametric solver gives you a perfect way for examining a parameterized series of models. The varied parameter typically represents a material property, frequency or reaction rate.

The analysis in engineering design does not end with the computation of voltages, stresses, and velocity fields. Frequently, we have to perform extensive post processing on the computed output in order to arrive at useful engineering parameters like capacitance, inductance, resistance, impedance, radiation patterns, S-parameters, phase angles etc. In the examples in this course, you will be able to translate the simulation results into engineering design numbers.

The utilisation of Matlab programme is very suitable for proposal of connectivity between two antennas, calculation, modulation and optimization of signals. Matlab programme for education is module for student, who wants to utilise this program for design, analysis and optimisation. There is mentioned basic principles

and simple instructions "how to do own programme for calculation".

It is very important to use programme for signal simulation, because this programme can imitate behaviour of transmitted signal in time.
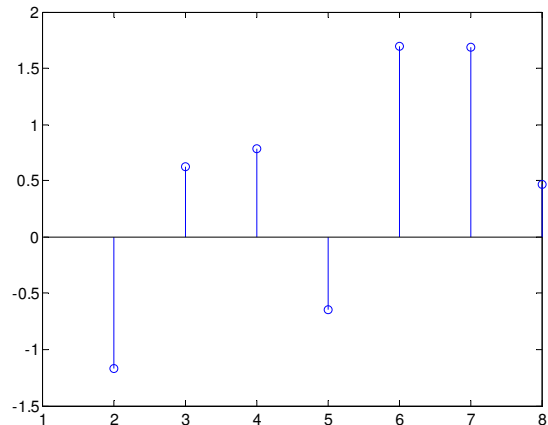

Fig. 2 : Ploted signal´s samples

6.2 Optical communication Systems

Optical communication systems are developing and innovating for every day. It is a new field in research. There are much unknown things. The changes in this department go from develop and innovation of optoelectronics (it is necessary part of optical communication system). The radio-frequency systems are supply with optical communication systems. This modernization is connected with claims on higher data rates and lower errors. The new development and new systems can be better import into e-learning education then into classical type of education. We can incorporate new things into created e-learning course.

We can although use graphical outputs from computer programmes or from some simulation programmes, when we can not use practical exercises inlaboratory. The graphical outputs from Matlab programme are shown in *fig.3*.
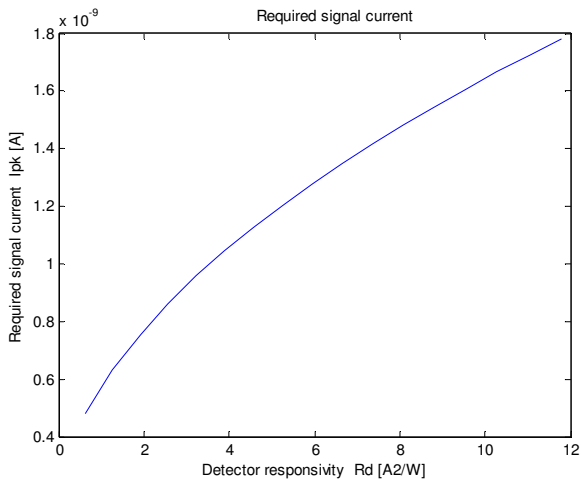
Fig. 3 : Required signal current dependent on detector responsivity for communication-track link iteration

These graphical outputs will be use in one of the lessons – the lesson about laser satellite communication. During the lesson, students can show how to analyse and optimized some parameters of very difficult equations. It is the best way to use e-learning for this subject, because student should see the optimization by changing values of parameters. It is not a problem to install the program on their computer and keep in touch the optimization process. The interaction is very important during the on-line course.

Students go through course module after module (sequential access). It is necessary to do study activity and fill in the test in the end of each module. When all study activity from previous module is done, then the next module can begin. The study activities are different in each of modules – tests, auto tests, group activity, single activity, work in pairs, there, students may used the discussion forum.

7 Conclusion

Moodle is very dynamic and powerful learning environment based on internet standards. Installation of Moodle can be adjusted to meet concrete education requirements. Community of moodle is permanently growing and moodle is used by large and recognized institutions like universities and high schools all over the world. As moodle is an open source software it is often sought by small communities and organizations. There are also many discussion forums on the internet solving possible problems with running this system. In this case, support of moodle is on a very quality and professional level. This is also one of the reasons why moodle is the most popular learning systems.

The on-line course Net-Trainers was first meeting with on-line education. It seems to be very useful for our

department. The project about e-learning module creation has started in special research. There has been an idea – creation e-learning courses. It has been because we have needed to create new modules from our department.

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