

TRAINING TEACHERS IN E-LEARNING WITHOUT INTERNET ACCESS

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Abstract

In this paper the authors present a solution to the problem of giving practical training in handling information and communication technology (ICT) without depending on internet access. The proposed method is to use an USB-memory to emulate selected educational resources that are otherwise available on the internet or on a local network. How this method can influence pedagogical issues is discussed and, it is asserted that the method offers interesting learning advantages beyond the obvious independence of internet connections. The paper describes the planning and implementation of a course about the use of Learning Management Systems (LMS) in higher education and, in particular, how it was designed to meet the needs of educators in a developing country with slow or unreliable internet connections. The course was a part of the project USo+I: *Universidad, Sociedad e Innovación. Mejora de la pertinencia de la educación en las ingenierías de Latinoamérica* (University and Society: Improving of the relevance of the education in the engineering of Latinoamerica) this project financed by the European Union, within the ALFA III program. The University of Borås was assigned to design and teach a course about LMS to engineering educators in Latin-America.

Keywords: e-learning, Learning Management systems, engineering education, developing countries.

1 INTRODUCTION

1.1 Background

The University of Borås is a participant in the project USo+I: *Universidad, Sociedad e Innovación. Mejora de la pertinencia de la educación en las ingenierías de Latinoamérica* (University and Society: Improving of the relevance of the education in the engineering of Latinoamerica) financed by the European Union, within the ALFA III program. The University of Borås was assigned to give engineering educators in Cuba and Guatemala a course about how to use a Learning Management System (LMS). At the University of Borås the concept of science for the professions is well established and the development of methods to enhance professional skills and promote positive attitudes towards lifelong learning has high priority. Most of that work is based on the theory of constructivism that argues that learners build their own knowledge from information, previous experience and, interaction with others [1, 2]. Problem Based Learning (PBL) [3, 4] is a frequent choice of pedagogical framework to reach the desired results. In PBL the course aims are achieved by working on problems that are presented at the beginning of the course and the participants are supposed to figure out what information they need to solve the problems and find it.

As a part of the project *Linking Universities in Asia and Europe in Implementing Sustainable Technology* one of the authors, Ramon Garrote, gave courses to staff at the Gadjah Mada University in Indonesia about the use of LMS in 2003, 2005 and 2006. The experiences from that course made it very clear that limited access to internet is a major concern in developing countries. A report about the project [5] describes the problems and concludes that "...it can be stated that the real problems are bandwidth and the collaboration of computer departments. Not adressing this at an early stage will jeopardise the whole distant learning issue" (ibid p.16) In the courses at the Gadjah Mada University it was demonstrated how to use a LMS by emulating internet in powerpoint presentations. Showing

screenshots and moving between slides gave some idea of how the LMS should work with internet connection but the method lacked the flexibility of actually connecting to the internet and the learning experience is bound to suffer when students cannot try out programs.

A course about the use of information and communication technology (ICT) in a developed country can rely on unrestricted internet connections, abundant access to computers and usually a considerable computer literacy among participants. In developing countries one has to consider the special circumstances and cope with the fact that most teachers in developing countries have little or no experience in using the Internet and information technologies in their practice. Obviously the access to computers for students and teachers is a matter of the cost, but also, speed and reliability of the Internet may be bad and many teachers do not have internet at home. It follows that during a course one cannot rely on undisturbed internet access. The participants may have to take turns on the available computers and the computer literacy may be low.

If the use of LMS in developing countries is to be widely implemented it has to be economically feasible. There are several LMS available as free open source software, more or less equal to the commercially available products [6, 7]. For this course the LMS "Moodle" [8] was selected both for managing the course and as example to be used within the course. It is an open source program, free to use in education and the source code is available on the internet. The intention was not only to find a suitable LMS for this occasion, but also (and perhaps more importantly), to demonstrate for the participants some of the Open Educational Resources (OER) that is available today. [9, 10] In particular, it was desirable to use only instructional material, text or video that is freely available on the internet. It should be remembered that even if internet bandwidth is very limited, OER can be utilized by downloading and redistributing the material on memory devices such as CD, a method that has been used in many rural areas in developing countries. For the development of higher education in developing countries the utilization of OER is very interesting and raises the awareness about OER. This could contribute to make education generally available in accordance with article 26 of the Universal Declaration of Human Rights [11, 12, 13]. The access to computers and internet is increasing in most developing countries but it is still a completely different situation than in developed countries where lecturers and many students have computers of their own and unlimited internet access. It is important to remember that when the technology becomes available it is still a matter of implementing major changes in practice if the education system shall benefit significantly from the use of ICT. It has been shown that it is a common situation at universities in developed countries that lecturers only use the parts of a LMS that facilitate their work, usually that is the tools for distributing documents [14, 15, 16]. It is a challenge for developing countries to take full advantage of the available technology as soon as the infrastructure is at hand [17].

2 COURSE DESIGN

2.1 Explicit course aims

1. After the course the participants should understand what a LMS are and be able to use and adapt the common tools in a LMS to design and implement virtual education/courses.
2. They should have an understanding about how ICTs can be used in higher education and how access to ICTs will affect methodology and pedagogy.
3. They should understand the standards for E-learning [18].
4. Exercises and a project intended to give practical experience in the handling of a LMS should be completed.

2.2 Further intentions of the course

In the future the participants in this course are expected to act as pioneers at their respective workplaces and promote the use of ICT, support colleagues and give courses about LMS. To do that it is highly desirable to have experience of handling the programs not only as a user but as an administrator. This means the participants ought to have opportunity to experiment with the program and try out features and settings. During this course it was necessary to face the problem of very limited internet access and participants having to share available computers. That situation is likely to be the norm in developing countries for many years to come, so the participants in this course must be prepared to work under such circumstances. One of the main advantages of using a LMS is the

convenient incorporation of free course material from the internet. If the connection between LMS and OER is emphasized it is more likely that the possible benefits are realized.

2.3 Specifications

The course was given the first time on Cuba in Mars 2010 with Ramon Garrote as lecturer. The participants were lecturers at the Instituto Superior Politécnico José Antonio Echeverría, Facultad de Ingeniería Eléctrica, Havana, Cuba where the group gathered at the start. The course was given in two parts, the first part with the participants gathered on campus for a two weeks period and the second part to be given by distance over the following three months, in total this meant ten weeks of full time studies or 15 ECTS points. In this course the main assignment was for each participant to select a course from their practice and adapt the existing course material to a LMS, possibly add some new material and prepare for the appropriate use of tools such as discussion boards, grade book etc when teaching the course in the future. All material that was needed in the process, that is, The LMS Moodle, Instructional videos and texts, Sumatra PDF, VLC media player, LyX, HotPotatoes 6, AbiWord, MoWeS, Portable II, OpenOffice is freely available on the internet.

To enable the participants to work without internet access the material above was downloaded and copied to 4 Gb USB-memory sticks. All programs were executed from the memory, allowing everyone to try out different settings and modifications in the LMS. Throughout the course everyone had their own USB-memory and the idea was that no one should be dependent on access to internet, or even access to a particular computer. Whenever a computer is available one can start up the LMS from the USB-memory and work on the assignments or study the instructional material. Between sessions all work is saved in the USB memory.

3 RESULTS

3.1 Students' assessments of the course

At the end of the two weeks of introduction the participants filled out a questionnaire anonymously to be included in the course evaluation. There were 15 participants and the questionnaire consisted of ten statements and three open ended questions. The statements were assessed on a five grade scale: 1= I fully agree, 2= Agree, 3= Neutral, 4= Disagree, 5= I do not agree at all

Table 1: Responses to the ten statements in the questionnaire.

Nr	Statement	1	2	3	4	5
1	The course objectives, contents and procedures were made clear	15				
2	I understand what a LMS is	15				
3	I understand the common features of a LMS	14	1			
4	I feel prepared to use a LMS in my work	8	7			
5	The course fulfilled my expectations	15				
6	Videos and other materials were well suited to the course objectives	15				
7	The practical task were well suited to the course objectives	14	1			
8	There was a high level of cooperation and interaction amongst the participants	14	1			
9	The course objectives agree with the material covered in class	15				
10	In general, the lecturer is an effective teacher	15				

Comment to the responses to statement 2 and 3: The participants also answered questions about their intentions to use different parts of a LMS in the future and the answers were consistent with the responses to statement 2 and 3 above.

Comment to the responses to statement 4: At the time this question was answered only the initial phase of the course was completed.

First open ended question: How do you think the teaching methods used in this course could be improved?

Summary of the responses to question 1: The participants are highly satisfied with the methods used, some point out that it would have been good to have access to an online discussion forum for the group.

Second open ended question: How do you think the contents of the course should be changed?

Summary of the responses to question 2: The participants found the material to be very useful and sufficient for their needs. It was suggested that some more video showing how lecturers have used LMS before might have been interesting.

Third open ended question: Are there any other points you would like to bring to the lecturers attention?

Summary of the responses to question 3: All participants seem to agree that they have learned a lot and appear prepared to make use of that knowledge in their work. It was pointed out that the use of a portable application was essential to cope with the limited internet access.

3.2 Other observations

The participants also answered a number of questions about their perception of LMS and OER. The answers indicate that they believe that the use of a LMS can facilitate their work considerably in the future and enhance the learning experience for students. They also expressed very positive attitudes to utilizing OER and share material. The full result of that investigation is pending publication. The students' assessment together with the lecturer's observations during classes and discussions with the participants indicate that the course was highly successful. During informal discussions some participants pointed out that they found the PBL method confusing at first but very stimulating once they started to work with their assignments.

4 DISCUSSION

The participants were highly enthusiastic about this course for several reasons. Their access to ICT is just about to reach a level where it can be utilized in education as a common tool. Hence they are very motivated and curious about the possibilities to use ICT in education. Many modern educational methods in developed countries depend on fast and reliable internet connections, for both teachers and students and cannot be used in a developing country. This course was designed to offer a long-term solution to that problem and allow the transfer of methods in spite of differences in internet access. The economy issues were considered in this course by only using OER and material freely available on the internet. That meant that the participants were given a practical demonstration of the abundance of OER, including free open source LMS. As some participants pointed out during informal discussions this was exactly what was needed: a source of course material and educational software together with a technical solution to cope with limited internet access and shortage of computers.

The most obvious advantage of the method of using USB memories to store all course material is that students that do not have a computer with internet access of their own still will be able to work with course material from the internet and practice their skills in handling information and communication technology. It means, more people can access higher education and that open educational resources (OER) on the internet can be utilized in many courses. To use OER can make education more cost-effective but also make it more feasible to use student-active methods like problem based learning since students can access information of their own choice at any time. Of course students in developing countries cannot be expected to have internet access at all times and it is important to choose methods that do not unnecessarily exclude people from higher education. At the same time it is important to increase the use of ICT to promote efficiency and quality of education and prepare for future development.

Some of the concerns with lack of internet access or limited band-width can be met by using a read-only memory. That is by distributing information from internet on a CD, a widely used method in developing countries. A flash memory can be used in the same way, to store and distribute documents from the internet. There are two main advantages with using a flash memory. Firstly since you save your work on your own USB stick you can work on any available computer. If you have a computer of your own it is still very convenient and gives a lot of flexibility. Secondly it is possible to modify and experiment with software that is normally kept on a web-server. Based on a constructivist view of knowledge it is arguable that education about ICT will be more effective if the students have the possibility to experiment with the software. The outcome of this course strongly supports that argument.

5 CONCLUSION

The experiences from this course confirm that by using USB memories to emulate a web server and other internet resources it is possible to conduct education about ICT and internet resources without depending on internet access. To run programs from the USB memory and thus allow people to experiment with the software, without concerns about access and security issues gives significant advantages. The method is highly cost effective compared to printed material. It is flexible and easy to adapt to different circumstances, such as distance education, blended learning and self-studies. By facilitating an extensive utilization of OER with the use of USB memories education can be made far more accessible in developing countries, but the method also offers great flexibility to students and teachers in developed countries.

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