

VIRTUAL LEARNING ENVIRONMENT

Challenge to Increase Teaching and Learning

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Abstract: The present paper summarizes the authors' experience of application of distance aspects in the education. In the article the main reasons why the authors use a virtual learning environment as an indivisible part of the part-time study program, and as a support of the full-time study program at their university, are explained there.

1 INTRODUCTION

Internet within a virtual learning environment is a significant contribution to education and its role in the education industry is growing constantly. This environment enables teachers to influence and enrich students learning in many ways.

Multimedia applications, an interactive system of digital media, where multimedia information is selected by the user himself according to his individual needs, give us an excellent chance how to support demonstrating, visualizing, describing and testing the explained subject matter to be much clearer and comprehensible. "Students need images and visualization in addition to words. Science learning is about creating images in mind, and teaching should support such image formation." (Williams, 2005)

Students' attitude to the university education can be quite different. Some of them study continuously as they used before. However, most students juggle their studies together with other activities, even with paid employment. Hence it isn't easy for teachers to persuade all students to study intensively for the whole term. Nevertheless, they should try to do it and support self-preparation of those students who are willing to carry on studying in this way. Lessons can be run more efficiently, like a discussion or consultation, then. A virtual learning environment can help us in this way very much as well.

In the article we introduce our experience in using a virtual learning environment, namely the professional virtual learning environment WebCT, and explain the main reasons why we use it as an

indivisible part of the part-time study program and as a support of the full-time study program at present

2 VIRTUAL LEARNING ENVIRONMENT AND BLENDED LEARNING

At our university we have been using the professional virtual WebCT learning environment not only for preparing and providing distance courses for public within lifelong learning but we have been using it above all as a support for teaching subjects studied at our university both in full-time and part-time study-programs.

WebCT, like all the other similar virtual learning environments, offers tools enabling planning and controlling studies, as well as preparing and presenting study materials, and also communication between teachers and their students and among students themselves. It enables test setting, receiving solutions, informing students about evaluations of their work, monitoring students' activities, checking their levels of knowledge, manage the process of student's agendas, etc. It supports team work as well.

"Blended learning in simplest terms describes the integration of face-to-face learning and teaching with that provided through a networked computer based medium. Crucial to the success of blended learning is how the integration is designed and implemented. The design of blended learning and the balance between the on-line and face-to-face

components will depend on a number of factors such as student numbers, academic discipline and the physical resource, as well as the ability of using the particular medium to enhance the learning and teaching.” (Linsey and Edirisingha and Heaton-Shrestha, 2005)

At our faculty the combined study-programs prepared for part-time students operates by linking distance studies provided through WebCT environment with consultations at sessions with teachers every fortnight. This means about three face-to-face sessions for each subject within one semester. The final credit test and exams take place face to face at the faculty. Formerly, the part-time students studied at home, using printed study material only, and the face-to-face sessions served as lectures. There was little time to discuss their newly-acquired knowledge with the teacher. It had a negative impact on results. Many students did not complete their studies. At present, thanks to the prepared e-learning courses in the WebCT system for each subject, it is much easier for the teacher to advise students on how to study.

The biggest advantages of such a prepared virtual study environment for combined study-programs are seen, above all, in the following aspects:

- The prepared virtual learning environment enables students to use, not only the recommended literature, but also supplementary material, such as electronic texts containing actual new information in the given academic discipline and multimedia presentations and programs created for the subject by the means of which the topic is visualized. There are many kinds of such multimedia materials e.g. small animation, short presentation, large presentation, multimedia program. We usually use the multimedia applications created by our students on a script given by the teacher with regard to students needs. In this way authors of multimedia study materials can help their classmates to understand the issue better. They create their multimedia programs and presentations mostly either in the Borland Delphi environment or in the Macromedia Flash environment within optional projects and/or thesis.
- Students are given detailed instructions not only on when and where to study but also how to test their levels of knowledge. “The feedback provided through tests helped students to

recognize what they needed to know, appreciate what they already knew and understand, what they needed to do in order to learn, and what they didn’t know.” (Black and William, 1998) There are several options for testing in the WebCT environment. Moreover we prepare, with help of our students, various other kinds of tests using multimedia applications as well.

- Part-time students need to be in “touch” with the teacher and the other students as well. In the virtual learning environment there are tools for communication that effectively support consultations and discussions between student and his/her teacher, among students themselves and among given group of students as well. In such a way communication take place within the semester at any time. Part-time students don’t feel lonely in their study any more. Communication tools not only help to develop students’ knowledge but they also play very important role from the social point of view. Moreover, from discussions and personal emails, teacher can gain a better grasp of students thinking and needs than from face-to-face sessions only.
- Thanks the above mentioned possibilities given through prepared virtual environment, face-to-face sessions do not serve as lectures any more. They serve as seminars. Part-time students have to be prepared for them and be able to discuss the topic with the teacher and other students. In this way, students are forced to study more regularly and systematically than before. They can study as intensively and effectively as if they were full-time students.

Final remark: Teachers and students at our faculty fully appreciate the possibility of providing the combine study-programs as blended learning, using WebCT as its distance aspect. Nevertheless, teachers never forget to recommend a printed textbook to students as an indivisible component of their study. Many of them prepare textbooks supplemented by CD where the suitable multimedia applications are found.

3 VIRTUAL LEARNING ENVIRONMENT AS A SUPPORT OF THE FULL-TIME FORM OF STUDY

Traditional teaching-methods influence distance education and different experiences gained through distance education can change our attitudes to the teaching of a subject. Indeed, the undoubted advantages of blended learning described above were really big challenge for applying some elements of distance study to the teaching of subjects taught within the full-time study programs. At present, in our faculty, most teachers use WebCT to prepare their own e-learning courses to support the study of full time students as well.

Used as a compliment to a subject, the biggest advantages of such a prepared virtual study environment are seen, above all, in the following aspects:

- Students have all electronic study materials assigned to the appropriate subject available altogether in one environment together with needed information.
- The relevant study material is accessible whenever and wherever. In this way also students staying abroad within the framework of the Socrates Erasmus students exchange for several months are able to follow the subject.
- When lessons are taught by more than one teacher, all teachers can be included as teaching assistants to the e-subject. Each of them inserts settings of exercises and the evaluation of credit tests for his/her students to the WebCT environment. Thus the lecturer (guarantor of the course and author of the e-subject) has a clear survey of both the history of lessons and results of all students.
- Students interested in the area explained within a subject can find additional material in the WebCT environment, and sources and information outside the immediate framework of the subject. Discussions on “a level” with their teacher can start. This is also one of the ways in which the teacher can train his potential thesis writers.
- In many subjects, the inevitable outcome of creating common projects is teamwork. Virtual study environments are inherently well-suited to this. Students can communicate with the teacher and each other, and discussions are accessible to members of the

team only. Even as geographically isolated members of a virtual team, they can send requests for advice and parts of project to the teacher for oversight.

- Students greatly appreciate accessibility to self-tests and quizzes with automatic checking and to multimedia study materials visualizing the explained matter.
- Students find also very useful the option called Calendar, where they can see all the information about important dates (written credit tests, examination etc) in one environment.

Final remarks: Obviously, printed textbooks are an indivisible component of study materials prepared for full-time students as well.

Unlike the virtual learning environment intended for combined study-programs, communication is usually less important in WebCT prepared for full-time study-programs. Teachers allow their students to use tools for communication but they do not include themselves in it. Communication tools are important only in the event that team work is required.

In the following chapter let us give some examples. We briefly introduce the virtual study environments (a so-called “e-subjects”) prepared in WebCT for two subjects, namely for the subject Discrete Mathematics and the subject Algorithms on Graphs. At the faculty, we use the e-subject concept to distinguish between the subject itself and the virtual study environment prepared for the subject. At our university we have been using the professional virtual WebCT learning environment not only for preparing and providing distance courses for public within lifelong learning but we have been using it above all as a support for teaching subjects studied at our university both in full-time and part-time study-programs.

3.1 A Case Study: e-Subject DIMA and ALGRF

The subject Discrete Mathematics is a compulsory subject taught in the fourth term. Its aim is to develop and deepen students’ capacity for logical thinking. Students gain a basic level of competence in combinatorics, graph theory and graph algorithms. Well-prepared students in the area of graph theory and graph algorithms should be able to describe various practical situations with the aid of graphs, solve the given problem expressed by the

graph, and translate the gained solution back into the initial situation.

The appropriate WebCT environment, the e-subject DIMA, is divided into three main parts; Content of the course, Support for study and Verification of knowledge.

Electronic version of the textbook (Milková, 2001) prepared for the subject DIMA together with content of lectures, setting of exercises, various self tests and assignments is placed there.

Especially, in the e-subject DIMA we post the syllabus of all lectures at the beginning of the term. After each particular lecture, the following day, we always post all of the prepared study materials used during that lecture in the e-subject DIMA.

We also post the setting of exercises which will be performed during the lessons in the following week. It is considered as very useful. Students are forced to prepare for the lessons and, as a result, standards of tuition are much higher because the lessons themselves are more time-efficient.

There are various self-tests and assignments for self-preparation included in the e-subject DIMA. Students can, but don't have to, complete them during the term. However, similar assignments occur in the exam test. It is up to the students whether they deal with these tasks and discuss them with their teacher during the lessons.

In the e-subject DIMA, we also include study materials marked as "optional" for students who are particularly interested in the given topic.

Two large multimedia presentations Combinatorics and Combinatorics as a Game, used in the partial teaching of the area of combinatorics, are placed there. The presentations were developed within a diploma thesis in the Macromedia Director environment. The presentation Combinatorics offers students the possibility to revise the subject matter, which has been explained, and to practice it through examples. The presentation Combinatorics as a Game contains a lot of animation which visualizes more difficult combinatorial principles in an amusing and understandable way. The first mentioned presentation is compulsory and the second is optional.

Probably the most important study material placed in the e-subject DIMA is the illustrious multimedia program Graphs prepared for the partial teaching of graph theory and graph algorithms. It was developed within a diploma thesis (Pozdílek, 2004) in the Borland Delphi environment. The program is a substantial help to the teacher during the lectures. The biggest advantage of the program, as opposed to the presentations, is the fact that there

is the possibility to create an infinite number of needed examples.

The program enables the teacher to explain a lot of subject-matter within the area of graph theory and serves as a helpful tool for visualization of various graph algorithms using a colouring process on graphs created within the program. All graphs which we prepare and use during lectures are entered into the e-subject DIMA. The possibility to open more than one window is very helpful because it is much easier to explain mutual relations among used concepts.

There is also an option called Save Graph in bmp format that enables easy insertion of needed graphs (see Figure 1) into texts. In such a way teachers can easily prepare tests. Students use it when they do their assignments as well.

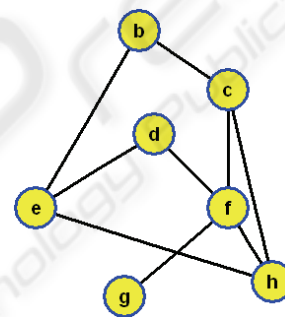


Figure 1: Sample of graph in bmp format.

The subject Discrete Mathematics is followed by the optional subject Algorithms in Graphs. The aim of this subject is to develop students' ability to study the specified topic of the graph theory and graph algorithms independently and present the matter comprehensibly to other students in seminars.

At the beginning of the term students are divided to groups of three members and each group chooses one topic of topics offered by the teacher. Then they have three weeks to prepare their presentation and speech. After this period the common seminars start.

During these three weeks communication in the virtual environment WebCT prepared for the subject Algorithms in Graphs (e-subject ALGRF) is very valuable. Students communicate with the teacher and each other, and there is also used the possibility that discussions may be accessible, but limited to the teacher and members of the group.

All presentations created by students in these three weeks are saved in the e-subject ALGRF before common seminars. In this way, the other students are able to prepare themselves for discussing of the topic with the speakers.

4 RESULTS AND CONCLUSION

All teachers of our faculty involved in combined study-programs are forced to provide their subjects as blended learning, i.e. they have to prepare distance part of the subject using WebCT. About 80% of educators teaching at our faculty prepare and provide e-subjects for their subjects intended for the full-time students. Most of them use the prepared virtual study environment only as an optional support of the subject. However about 30% of them use the created e-subject as an indivisible part of his/her subject. These teachers require students to deliver assignments, projects, etc within the e-subject. They support team work in their e-subjects. There are also teachers using prepared e-subjects for in-line testing of their students within the framework of seminars and examinations.

The continuous quality evaluation of an e-learning course is very important not only for the teaching material itself, but also for the management of the course. Our faculty has a long tradition of e-learning utilization. Using results given in (Poulová and Slabý, 2003) we recall some more general perspectives related to this issue at the end of our article.

Both teachers and students see the main advantage of a virtual study environment in that the relevant study material and all needed information are accessible whenever and wherever.

From the students' perspective, the big benefit is the possibility to use multimedia material visualizing the subject matter and to test their knowledge through several kinds of self-tests.

From the teachers' perspective, the major benefit is the opportunity to change the materials very quickly and with respect to the current situation.

We should also accent the fact that from the teacher's (respective teaching assistant's) point of view, the course can be much wider than from the student's viewpoint. Teachers can use "hidden sections" of the course environment, like repositories of additional exercises, databases of test questions etc. Here he/she can save the supply of useful materials. Such kinds of shared resources can be found very useful, especially when several teaching assistants teach the same subject."

There are other possibilities as to how and why to use a virtual learning environment. Some challenges could be shared through digital libraries, enabling teachers working at different universities to

choose and share study materials prepared for their subject or related subjects.

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