E-learning Environment in Multimedia and Internet Technologies Teaching

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Abstract
The aim of this article is to bring some of the experience we have got from teaching the subjects Multimedia and Internet Technologies which are part of both teacher training and applied informatics study programme. Students of teacher training do not get so much possibility to have the teacher’s role and are not much confronted with own responsibility for creating presentations, tasks, seminars and evaluation of them. They also know the work with learning management system only as a student. We have given them the opportunity to try their teaching skills. They could try the role of teacher in the LMS Moodle, created interesting tasks for younger colleagues, students of applied informatics, they learned to evaluate and take responsibility for it. The results were striking. We use the experience with such system also in the subject Internet technologies where the students get experience with programming activities which are part of such system.

Keywords

Introduction
Development and progress in the area of digital technologies allows faster access to information. Connection between computer networks facilitates communication and provides access to multimedia databases for a wider audience. Increasing capacity of storage media and CPU power opens up new possibilities for more sophisticated use of human knowledge. Informatization, digitalization and visualization bring current overlaps of basic human literacy. Perhaps it is not even possible to avoid a graduation of these processes and their conscious or subconscious application in our lives.

The most important learning tool is no longer blackboard and chalk these days. Modern school cannot make it without modern technology, such as in particular the Internet and multimedia. These two phenomena have become a common part of our lives and in significant way they also affect the learning process. The priority of us teachers is not only to monitor developments in these areas, keep pace with constant change and rapid development of technology and skills for the 21st century, but also to apply this modern knowledge in our own teaching methods.

Even though schools have new technologies, in many cases the teaching methods are still old-school, without changing the mindset of the process. This action called the process of learning may also be active, creative, productive, vibrant, based on a relationship of the student and the teacher.
They participate in the process, which should be beneficial for both of them. The quality of human resources at each university is a prerequisite for university development, teaching process and research activities.

Other idea we try to put into the teaching of subjects at our department is also the cooperation between the students of applied informatics and the students of teachers training. The teacher should be able to express its needs for the software he uses or would like to use in education. These are of course given by his experience with such software or environment where he can see which tasks are beneficial and the software should contain them or which are not that necessary for environment used at basic or secondary school. The student of applied informatics on the other hand should get some experience with different technologies to be able to fulfil the needs of somebody who is ordering some product from him.

**Invisible civilisation**

Some aspects of the information boom, such as for example, quantitative and qualitative abundance of information now cause, "that no man can engage in a long time, which can ultimately lead to spectacular curiosity to a deeper interest" (Horváthová, 2012). We are talking about so-called dispersed curiosity that many of us could feel at first hand. It is also pervasive in the school environment where it becomes increasingly difficult to attract, motivate, and "impress" students in terms of giving more enthusiasm for the subject of their activity. The use of multimedia is one of the things in the educational process which becomes a factor that „raises the bar“ for traditional teaching methods. The world of school gets in motion with them the same way as our living-space, where we have almost overwhelmed the number of passing images and surfaces, fancy flash animations, or "perfect" media images. This raises almost a primary need to be able to work with different types of information, to be able to read, understand, select and even create it and not just let it manipulate ourselves.

**Multimedia**

This word has become not only part of our informatics library but has its place also in human dictionary occupying our consciousness and thinking. If we think of multimedia as the source code for our journey, it cannot be taken isolated without taking the complex world view in mind.

Multimedia technologies are influencing and changing countless areas of human activity, not excluding education. That is why we portray their actions in all possible variability in the full context of education, showing the multimedia application potential especially in the educational process. Although we have to realize that the mere use of new technologies in education will not bring the expected changes in traditional classes. This should be done hand in hand with transformation of the customary methods of teaching and thinking of teachers about the process, pupils and the priorities of the time.

According to the Theory of dual coding (Horváthová and col., 2011) multimedia activate multi-sensory abilities of a man and increase the possibility of understanding and re-equipment of the subject area. Their use as a presentation tool makes presentation easier and more effective. The use of multimedia in education has quite a long history. The main reason for it is the different expressing possibilities of multimedia which make it perfect for use in education. This gives also the possibility to make the process more individual and more effective. One can say that they are suitable for e-learning.
The subject Multimedia has its place in both teacher training and applied informatics programme which are studied at The Department of Informatics at Faculty of Natural Sciences in Banská Bystrica. The subject was created by the editor of this article more than fifteen years ago. It is still in progress of modification and every year it is adapted to the needs of new knowledge. Few years ago it was also put into the environment of so called „Virtual Department of Informatics“ where it is used not only by students of distant forms of study but also full-time study students find positive opportunities of this source of information. The rapidly changing content of the subject requires a change in approach and the use of modern methods of education.

Experiment in teaching of multimedia

The transition to an electronic learning environment at our department is a long process, but in recent years this trend has intensified. At first it was only accessible through lectures that served distance education students as help to draw content of the object. Today, each topic has a presentation prepared, specific multimedia applications, test, one or more tasks, and many other resources and recommended links to supplement the knowledge base. Discussion forums are launched with some topics where students engage in when they are interested in the topic and they found on the Internet some other interesting things.

The content of the subject is the same for both teacher training and applied informatics, the only difference is the semester in which the subject is placed. In applied informatics it is the fifth semester of the bachelor degree whereas in teacher training it is the third semester of master degree. We realized the different possibility of teaching the subject after connecting these two studying programmes. Students of the teacher training were given the teacher role in LMS Moodle (Fig.1) of our virtual department environment with already implemented course of multimedia. This course was tested and improved for years, but this was the first time, when we tried this method of learning and teaching through such experiment. Authors didn’t meet with any approach published in other available articles.

![Fig.1 The Multimedia course](image)

The students know the environment for longer time but they never had the opportunity to see it as a teacher. Teacher can make any modification of the course; he can upload files, create activities, make tests and assess the students of the course. The task given to the students was to take care of one topic in the course. They had to improve it, add presentation, create task and evaluate it. Students themselves were assessed how they could manage the task in the role of teacher. That combined their activity in managing the topic, how interesting and hard the task was and how could they communicate with “their” students.

To fulfil the whole task they needed to combine not only the knowledge from multimedia, but they had to use and apply them into education, therefore also their didactic skills were trained and
tested. Therefore in the preparation period we had also discussion about tasks which were prepared, if they are suitable, what are the threats and complications in them, and how can they be assessed. Students - teachers could advise each other, which of the alternatives would be more appropriate, or what could be the reaction of their students. Each task had to be checked also how much time-consuming it is because it had to be solved in one hour limit and they had to check also the necessary software to be available on all system platforms (Windows, Linux, Mac OS)

All tasks in the course had approximately same form. There were also some voluntary tasks with some topics where the students could show their higher interest with that topic. These tasks helped them then in the final assessment.

Fig. 2 Assessment and positive motivation

There was a time limit after giving the task to the students to solve and upload it to the system Moodle. After this the evaluation process started. Any reduction in the number of points had to be justified. Good teacher also encourages with positive motivation. In this way some teachers were so consistent that, in addition to the allocation of points, they assessed also verbally all their students.

We can say that both students and teachers have done their work responsibly. Teachers had to do much work in short time, they had to invent, organize and evaluate everything. This was done
teacher after teacher, each with new topic. Students had to work systematically on each topic and task and had to comply with the deadline. From the communication with both sides we found out, that this kind of work and the work load was acceptable for them. Many did it really with enthusiasm because the tasks were adapted to the young generation because the creators were in almost the same age group as the solvers. The tasks were interesting, amusing, appropriately challenging and enlightening.

Assessment

The real teacher (one of the authors) had all the documents (given and solved tasks), time information, score, communication between students and their teachers to her use. There was a possibility to speak with both groups of students and obtain the feedback during the lectures, led by the real teacher. Interesting was that nobody complained on the workload although much work has been done. It was also possible to follow the whole course in LMS Moodle, to see how the students can solve the tasks and to compare how they can handle them.

Fig. 3 The tasks in LMS Moodle

If we talk about assessment, the main task of students-teachers was to prepare the teaching process which included the practical tasks, evaluate these tasks and communicate with students. Each group of students had the same subject at the same term, they had the same criteria, the same requirements of knowledge and skills, but they were expected to have different levels of experiences. Competencies of AI students should be more professional in depth and future teachers should have more pedagogical experiences. The subject of multimedia was previously taught to both study programs together at one time, even in the same year of study (third year Bc.), which, although
saved the teachers time, it did not allow the individual access to each group according to its needs. Comparing the method where students teach other students using virtual environments with the method used before, we consider this new way more prospective. We are just somewhere at the beginning of examining the efficiency of this teaching method, but the situation requires to accomplish also such experimental research and look for new ways so that we come to know the correctness or incorrectness as soon as possible.

**Internet technologies in distance learning**

If we talk about internet technologies in combination with distance learning, we may look at it from two points of view, both giving us the possibility not only understand the principles of given technology but also experience how to give these to someone who wants to learn it. One of them is the already mentioned idea of giving the role of the teacher to the student to explain the basic terms, tasks and knowledge, usually also with the use of some e-learning environment. The other point-of-view is based on the fact, that the user of them should know what to expect from such application and what would be necessary to ask for if he would need to create some new application of this kind. This gives the possibility to combine the use of different internet technologies to design the basic tasks used in such environments.

The knowledge of different internet technologies is split into three subjects in our Applied Informatics studying programme. This gives us the possibility to look at the design of internet applications from the very beginning, creating just static HTML pages with CSS design, continuing with client-side scripting language oriented mostly on data using the XML technologies and concluding with preview of server-side scripting languages which are used for dynamical web pages and applications.

The content is of course consulted with knowledge brought from secondary schools from which the students come. From here we can see the fact that with different „School Educational Programme“, also different students with different knowledge of internet technologies come into our course. This starts at web pages made by text-editor and saved as HTML document and ends with very good knowledge of web management using PHP or other scripting language or content management system.

This wide range was also the reason for splitting the contents into more terms. From the pedagogical point of view we try to give „hands on“ sessions as much as possible and try to avoid the so called „cleaning of the empty room“ problem which may arise when we try to cover area in which students do not have that much experience to organize all the knowledge given to them from beginning.

Idea of this section is not to go deeply into all the topics of this internet technologies course, it is not necessary to give week-after-week contents. Generally speaking our aim is to cover as many applications as possible to cover the possibilities that internet technologies offer today. And to do this we give students possibilities to try as many functions they might be asked to implement in the system they will work on. This also covers different learning management systems for different types of schools or educational organisations. Of course one has to have in mind the complexity of such system and serve all the tasks gradually but also give students chance to express themselves and award their creativity in final assessment. Some of the ideas and final products can be seen in the following list and figures:

- create table with 8 rows and 8 columns each cell with white background, when you click on any cell it should change its background from white into black and vice versa,
• using two buttons → and ← simulate switching between multiple pages, actual page will be shown between the buttons,
• create array with random numbers and simulate its sorting using some standard algorithm,
• find daily EURO rate on the pages of Central European Bank and create PDF version of exchange rates,
• create timetable for school in XHTML format and transform it into XSL-FO and create PDF document,
• find interesting article about internet technologies on the Internet and without rewriting make a DOCBOOK document from it,
• using JQuery create following effect: you have a list of elements placed in a table, each element can be highlighted, you will be able to highlight more elements until you reach maximum which is given as a constant, when you highlight maximum number of elements all of them unhighlight and some action will be done with them.

**Fig. 4 Some of the homeworks presented by students**

**Conclusion**

Although the real teacher apparently left a significant part of her educational tasks to older students, there was no time to spare. The number of students on both sides (10 future teachers and 53 students of applied informatics) and the managing of the teaching process were posing quite a difficulty. AI students knew from the beginning, that they were a part of some "game" and that their older colleagues, who invented those tasks and will evaluate them later, will take care of them. Based on an interview with them, it was clear that they
enjoyed such an unconventional education and maybe they expected from their older colleagues kind of a “student solidarity”.

Students - teachers were often more strict than experienced teacher. They were not inclined to tolerate any exceptions, no inconsistency. The only excuse to allow such non-compliance deadline was the illness of the student. It was interesting to see how sensitive some future teachers were with their task. We believe that some of them can be extremely good teachers, if they remain faithful to their profession.

The best thing at this whole experiment was a good feeling at all sides. Students - teachers had a good feeling, because in the last year of their study they finally became a part of real learning process and had also the opportunity to influence this process. At students had a good feeling about this demanding, but interesting subject, where they could demonstrate their skills and creativity. And teacher had a good feeling because it was fun and interesting for all her students.

The use of virtual environment which is common to both teachers and students has a great potential. Thanks to it the organisation of education is easier and quicker, we have better overview over communication and it is something natural and obvious for the young generation. The effect that we expected at the beginning of the term, far exceeded our expectations. Not only the students managed to get theoretical knowledge of the subject and showed it in the final testing, they could manage also many hard practical tasks. In addition, the students of teacher training could also try the teacher role of the learning management system. They have seen the teaching process and could realize one part of their future career.

From the applied informatics point-of-view we should be able to prepare the students not only to use learning management systems but also to be able to create such, of course with the help of the teacher who knows what to await from such a system and can express its needs for the topics he teaches at the given school type. We think that this is also possible and shown methods help it at least a little bit.

Modern education depends on how to utilize various possibilities of modern technology to improve learning and teaching and therefore it is very important to prepare the younger generation of teachers to best use of modern technologies in the teaching process. Our contribution can serve as a sample of successful launch of prepared educational models into practice.

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