

E-learning at the University of Maribor

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Abstract

This article presents the historical walkthrough the e-learning at the University of Maribor. It does not stop at the present but wants to give some vision for the future development. E-learning at the University of Maribor started at the Faculty of Education in 1996 when we developed the first electronic textbook “Application of computer in education” presented in Slovene and English languages. At the turn of the century we started experimenting with videoconferences, video lectures and learning management systems (LMS). We always want to be in the forefront of the application of ICT in education. In the past we could afford the equipment that exceeded the students’ budgets. Now the reality has changed and students have better hardware than we do. To motivate them we need to show them how to use their devices in education. Production of e-learning materials, interactive technology and didactics strategies are the topics that they need to learn now. We can show them what they are unable to study for themselves: videoconferences in education; LMS systems from student’s and teacher’s perspective; how to enhance the quality of e-learning materials; and prepare them for MOOCs.

1 Introduction

At the turn of the century many different approaches were started to find a successful way into the e-learning. We wanted to present our advancement in the ICT in education through overlapping phases.

2 E-books and e-learning materials

2.1 Years 1996 – 1998: The beginning

It is not always easy to pinpoint the beginning of an area. We know that many little things produce the change. But we could agree that the historical artefact we still have is the development of the first e-book named “Application of computer in education” (Figure 1). With this e-book we wanted to prove the concept of e-learning and learn how to prepare e-learning materials. This was prepared in Slovene language and later translated to English (Figure 2). Book is still available on the web and students are assigned to compare the presented ideas with the contemporary development in ICT in education.



Figure 1: First e-book at the Faculty of Education

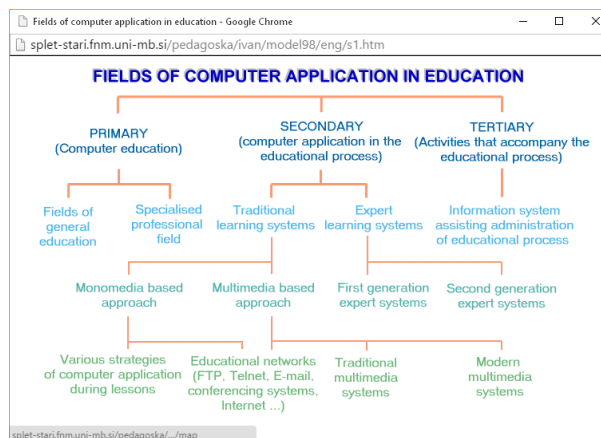


Figure 2: English version – first page

2.2 Years 1989 – 2009: Course “Multimedia for teachers”

(Krašna & Gerlič, 1999a) (Krašna & Gerlič, 1999b) (Krašna & Gerlič, 2002) (Krašna & Gerlič, 2004)

In the 1998 all the study programs at the Faculty of Education incorporated Multimedia as a study course. (Krašna, 1999) We have done extensive research and prepared the pilot project with the students of computer science. As we gained sufficient knowledge we prepared the learning materials and exercises for the rest of the students. It was necessary to find the right level of comprehension of the students. We prepared learning materials and observed the students. In those days not all students had computers and internet access.

The first year was very busy. As we discovered faults we immediately corrected the learning process. Most of the problems were related to the poorly written learning materials. This is not new since everyone knows it is hard to explain something that is self-evident to him. We spent a whole year to resolve ambiguities in the learning materials.

Second year we conducted a students' survey. We have performed the survey each two years' since then. Survey gives us the didactical mirror in a large scale population and the trend of increasing knowledge of students' population.

Comparison of results of survey done in 2002 and 2004 showed that major changes need to be done in the exercises since students' knowledge of ICT grow beyond the previous complexities of the exercises in the course Multimedia. We needed to acquire new equipment and upgrade the complexity level. We expected that this study course is going to be subjected to constant changes

according to the evolution of ICT. (Backer, 1999) (Bennett J., 1999) (Bennett L., 1999) (ICT Directorate, 2000)

Students should have the skills to be creative [teacher creativity]. (Feldman, 2002) We need a creative teacher that would use the most of available ICT in their education process. (Gerlič, 2000) Whenever we perform the changes in learning materials we need a transition period for diminish the perturbation. It is always possible that we set the complexity level too high for the current population. Observations and surveys give us the feedback and we will adjust the complexity level.

We have different types of students. Some are more susceptible to the novelties but others are more traditional. The aim of the study subject is to provide the same level of satisfaction with the gained knowledge for all of them. (Van den Berg, 1999) Therefore, we encourage their creativity by preparing the exercises differently. Each student should see the benefits of the study program.

At that time, it was not easy to distance ourselves from the safety of natural sciences and prepare the learning materials to address the needs of social science students. We conducted many students' surveys to get sufficient insight in the desires of the young social science students. Any reader should be aware that we could not find any common point with the lecturers from social sciences since most of them were hard traditionalists and some did not use computer at all.

If students obtain skills to prepare better seminar work, we fulfil our goals. This changes the idea of the subject from the academic perspective to the usefulness of acquired knowledge. Lecturers from other study programs admit students make higher quality seminar work.

At the present most of the students have high speed internet access and therefore we can prepare any kind of e-learning materials.

3 Application of video in education

Video in education is not new, but it was not widely used until computers were capable to display sufficient quality video and equipment for video production was available to the general public.

3.1 Year 2000 – 2002: Beginning of using video in education

(Krašna & Bratina, 2003)

We started using digital video in education around 2000. At that time, we bought the first video editing system (Matrox RT 2000). This system enabled us to start producing video learning materials. We wanted to discover the didactical value of video as learning materials and how to use it properly. In those years we discovered the term and the meaning of "information overflow". We prepared learning materials with video clips and experimented with them. We experimented with the quality of video, distribution of video and integration of video into web learning materials.

Table 1: different approaches to the integration of web and video

	using one window	using two windows	using three windows
basic video		+ high quality graphics	+ high quality graphics + description video
	+ subtitles	+ subtitles + high quality graphics (see Fig. 2)	+ subtitles + high quality graphics + description video
action video	(see Fig. 1)	+ high quality graphics	+ high quality graphics + description video
	+ subtitles	+ subtitles + high quality graphics	+ subtitles + high quality graphics + description video (see Fig. 3)



Figure 3: Video lecture (2000)



Figure 4: Video lecture supported with higher quality graphics (2000)

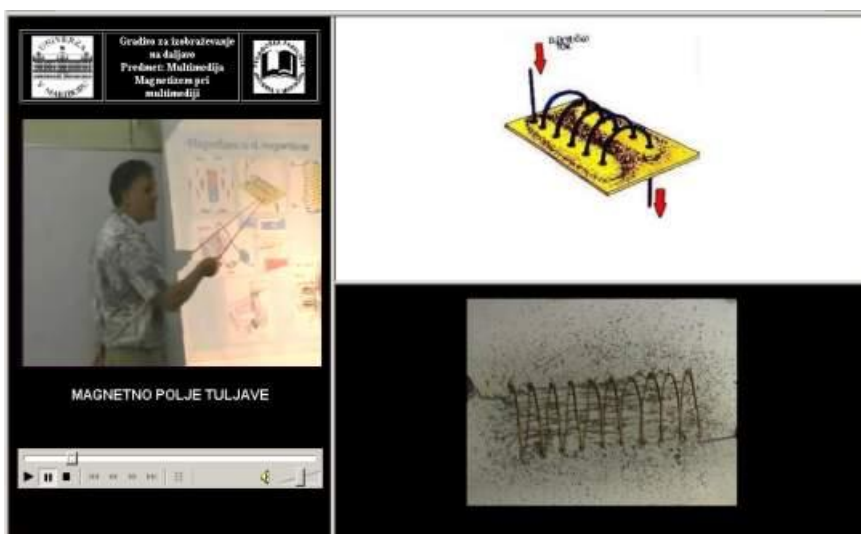


Figure 5: Video lectures with high quality graphics and description video (2000)

Experimenting with the students we discover that using three information flows (see fig) is very demanding for students. Design consideration where to focus students' attention is needed and in general the flow speed control is required. Even in careful planning and designing the synchronization proves to be a problem and students often loose attention. Using more than three information flows is a waste of time and resources because nobody can follow the lecture.

3.2 Years 2006 – present: Video in education

(Krašna & Bratina, 2007)

Since the year 2000 we constantly monitor the students' performance in the course Multimedia for teachers (see table). Through the years the number of students has grown and in 2006 we needed to make a shift in the concept. Every year we made a revision of the learning materials to keep the pace with the technological advancement. Careful observation of students' ICT skills shows us that we could change the concept of the course from general knowledge to the production of e-learning materials. With the change to the Windows XP SP3 we acquired new computers; multimedia hardware; and reshaped the learning materials. We could for the first time use digital video on our computers.

Table 2: Students' number trend in the course Multimedia for teachers

year	No. of students
2000	182
2001	405
2002	465
2003	511
2004	510
2005	501

In the year 2006 the old Faculty of Education transformed into three faculties: Faculty of Education, Faculty of Arts and Faculty of Natural Sciences and Mathematics. This was necessary because it had become the biggest faculty at the University of Maribor with more than 6000 students. Past estimates show that around 22 % of all students at the University of Maribor were at the Faculty of Education.

Video in education became necessary to manage different study programs and students' preferences. An instructional video was prepared for recording and editing of digital sound and digital video; use of scanner and OCR; and use of electronic presentations. Video was streamed using MMS (multimedia stream protocol) which is now obsolete.

The instructional video did not significantly reduce the time to finish the assignment for students but it did decrease the need for tutors' assistance at students' work. Students who wanted the help of tutors asked more elaborate questions. Exam data showed that failure rate did not decrease with the instructional video, but the number of excellent students increased.

We have learned that instructional videos are a nice addition to the learning process, but it has its limitations. Video should not be longer than 3 minutes and it should be focused at one task. Longer videos with the diverse focus are waste of resources. Today we use video guides for Office software (Word, Excel, and PowerPoint). We plan to prepare video guides on how to use interactive boards and upgrade the video lectures for using the statistics program SPSS.

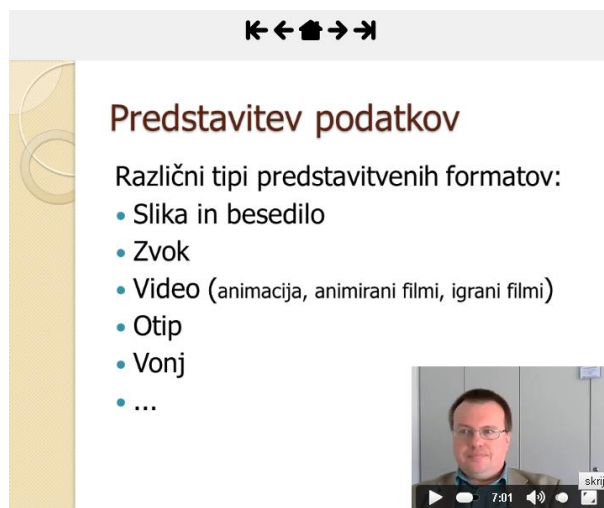


Figure 6: Contemporary video narrated learning materials (2014)

3.3 Years 1999 – present: Videoconferences in education

(Krašna & Gerlič, 2000) (Krašna & Gartner, 2005)

It became evident that videoconferences have their role in education during the project CoLoS (Conceptual Learning of Sciences, Tempus S_JEP-09641-95, 1995-1997). First tests were conducted at that time, but the hardware and information infrastructure was inadequate to use it everywhere. Only on specially equipped rooms with ISDN infrastructure it was possible to test the equipment. These facts did not discourage us to test the potential of videoconferences in education. In 2000 we prepared a report on all aspects of using videoconferences in education and findings of this report is still used today.

Eventually infrastructure become better and we could use videoconferences in different areas. In 2004 and 2005 we tested videoconferences for teaching practice. All students in Slovenia, who study special didactics discipline, need to go to school and give lectures to the primary and secondary school students. It is a mandatory part of the studies. After the lecture the didactical analysis follows where students discuss their work; highlight the good part of their lecture, their failures and possibilities to improve their performance in the class. Every “foreigner” in the classroom influences children’s performance and distracts them. To minimize the distraction, we use camera in the classroom (Figure 7) and operator in the adjacent room (Figure 8). Results of these experiments were very good to excellent because children did not perceive camera as the distraction and we could have observed their behaviour and discussed the student’s performance in real time.

Despite the good feedback we could not afford to continue with these activities because we were not able to finance broader infrastructure. Only one school (in our logistical vicinity) has an adjacent room to the classroom empty and suitable for videoconference operator, but the test without an operator was not successful. With the recent financial cuts to the schools and faculties we have only good memories of these experiments.



Figure 7: Camera in the classroom



Figure 8: Videoconference operator working place

Today we mainly use videoconferences for the lecturers from foreign countries and training of students to practice corresponding didactics strategies. We mainly use Adobe connect video conferencing system and we are experimenting with Skype for Business.

4 Application of the LMS

(Krašna & Bratina, 2008)

This topic contains the report of using LMS at the University of Maribor and Faculty of Education. From the early beginning when we tried to develop our own LMS to the adoption of LMS Moodle.

4.1 Year 2000 - 2006: The Beginning

First attempt to use the LMS in education was held in 2000. The “Didactical lab” (prototype of LMS) was developed as CGI program.

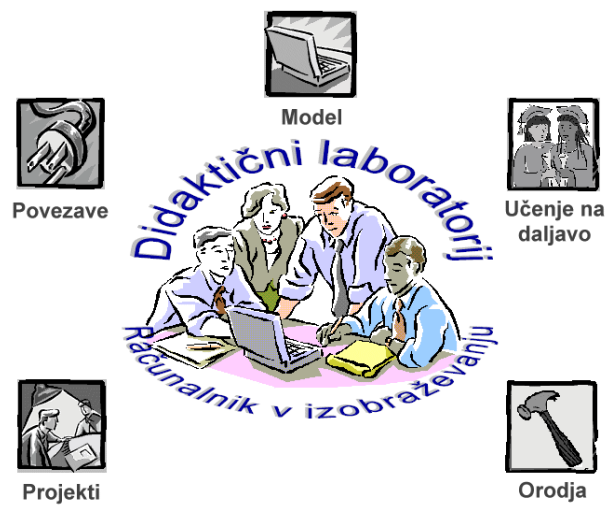


Figure 9: Prototype of LMS (2000)

With the prototype program we learned the functions of LMS and its didactics potentials. After initial steps we wanted to develop second LMS (in 2004) with the aim to support the video learning materials.

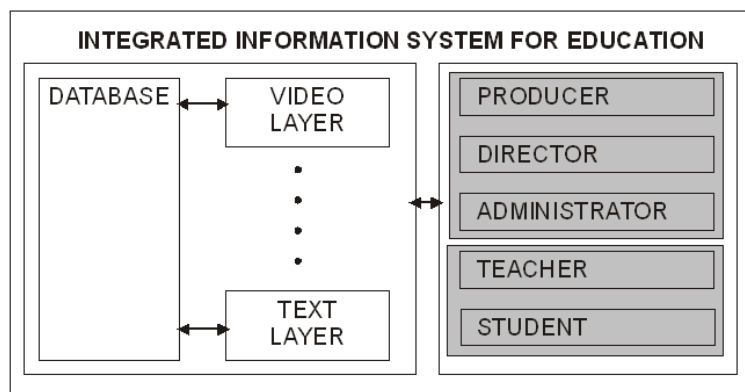


Figure 10: Integrated information system for education (2004)

Cost analysis shown that we did not have resources nor funds to maintain our own LMS and we decided to adopt LMS Moodle for all our further e-learning processes.

4.2 Year 2006 - present: Moodle at the faculty

In the year 2006 the Government of Slovenia – Ministry of Education funded project Partnership of faculties and schools 2. Members of our faculties have prepared different e-courses in Moodle:

- E-book: First steps into Moodle
- Introduction to the distance learning
- School and classroom discipline
- Application of audio and video in education
- Text editing
- Electronic presentations

- Introduction to the pedagogical statistics
- Team work
- Early computer science with LOGO
- Communications
- Introduction to the e-learning materials and
- Teachers' practical training

Since that year we are bound to the LMS Moodle in our education system. We were reluctant to upgrade Moodle because after version 1.95 all previous SCORM packages and WIKIs stops working. In year 2015 we upgraded Moodle at the Faculty of Arts to the version 2.9 and transfered the courses. We still need to solve problems with SCORM packages and WIKIs.

4.3 Moodle at the university

University of Maribor adopted Moodle as the official LMS shortly after first LMS were established in different faculties. Their aim was to centralize all e-learning in one place, but it was a bit too high. When lecturers started using the Moodle it proved to be hard to handle. In 2012 a team scanned the Moodle and reviewed courses to delete obsolete and duplicated courses. After the process ended they discovered that there are still around 22000 courses and decided that they need to change the concept.

The new concept of using LMS at the University of Maribor is that it is bound to the student information system. All courses are created from the information system and students are enrolled automatically to their courses according to the year of study and study programs. The centralized system becomes decentralized with the local administrators on faculties which can do basic administrative support for lecturers. But many faculties still use their local Moodle installations. Local Moodle enables lecturers with greater flexibility on large data (video) and faster feedback to students. University Moodle does not allow instant feedback on e-test because hardware is not capable to handle the increased load.

5 Year 2013 – 2015: Rectors initiative to upgrade e-learning materials

(Krašna, Duh & Bratina, 2014)

In 2013 the Rector of University of Maribor started the initiative to upgrade the quality of e-learning. A team was formed to analyse the current state of e-learning and to prepare the guidelines for quality e-learning material production and application of distance learning. Each member was assigned to prepare pilot learning materials to present what he/she is capable while thinking that could be the future e-learning for all other lecturers. Many quality e-lectures were developed, tested with students and verified.

5.1 MOOC

During the Rector's initiative we discussed the possibility to start MOOC at the University of Maribor. Many considerations were included into the analysis and we can structure them in few questions:

- What are the suitable courses for MOOCs?
- Are we capable to prepare e-learning materials for MOOCs?
- Are we able to carry out MOOCs?
- How to see the financial benefits and provide long term funding?

Answer to the first question was easy. The obvious candidates for MOOCs were courses that most of the students need or can be suitable for wider population. Therefore, courses from the area of mathematics and ICT were best candidates.

The answer to the second question was more challenging. Some argue that we would need expert help and others (including myself) who already have made different kind of e-learning materials advocate the in-house development.

The third question was the one that raised conceptual disagreement between members of the group. Some advocate that it would be enough just to open the course and let students enrol. Others advocate the students' cooperation to be the focal point in the MOOCs and the third advocate the active support of competent tutors for every enrolled student. We did not have sufficient manpower to carry out MOOCs with the active support.

Answer to the last question never come and we tried to get the pilot MOOC funded by applying for the government research funds or EU funds. There were no tenders to fund such projects at that time.

University of Maribor does not have MOOCs and does not plan to implement them in the near future.

6 Transition from technical to aesthetical consideration

(Duh & Krašna, 2011) (Duh, Bedrač & Krašna, 2012)

In many years when we were members of the development team for e-learning materials production we were bound to the instructions from the Ministry of Education. Technical specifications were strict and could be easily achieved (number of characters, number of images, seconds of audio or video, number of interactive elements, seconds of animations, number of simulation). Didactical specifications were defined in the curriculums and could be easily checked too. Many e-learning materials were produced that met the requirements but were so ugly that kids hated them.

With the help of the specialist from the didactics of fine art we conducted a survey and found that aesthetical requirements should also be part of the requirements for e-learning materials. It is hard to grade the aesthetics, but we found the way to successfully address this dilemma. If the development team would have visual designer specialists who have experiences with the "taste" of kids the produced e-learning materials would be much better accepted.

7 Further development

(Krašna, Duh & Bratina, 2014)

In the next few years we would like all our lecturers to advance one step further from the materials they use today (Table 3).

Table 3: Advancement of e-learning materials to the next step for the next few years

Current state	Next state
File (Word, PPT, PDF)	Files with description
Files with descriptions	Addition of multimedia elements
Multimedia learning materials	Interactive multimedia learning materials
Paper student assignment	Electronic submission system
Electronic submission system	Use of e-tests

Contemporary researches are in the area of interactive technology; mobile devices and blended learning (Pukšič & Krašna, 2015); and application of e-learning materials in humanities (Gartner & Krašna, 2015)

8 Conclusion

In this article we have presented historical overview of ICT in education at the Faculty of Education which was the biggest faculty at the University of Maribor and also the most advanced in the use of ICT in education. We did the best to follow the advancement of ICT in education with the limited resources and funds that were available. In recent years the effect of never-ending economic crises becomes more apparent because students have better equipment at home than we can provide them in the classrooms. Changes in the student population shows that their ICT competences are getting better and better each year, but at the same time they are almost exclusively internet users and not content creators. Special didactics study programs students (future teachers) should be different. Teachers are required to be ICT literate and they should be competent to produce e-learning materials and in this field we still have competitive advantages. Effective use of interactive technology (smartboards) and production of interactive multimedia learning materials are the goals we have for all of our students in the near future and we will not stop there.

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