

Us and Them – The Story of Joint Venture in eLearning of Teachers and Students

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Abstract: *Over the years, we collected some excellent experiences considering the collaboration with students, in the field of creation of digital resources for use in eLearning. An important number of valuable electronic materials were created with the engagement of students of the computer science study program at our Department. After receiving initial created resources, lecturers had to work additionally to prepare them for use as a part of university courses, sometimes having to make significant and large scale changes. Still, work created by students was of a great value, for several reasons. First of all, students were introduced to principles and methodology of eLearning on some real life, practically usable material, thus being able to see all of the problems they might encounter in the future. Secondary, it gave us a lot of raw material to work on more, thus relaxing efforts for eLearning material creation. Finally, these resources introduced us to different, sometimes rather interesting views on problems and resources in question, or on teaching methodology, giving us new ideas, notions, and concepts to work with.*

Keywords: *eLearning resources, eCourse development, teaching resources creation*

INTRODUCTION

One of the most obvious problems with eLearning in practical use at University level is a need to create a huge amount of teaching material. At each faculty and for each study program, there are a lot of obligatory courses that require passive and stable teaching material, but also in addition some multimedia and interactive learning resources. Also, there is a need for creation of testing and self-testing resources, glossary of definitions, theorems and other notions, or links to either pre-requisite, or bonus, extra material. There is also a need to keep these resources and links live and up-to-dated.

In addition, by Bologna principles, there are a lot of elective courses, requiring the same set of eLearning resources. For example, at Department of Mathematics and Informatics - DMI, Faculty of Sciences, University of Novi Sad, for the study program of "Computer Science", needed minimum for students to finish studies and collect 240 ECTS is set of 31 courses – 22 obligatory and 9 elective. On the average, number of courses that different students select in one school year is around 33 or 34 courses – students prefer several "easier" courses, to those demanding and hard to pass. Thus, for the curriculum at the DMI, 52 courses are developed and offered, 22 obligatory and for each of 12 elective computer science courses that exist in study program, we offered three or four different courses. Common practical problem appears – How to create good eLearning material and keep it fresh, and up-to-date, as suggested in [3] or [4], for example.

In the last decade, we worked on more than one method to overcome this problem, and here we present some of the ideas:

- Tools were investigated to convert existing, legacy teaching material into the eLearning resources, as presented in [7]. Those became an integral part of eCourses created within LMS Moodle which is used at our Department for around a decade now. Articles usable for decision about the LMS in use are [6], or [10];
- Another line of research deals with teaching activities, and replacement of standard classroom actions with electronic ones. Discussions presented in [5] were an excellent bases for our work, and our experiences and findings were in use with satisfactory success both for lecturers and students involved [11];
- Employed eActivities helped us also in unexpected ways. More can be found in referenced papers, but as a hint let us mention that they helped us fight cheating [9], achieve fairer grading process [8], or brought further ideas for evaluation of students within courses [1].

Still, even with all of the help we gained this way, inclination to transfer all of the courses to LMS Moodle and keep them up-to-date required a lot of work. Some help was needed, and it was accomplished by our students.

The rest of the paper is organized as follows: the second section presents description of our original ability to acquire help from students. Since this ability vanished after study program of "Professor of Computer Science" was cancelled, in the third section we present a way out of the problem and another model of getting help. Fourth section gives some numerical data about the course on eLearning, such as number of students, grades, and data about the course selection. In addition, results of a satisfaction survey conducted are given. Finally, the fifth section gives some concluding remarks.

THE EDUCATIONAL ENVIRONMENT

Students of the study program "Professors of Computer Science" as a part of curriculum have to pass the course on "Distance Learning". While the study program and the course lasted, it was very helpful for resources development! The course was conducted on fourth year, meaning that before it they had to pass a lot of other courses within the curriculum. Another important point was that during the first three years of studies, these students had several courses on pedagogy, didactics, and teaching methods, thus gained enough knowledge to create digital teaching resources. During four years the study program lasted, we have got 20 lectures prepared, of a high or at least satisfactory quality. It was good starting point in the development of eLearning resources. Lectures belonged to various courses, which students chose themselves, and were afterwards further improved and completed by lecturers. Yet, unfortunately, small number of students enrolling forced the Department to drop the study program.

ANOTHER APPROACH TO PREPARE TEACHING MATERIAL

As there is no study program of "Professors" since school-year 2008/09, another way to get support in preparation of teaching material was invented. To be able to stay modern and keep our courses and teaching up to date, curriculum contained four courses with no fixed topics and content. Two courses at the graduate and two at post-graduate level, entitled "Elective Seminar A, B, C, and D" were defined in a specific way. Their content is not defined in the curriculum but instead of that each semester professors can freely select topics of their current research, and offer those to students. If there is enough number of students interested in proposed topic, the course is conducted. Having each semester 5-6 seminars on different topics to select from, students had no problem finding appropriate one.

The first time the course "Elective Seminar – eLearning" was offered during the school-year 2004/05 and attracted 7 students. For the next few years we had a rapid growth of students' selection the course. 17 students in the second year, 26 in the third, and in the fourth year 94! After that, a pause of one year was made, and on subsequent years *controlled* number of students was allowed for the course, between 25 and 30.

There are two things that need clarification considering the course:

- **What are the reasons for a large number of students applying for the course?** - Excellent grades students have achieved are on the average above 9.50 (on the scale from 6 to 10). Yet, only for those who succeed in passing the exam – and that percentage is not large! Students are informed that instead of getting a low grade, they will be forced to redo and improve their teaching material, do additional work and create more resources, until the final results are satisfactory. Consequently, the created materials are of high quality, represent excellent starting point, on which lecturers continue to work and use them as a part of belonging courses.

- **What are the results of students' work and why there is still need to keep the course alive?** - The first and the most important reason that we still have to keep this course is our wish to teach students theory and practice of eLearning and the development of eLearning materials and resources! The second obvious reason is the need for improvement of existing eLearning material and/or need for the development of additional resources on the same topic.

WHAT DO WE GET AS A RESULT

Some general statistics

Data about students applying for the elective seminar on eLearning are presented in a table. Besides the sheer number of students, the notion of "successfully created eLearning material" is introduced and will be identified with the resources deserving the highest grades of 10 and 9. In practice this means that they didn't require a lot of additional work by the lecturers to be practically usable. The data is given in Table 1.

Table 5: Participation and results within the course over the years

School-year	Number of students who applied for the course	Number of students who passed the exam	Number of successfully developed lectures
2004/05	7	7	6
2005/06	17	15	10
2006/07	26	21	16
2007/08	94	62	44
2008/09	-	-	-
2009/10	15	9	7
2010/11	25	17	14
2011/12	19	16	7
2012/13	24	24	17
2013/14	20	12*	7*
2014/15	22	4*	4*
Total	269	187*	132*

* - students are still working on their exam material

Additional explanation is that some of the students who haven't passed the course during one school-year, re-applied for it in the following year. As can be noticed, we gained 132 from very-well-developed to excellent lectures, plus additional 55 usable lectures. Disregarding the last school-year, we can conclude with satisfaction that around 74% of the students passed the exam, while more than half of them (52% to be precise) had developed very usable eLearning teaching material.

Types of Resources we Received

An interesting question was to see what subjects and topics were the most interesting for our students to create eLearning materials. While courses from the first year have more chances to be selected than courses from the last year, there was also some subjectivity, because over the years, we suggested to students courses to select, based on our actual needs at the moment. Consequently, data we present should not be considered as a competition between selected courses, but simply information about which courses gained the most use of the course on "eLearning".

Table 6: List of developed resources, divided by associated courses

Course	Number of students creating resources for the course
Software Engineering	26
Object-oriented Programming	24
Introduction to Programming	23
Operating Systems	16
eLearning	12
Discrete Mathematics	9
Web Programming	8
eBusiness	7
Mathematical Analysis	7
Total	132

Additional explanations: the most selected courses were actually those for which we need more learning material. Assistants teaching “eLearning” course over the years, were also teaching these courses: “Software Engineering”, “Object-oriented Programming”, and “Operating Systems”. When we add to that list the course on “eLearning” itself, it is natural that those courses are the most selected ones, either voluntarily, or by suggestion. The last course with double-digit number of selections is the course “Introduction to Programming”, the first major course our students encounter and course all of them passed at that point.

One more course is very interesting for our analysis. Since the introduction of the course on “Web Programming”, this course is by far the most often selected one. Unfortunately for the lecturers, received eLearning materials produced by students are very often of insufficient quality, so out of more than 25 selections, only 8 qualified to be mentioned as “resources of a satisfactory quality”.

Natural question that arises is “Do we have some course completely covered with the eLearning resources?”, either initially developed by students and improved by lecturers, or developed by lecturers from the start. Natural answer is also obvious – NO, since we always aim to improve all of our teaching resources digital or other, thus changing and adding to the old ones improved and superior material. Still, the answer to easier question “Is there a course covered *sufficiently* by eLearning resources?” is – YES. Courses in “Object-oriented Programming”, “Software Engineering”, and “Operating Systems” have *all* of their topics covered by the eResources. Still, each year we again offer students to renew, and improve existing materials and resources.

About the Contents of the Resulting Lectures

During the first few years, there existed a dilemma about the things students will be able to produce, both concerning the quality and quantity of materials. Still, as years went by, we became aware of their abilities and our needs. For each course, static, written material was supplied, either as a book, document, or graphics, covering selected topic. After that, students were required to create an eLesson based on this material (sequence of screens explaining the topic) and eventual links to pre-knowledge material, or additional resources. Within eLecture, students were asked to develop also initial testing questions, in order to keep students alert and in touch with the contents.

Several years of such a practice showed that this doesn't present any problem for students, and that they are able and willing to create even more digital material. After some experimenting over the following years, it is settled that students are required to develop four things: eLesson, glossary of the most important terms and notions, question database (with at least thirty questions), and a quiz that selects randomly ten questions from the database, to be used for self-testing.

Opinions and Satisfaction of Students

On four occasions we conducted a survey to see opinions of students about the course. A survey is a common one for the courses created and conducted as a part of a long-lasting educational DAAD project [2]. It consists of four parts, assessing different aspects of teaching. Those parts are: questions about organization of teaching activities, about the quality of lecturer, about the quality of assistant, and about attendance of the course, and workload needed for gaining adequate knowledge and to pass exam.

The first survey was performed at the beginning of the course conduction, during the school-year 2006/07. The next was carried out during the next school-year, when there was the largest number of students at the course, 94. For the third survey, we estimate that we had much more experience with the course, and relatively long time of established rules about the quantity and quality of resources produced. The last survey was conducted during the previous school-year, 2013/14, with 20 students.

Our biggest problem with surveys lies in the organization of course activities. At the beginning, there are several theoretical lectures about the principles of eLearning. As a continuation, practical lectures follow, preparing students for “application oriented things”. In parallel with the lectures, exercises are performed where everything presented by that moment theoretically, is in parallel presented and tested in practice. Lectures and exercises take approximately two thirds of the course time. Up to that point, students are expected to select a topic they want to process and prepare teaching material, and to produce a working plan, explaining *how* they will proceed and develop teaching materials.

Even before lectures and exercises are finished, students start working on material creation. Since the course deals with eLearning, and digital resources for use in distance learning manner, it was only natural to let students work on those *from home, in the distance learning manner*. Time for presentation of their material, questions and consultations, was still available, but experience showed that questions and consultations via e-mail were preferred. While this organization works fine for the most aspects of the course, conducting a survey was a problem! Switching to electronic surveys (using the very same LMS Moodle), helped a little, but the response was never too high.

In Table 2 the first part of the results is presented, dealing with the course in general. Questions required answers on the scale from 1 (totally disagree) to 5 (totally agree).

Table 7: Survey results about the course quality and organization

	2006	2007	2011	2013
Part I – Lecture organization				
1. Organization of lectures is good	4,8	4,7	4,4	4,6
2. Type and difficulty of the tasks is motivating	4,2	4,0	4,3	4,1
3. Quantity and quality of lectures is appropriate	4,2	4,2	4,4	4,4
4. Lectures and exercises are well coordinated	4,5	4,6	4,4	4,6
5. Course resources are appropriate	3,9	4,0	3,8	4,0
6. Overall quality of the course is good	4,6	4,6	4,8	4,7
7. The course is useful	4,6	4,5	4,2	4,5

Supplementary information was gathered through oral communication. Drop of the grade considering “lecture organization” was explained by wish to make lectures *faster*, enabling start with the work and material development *sooner*. Students are not too satisfied with the content offered as learning resources, which might be justified up to a point. Complexity of Moodle system itself, and the fact that the official book has more than 700 pages, compared to some links to digital resources and the booklet we offered with only 60 pages was not enough to satisfy students’ wishes.

Table 3 presents results of the survey about the quality of lecturers and assistants. Again, answers were on the scale from 1 (totally disagree) to 5 (totally agree).

Table 8: Survey results about lecturer and assistant

	2006	2007	2011	2013
Part II and III – Lecturer and assistant				
1. Lectures were well prepared	4,8	4,8	4,8	4,9
2. Explanation style of a lecturer was good	4,4	4,5	4,3	4,4
3. Lecturer was willing to answer additional questions	4,7	4,6	4,4	4,6
4. Overall grade for the lecturer	4,5	4,6	4,8	4,7
5. Exercises were well prepared	4,7	4,7	4,8	4,8
6. Explanation style of an assistant was good	4,9	4,8	4,8	4,8
7. Assistant was willing to answer additional questions	4,9	4,9	5,0	4,9
8. Overall grade for the assistant	4,9	4,8	5,0	4,9

It is obvious that the grades for each of the questions in this part of the survey are so high, that the discrepancy between lecturer and assistant grades are irrelevant. Yet, it is normal that assistant has slightly higher grades, because of the nature of the course, and his part being more interesting to students.

The last table shows data about the technical matters and requirements of the course:

Table 9: Survey results about the course requirements

	2006	2007	2011	2013
Part IV – Course requirements				
1. How many lectures you missed?	1,2	1,0	0,7	1,0
2. How many exercises you missed?	1,1	1,0	0,5	0,6
3. Did you use „consultations“? (answer „yes“ by)	93%	87%	85%	90%
4. How many hours weekly you needed to prepare for the following lectures?	2,9h	2,6h	2,5h	2,4h
5. How many hours weekly you needed to solve the assignments?	2,8h	2,9h	2,6h	2,4h

Verbally, the last table can be depicted as: students missed very small amount of lectures and exercises, while using consultations intensively! They spent a lot of time to prepare for the lectures and to finish their assignments. One more time, through additional oral discussions we found out the reasons: students very much liked the fact that they can actually finish with the exam in a Bologna manner, during the school-year, loved very much practical nature of the course, and particularly the fact that they can get their grades before the final exam period. One textual note given in a survey was particularly praising for the course: “Interesting, well structured course which provide us with some basic knowledge of teaching ‘strategy’ and very good experience in online learning.”

CONCLUSIONS

When discussing the application of eLearning at the Department of Mathematics and Informatics, Faculty of Sciences, Novi Sad, it can be noticed that we have been using eLearning facilities in different courses and with high extent for more than a decade. LMS Moodle is running at full speed for more than a decade now and each of the courses in computer science, and a lot of the courses in mathematics are covered with at least some eLearning resources. While it sometimes means that there exists only an inadequate repository of static teaching material, we use it as a starting point for the development of additional resources. Yet, the intention and wishes were since the beginning of use of Moodle to develop dynamic, multimedia, and active resources, helping students to better understand the notions and subjects and increase their motivation for learning.

As presented in this paper, a large assistance in the creation and development of eLearning teaching resources we had from students. And not just that, this activity in addition fulfilled twofold purpose – introduce students to modern and up-to-date methods

of teaching *and* help lecturers achieving starting material for eLessons, quizzes, glossaries, assignments, links, and other types of teaching resources.

Quality of the developed resources was of a variable level – from amateurish and weak, to excellent and worthy. After the course, lecturers each time checked the material both for quality and legal/ethical issues, making sure that all is acceptable and exploitable. The experience with this organization of work is largely positive, and we can with pleasure suggest other institutions to follow it and apply the same methodology.

The most of the ideas described in this paper are the result of cooperation within the already mentioned joint educational project, conducted for the last fifteen years with the participation of 15 universities from 10 countries [2].

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