Curriculum Development of the Course Information and Communication Technologies

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Zagreb School of Economics and Management (ZSEM) was founded in 2002. Due to this we were able to take advantage of new technologies and implement them into educational system. ZSEM is the only high-education institution in Croatia which systematically uses e-learning in its classes. All our courses are connected to e-learning and, in addition, e-learning is obligatory for our students and teachers. Up to now 66 undergraduate courses have been developed.

In this paper we will describe the curriculum development of the course Information and Communication Technologies (ICT), which is intended for the first semester students and which at the same time serves as a basis for many further courses. We will compare the curriculum developed for full-time students who intensively use e-learning in their class with the curriculum developed for distance learning students.

Taking into account 5 generations of students the course development will be shown. The emphasis will be on student's WebCT activity via open and closed discussions, online quizzes, questions, student discussions quality and ranking, the number of WebCT accesses etc. We will analyze student's results and see how an extra activity reflected a student's average grade. We will also analyze student's satisfaction with the course as well as our future plans.

I. INTRODUCTION

The introduction of Information and Communication Technologies into education offers better possibilities for a more productive class management. [1]-[4] The role of a teacher changes. The teacher becomes mentor to his/her students. In some way, the teacher is at the same time the student – he/she has to learn constantly, accept new technologies and implement ICT into education. Due to rapid ICT development knowledgespan is in decline, and today it lasts approximately for five years. Taking all this into account, it is easy to see that teacher has a very important task. He/she is due to prepare his/her students for a life long learning (LLL).

Zagreb School of Economics and Management (ZSEM) is a private high-education institution, which was founded with the aim to provide its students with the similar knowledge one gets in the best world universities of this type. [5] It was founded in 2002. Due to this, from the very beginning we were able to take advantage of the implementation new technologies into education. In this paper we will show the development of the course "Information and Communication Technologies". The course is thought in the first semester and its aim is to provide all future economists and managers with an insight into the wide range of possibilities connected to modern technology. This subject serves as a software support for the courses: Mathematics for Economists and Managers, Statistics, Accounting and so on. The following courses build up on this course: Management Information Systems (MIS), E-business, Software Management Projects and so on.

At ZSEM there are two groups of students at the moment: full-time students who use ICT in their classes and students who attend distance learning classes (DL). Full-time students and teachers are restricted by place and time conditions. However, all lecturers are due to use new technologies in their classes. Thanks to LMS (Learning Management System) a rapid and constant teacher-student communication has been established. The Board of ZSEM played a significant role in a systematical implementation of LMS [6] (in our case WebCT [7]). At the moment ZSEM is the only high-education institution in Croatia, which has all

its courses prepared and developed in e-learning form, which comes as a benefit both for teachers and students. [8] At the end of each semester an online evaluation is carried out. It evaluates the satisfaction of students with course(s), lecturers and studying in general [9]. In order to improve the quality of the developed e-learning courses, we have developed 11 standards which help e-learning team make annual evaluation. The standards can be divided into four groups: static, dynamic, administrational and other. [10]

II. INFORMATION AND COMMUNICATION TECHNOLOGIES CURRICULUM

The course Information and Communication Technologies (ICT) is thought in the first semester. Due to the rapid development of ICT, 20% of syllabus changes each year. Apart from this, we constantly introduce all sorts of novelties in order to motivate our students. The syllabus is consisted both of obligatory and additional part. The obligatory part has not changed since 2002 [1], which is not the case with the additional part. In table 1 the current ICT syllabus is shown:

Full-time class		Distance learning class	
1. quiz	12%	1. quiz	12%
2. quiz	12%	2. quiz	12%
3. quiz	12%	3. quiz	12%
Exercises (Labs)	34%	Exercises (Labs)	30%
Class participation	5%	Homework	10%
Final exam	25%	Final exam	24%
Additional activity		Additional activity	
ECDL degree	5%	ECDL degree	5%
Student's presentation	2-5%	Student's presentation	2-5%
Closed teacher-student discussion	5%	Closed teacher-student discussion	5%
Closed student-student discussion	5%	Closed student-student discussion	5%
WebCT participation		WebCT participation	
Quizzes		Quizzes	

TABLE I.   THE COURSE SYLLABUS OF BOTH ICT AND DL CLASS

During the semester 15 lecturers and 15 computer exercises are planned. Students are obliged to take part in 3 semester quizzes. Each quiz consists of 15 questions, and each question has five offered answers, out of which only one is correct. Incorrect answer brings –1 point. The first generation of students did this task in a written form. Last two generations have been doing this quiz online in a computer room. The introduction of online quizzes was beneficial, since the moment student finishes his/her quiz, he/she can see the results and get feedback. [11]

Students can beforehand check up their knowledge in online simulation quizzes. Simulation quizzes are made in order to check up student's knowledge in the subject, and in addition, they last for 45 minutes. One can take part in it several times. In contrast to the simulation quiz, the real quiz lasts for 25 minutes and one can take part in it only once. The DL syllabus differs in some points. Since DL students are not obliged to attend classes regularly, every week they have online homework at their disposal. Homework brings 10% of the final grade for the DL students. DL students do online quizzes at home.

Very important parts of this course are computer exercises. Full-time students do one exercise every week in a computer lab (MS Word, Excel, presentations, web design, image processing, Internet, videoconference, database etc.). After having done exercises, students get tasks which are due to be handed in before a certain deadline. Those tasks are individual and different for each student. DL students do exercises on their own. Full-time students are obliged to attend class(es) regularly, hence, we have decided not to evaluate their class

attendance. In contrast to this, class activity is evaluated. DL students get participation credits by doing online homework.

Extra credits can be obtained for a preparation of a presentation connected to ICT field. The student is due to consult the teacher on the presentation. Depending on the presentation quality one can maximally get 5% of the credits. ECDL degree can bring extra credits too [12].

The final exam brings 25% of the overall grade for full-time students, and 24% of the overall grade for DL students. One can take part in final exam only then, when all exercises and tasks have been fulfilled and submitted on time. One is not obliged to take part in a final exam if the overall success of all completed tasks and exercises is above 92%.

III. ADDITIONAL ONLINE ACTIVITIES

In order to motivate our students, new additional online activities have been introduced constantly. One of the first activities of this type were online discussions. Steinberg & etc. analyzed in their research [13] three groups of online discussion participants: namely, students who write posts (active), students who read posts, but do not take part in a discussion (passive) and students who do not take part in online discussions at all.

We will firstly analyze active participants in online discussions. In this course we use both open as well closed discussions [14]. In closed discussion a moderator can be both - teacher or student.

Approximately, once per weak teacher opens an interesting topic concerning ICT area and students comment on it. Asynchronous discussion enables introverted students to express their opinion. In this way, we have largely raised student activity. During the schoolyear 2006/2007 50% of students were active at least once during the class, and thanks to forum activities in closed discussions this percentage raised up to 58.36%. During the schoolyear 2007/2008 33% of students took part in closed forum. On the average each student sent 7.6 posts. Regarding closed discussions, we gave extra credits for student-student discussions. Although many regard this sort of discussion as very important [15]-[18], we have just started practicing it. Only 3.2% of students took part in this sort of discussion.

Via modern LMS one can follow the participation of so called passive students in online discussions. If this is to be taken into account, the participation is to be improved significantly. Even 95% of students were either passive or active participants in online discussions, and on the average each student read during the semester 751 posts.

This year introduced quizzes connected to a topic discussed in an online discussion. The questions were connected to ICT and were made by teacher. He/she posted them randomly, mainly in late hours. The students who were first to offer the answer got extra credits. 18.4% of students took part in the quiz.

The students who were among the 10 most active ones regarding the WebCT participation, that is to say, the number of sent posts, got extra credits. Since the site is very dynamical and all kind of news crop up constantly, even 10 students accessed the WebCT more than 2500 times during the semester. Their average grade is 4.3 and definitely excels the year average, which is 3.54. The average of all students equals 1248 WebCT accesses, and the first place owns a student with 3477 accesses. Another ranking was made according to the number of sent posts. The analysis of the discussion content was carried out in closed discussions [14], and both open as well closed discussions were taken into account. The average grade of the first top 10 students is also above the average and equals 4.78%. There is no significant relation between most active students on these two ranking lists.

IV. RESULTS

In table 2 a contribution of a particular element in an online activity is shown. 60.9% cover online discussions. This is partly expected, due to the big importance the discussion has in the e-learning system. Homepage covers 16.5%. One can approach LMS via news or the official site. The organized sites (lectures, exercises, information, etc.) cover 8.6% of the activities. This is expected, since this part is made by designer and it also belongs to static standards. [10]. Online quizzes cover 3.2%. The result is weak in comparison to other online activities. Still, if we take into account that each student took an online quiz 40.4 times on the average, this could be considered as a solid result. Calendar or virtual blackboard covers only 5.1% in spite of the fact that it is very dynamical and full of various announcements. Mail covers 0.5%, since the majority of communication is done via open discussions. Other sites are covered by 5.1%.

Online element	Average	%
Homepage	205.9	16.5%
Organizer Page	107.6	8.6%
Online quizzes	40.4	3.2%
Calendar	63.7	5.1%
Mail	7.3	0.6
Other	63.7	5.1
Discussions	760.9	60.9%
Passive discussions	751.1	
Active discussions	7.6	
Original	2.2	

TABLE II.   THE CONTRIBUTION OF THE PARTICULAR ELEMENT IN ONLINE ACTIVITIES

Figure 1 shows the distribution of the middle grade in full-time class regarding three different generations (first, last, and one in between). Regarding the first generation, 100 students attended the course and the average grade was 3.37. Later we improved some things concerning exercise organization [1]. In the year 2005/2006 there were 210 students, and the average grade was 3.41. As previously stated, regarding the last generation of students, we dedicated a great deal of attention to their motivation [19] and as a result we got the highest number of students up to own: 250 and the average grade was 3.54.
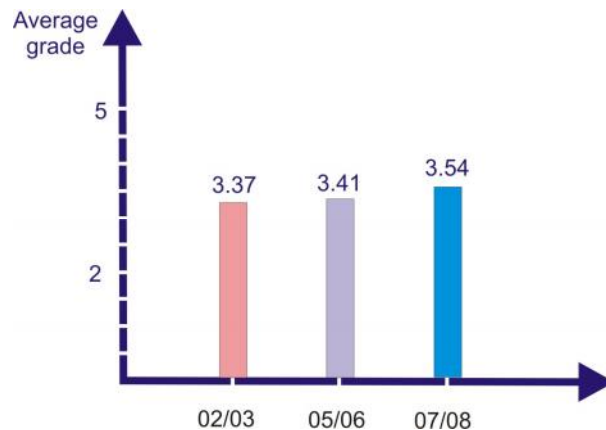

Fig. 1.   Full-time class – average grades according to different generations

Distance learning group started with the second generation. Since we talk here about older and more serious students who usually work (or are top athletes) and mostly pay tuition by themselves, one can expect here some better results. Figure 2 shows the distribution of average grades regarding different generations of DL students. In generation 2004/2005 the average was 3.61, and in 2006/2007 4. At the moment DL sample is much smaller than the one of the full-time class.
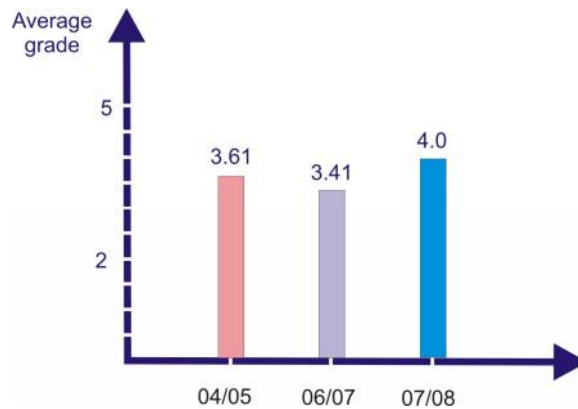
Fig. 2.   DL group – average grades according to different generations

As the course proceeded, the satisfaction of students became higher. Student evaluations were carried out at the end of each semester. To the question on the usefulness of WebCT in the ICT course, the students of the last generation gave the grade 4.8 (on a scale from 1 to 5). Students are also largely satisfied with the course. The grade is 4.6. Student feedback is the best sign that we are on the good way, and in addition, it is an enticement to engage ourselves more in the development of new curricula and student's motivation. The next step is the preparation of digital curriculum that will connect recorded lectures and Power Point presentations, and is intended primary for DL students. Enough space for research has been left in closed student-student discussions.

V. CONCLUSION

The implementation of ICT into educational system offers great possibilities for the improvement of the quality of educational system. Students reach information via different media, and teachers can use new techniques in order to prepare different programs of instruction and motivate students to stay active during the course. It is important that student-teacher communication stays asynchronous – independent of time and place.

In this paper the development of the course Information and Communication Technologies has been described. Apart from the part on lectures, exercises and class participation, we also emphasised the use of new technologies and techniques in the motivation of students.

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