Students' Readiness for Electronic Examinations

IGOR BERNIK, EVA JEREB
Faculty of Organisational Science
University of Maribor
Kidriceva 55a, SI- 4000 Kranj
SLOVENIA

Abstract:: Electronic learning exists a relatively long time but electronic examination is in its infancy. This paper is about one of the essential matters in electronic learning: taking electronic exams. It discusses readiness of students for taking such exams. The study confirms that the majority of participants are prepared to take electronic exams. They are enthusiastic about the immediate feedback and time and place flexibility. However they have some reservations about the technological issues.

Key-Words: e-learning, e-examination, group decision support systems, survey

1 Introduction

In the year 2004 54 students of the Faculty of Organisational Sciences University of Maribor participated in the survey of students' readiness for e-examination. The results have shown that the majority of students would introduce e-examinations as fast as possible. The most important factors, which contributed to the positive relation towards e-examination, were immediate feedback and freedom of choice of place of examination regardless whether exams are running synchronously or asynchronously. Students also stated some negative opinions about e-examination mostly because they were afraid of technology and were not familiar with the methods of e-examinations. They had some doubts in time limitation and did not know whether it would be good or bad for them.

The survey was carried out again in the year 2005. 173 students of the Faculty of Organisational Sciences University of Maribor participated. Within the survey carried out in the year 2005 the same students were tested twice, before and after taking exams electronically. The comparison of students' opinion about e-examination before and after taking electronic exams is also presented in the second part of the paper.

Before carrying out the survey the students were fully informed about this subject and explained by cases what is meant by e-examination. A presentation was prepared very precisely to avoid the differences in understanding of the survey among the test groups.

2 E-examination explained

Distance learning, based on interactive technologies, is an integral part of the modern educational process [1]. Distance learning courses usually use the Web as the medium, and therefore Web site design and management becomes a necessary component of course development [2]. At this point the term electronic occurs. Closely connected to e-learning is e-examination, also known as computer-assisted assessment (CAA). E-examination can take place locally-in classroom or away from the examining institution. A remote electronic examination is conducted with candidates at a location separate from the examining institution using the Internet for communications. Candidates respond to questions by typing or dragging their answers into text boxes for uploading to the institution. In an asynchronous examination candidates download the exam paper from the web site, prepare their answers off-line, and reconnect to the examination web site at the end of the set time period. In a synchronous examination candidates remain connected to a server for the duration of the examination period [3]. The last is also characteristic of the e-examination in the classroom at the examining institution.

With rising numbers of candidates to be examined, the prospect of grading the exams automatically promises faster, cheaper and more consistent grading [4]. Even if automatic marking is not used, capturing candidates' answers electronically has potential benefits in legibility and comprehension for graders. There are advantages, too, in security, with papers being held electronically and only being released to candidates shortly before the designated start time of the examination. In a distributed system, as commonly found in distance education, electronic examination has the potential for speeding up the whole examination process from the transfer of student answers to markers, standardisation of answers, to the consensus on the final grades.

We must be aware that all of knowledge cannot be examined electronically. In cases where students must

master theoretical and practical knowledge and show some manual skills e-exams had to be combined with other types of exams or completely left out. For example brain surgery exam can be divided into three parts. In the first part where the theory is examined the e-exams could be used. The second part where the students are confronted with a study case also the computer assisted assessment can be used for simulation of solving the problem. And the third part where surgery skills are examined the students must be monitored in a study or a real situation. Of course we must not expect that all of the teachers are going to switch to e-exams wherever this is possible but it is necessary to support and motivate those who are willing to.

3 Methodology

Readiness of students to take exams electronically was researched with the help of group decision support systems (GDSS) which is described in [5]. According to the study programmes renovation directives set by the Bologna Declaration we defined four possible alternatives for taking exams:

- No e-examinations. Examinations should be oral or written on paper.
- Use e-examinations for instant tests and classic tests for final exams.
- Combining electronic and classic examinations.
- E-examinations only. In classroom or remote, asynchronous or synchronous.

On the base of these alternatives the questions for the survey were gathered and categorized. The process was supported by GDSS GroupSystems [6]. GroupSystems solutions help teams accelerate the knowledge process and generate results faster. The software gathers implicit knowledge and enables productivity without information overload. To find out more about the used methodology see Jereb and Bernik [7].

Brainstorming was used to collect the questions, which would help us select the right alternative. Brainstorming stimulates creativity by passing ideas randomly and anonymously between participants, allowing them to add their own contributions as inspiration takes them. We raised the electronic brainstorming activity with next question: "Why would you like/dislike to have e-examinations in your learning process?" We received 83 answers and sorted them with the Categorizer function. Categorizer helps a group sort ideas and descriptive comments. Ideas can then be easily and quickly sorted into categories. As a result of the categorizing activity we got 12 questions. These questions were then transformed into statements for the survey. The answers should help us to choose the right alternative for taking exams (Table 1).

Table 1. Statements for e-examination survey.

S1:	I would replace classic written or oral exams with e-exams.
S2:	Immediate feedback is one of the main advantages of e-examination.
S3:	E-examination is far more interesting than classic examination, it attracts and motivates me.
S4:	E-examinations should be time limited.
S5:	E-examinations ensure objective evaluation of results.
S6:	E-examinations require a high level of computer knowledge.
S7:	E-examination is straining, it would make me too tired.
S8:	One of the advantages of e-examinations is less possibility of cheating.
S9:	Knowledge should be tested instantly with help of e-examinations.
S10:	E-examinations could take place remote from the school.
S11:	E-examinations could be carried out anytime, according to individuals.
S12:	If I could choose between classic and e-examination I would choose e-examination.

After the statements were set the survey among the students of Faculty of Organisational Sciences was carried out. First testing was performed in the year 2004 with students who did not take an e-exam yet. Second and third testing were carried out in the year 2005, one before and one after taking an e-exam. The e-examination was performed with the e-testing tool Perception. The methodology is briefly described in the section below.

3.1 The e-testing tool Perception

The e-testing tool Perception enables us to write, deliver and score different types of tests, assessments and questionnaires and is used by thousands of corporate human resources professionals, trainers and educators in more than 40 countries [8]. Perception can be used for academic examinations and tests, attitude surveys, personnel evaluations, self paced study guides and gives us everything we need in order to author, administer and deliver computerized assessments. Perception have four stages in the use. First stage is the Authoring stage. At this stage we composed a bank of questions and then selected appropriate ones for the assessment that was given to the students. The second stage is called Scheduling. At this stage we specified which students could take which assessments and when they could take them. The third stage is the Delivery stage. At this stage

students received their assessments. Assessments were delivered from the Perception Server through to a Web browser, through the internet connection. The last stage is Reporting stage. After the participants had taken their assessments, we used the Web-based program Enterprise Reporter for reporting and analysing the results. After the e-examination the students were asked to look through the 12 statements again. The results of the survey and comparative analysis between the year 2004 and 2005 are shown in the next part of the paper.

4 Results

In the year 2004 a total of 54 persons (20 females and 34 males) participated in the study. Ages ranged from 21 to 44 years, with a mean of 27 years and 5 month (M=24,4 years for females and M=29,2 years for males). In the year 2005 a total of 173 persons (107 females and 66 males) participated. Ages ranged from 20 to 50 years, with a mean of 25 years and 6 month (M=26,4 years for females and M=24,7 years for males).

The results of both surveys made in 2004 [7] and in 2005 showed that students are prepared to take exams electronically. On the basis of the positive students' response we then performed a pilot e-testing. After the testing we checked the students' opinion again and compared the results before and after testing.

responses were captured before and after e-testing. The results before taking e-tests (see Table 2 and Figure 1) are statistically comparable with the results of the test groups of the years 2004 and 2005. Some minor deviations are probably the result of the low age of the last test group and their homogeneousness (the same generation and type of study).

Much more interesting are the results got after e-testing. It is obviously that the majority is enthusiastic about taking exams electronically (S1). Immediate feedback remains the main advantage of e-examinations (S2). After performing e-tests the students found e-examinations far more interesting and felt attracted to this kind of taking exams (S3). Students also stated that there is less possibility of cheating and that they believe in higher results evaluation objectivity (S8 and S5). It can be seen that students who first feared e-examinations and were anxious about the information communication technology (S6) found out that good prepared e-testing is relative simple. Students could focus on knowledge testing and had no problems with the computer technology. If we look at the statements S10 and S11 we can see that students who performed e-testing favor taking exams remote from school and anytime. The results of the last statement show that more than 62% of students would choose e-examinations in stead of classic tests and that no one would refuse it. Only by the fourth

Table 2. Comparing results taken before and after e-examination by statements.

	Strongly Agree				→		Strongly Disagree			
	1		2		3		4		5	
	Before	After	Before	After	Before	After	Before	After	Before	After
S1	33,3%	**58,3%**	33,3%	**16,7%**	20,8%	**20,8%**	8,3%	**0,0%**	4,2%	**4,2%**
S2	66,7%	**75,0%**	4,2%	**4,2%**	12,5%	**8,3%**	8,3%	**4,2%**	8,3%	**8,3%**
S3	33,3%	**54,2%**	25,0%	**20,8%**	16,7%	**12,5%**	20,8%	**8,3%**	4,2%	**4,2%**
S4	25,0%	**25,0%**	16,7%	**25,0%**	29,2%	**16,7%**	12,5%	**16,7%**	16,7%	**16,7%**
S5	29,2%	**41,7%**	20,8%	**20,8%**	37,5%	**20,8%**	8,3%	**12,5%**	4,2%	**4,2%**
S6	12,5%	**12,5%**	16,7%	**16,7%**	16,7%	**0,0%**	16,7%	**8,3%**	37,5%	**62,5%**
S7	8,3%	**12,5%**	12,5%	**8,3%**	0,0%	**0,0%**	16,7%	**4,2%**	62,5%	**75,0%**
S8	33,3%	**54,2%**	8,3%	**12,5%**	16,7%	**20,8%**	33,3%	**4,2%**	8,3%	**8,3%**
S9	25,0%	**41,7%**	16,7%	**25,0%**	25,0%	**20,8%**	33,3%	**8,3%**	0,0%	**4,2%**
S10	45,8%	**66,7%**	12,5%	**16,7%**	20,8%	**8,3%**	4,2%	**0,0%**	16,7%	**8,3%**
S11	45,8%	**62,5%**	12,5%	**12,5%**	12,5%	**12,5%**	16,7%	**0,0%**	12,5%	**12,5%**
S12	33,3%	**62,5%**	12,5%	**16,7%**	25,0%	**16,7%**	8,3%	**4,2%**	20,8%	**0,0%**

The comparison of students' opinions before and after taking e-exam was preformed with a test group of 24 students (8 females and 16 males). Ages ranged from 19 to 23 years, with a mean of 21 years (M=21,13 years for females and M=20,94 years for males). The students'

statement (S4) nothing has changed. The majority of students (75%) still think that e-exams should not be time limited. The differences about students' opinion about e-examinations of the year 2004 and 2005 and before and after e-testing are shown in Figure 1.
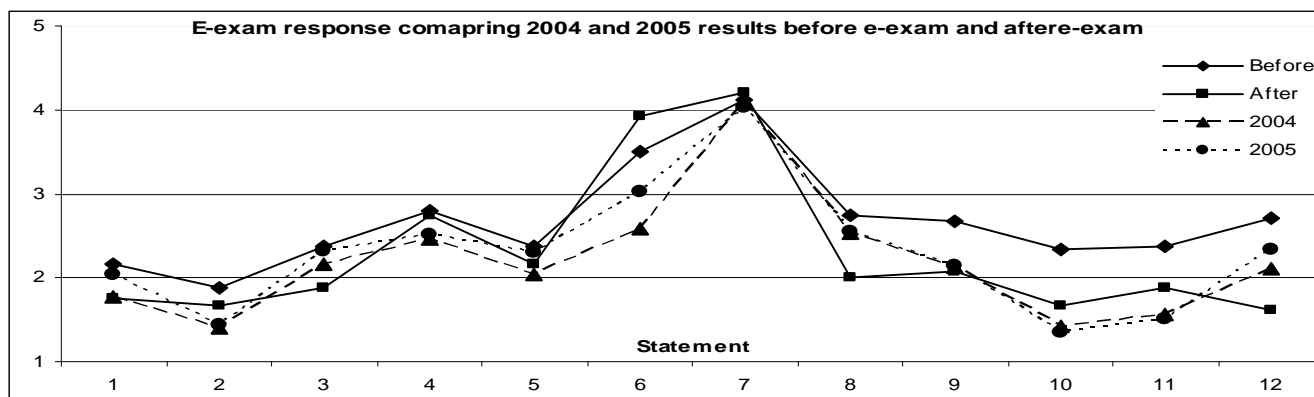
Figure 1. Comparing students' responses

5 Conclusion

The information-communication technology has a profound impact on our society and a great potential to enhance education. Students have the opportunity of studying at home or in a virtual classroom without time pressure; they can study at the time most appropriate for them. The feedback from the students involved in our survey confirmed the need for introducing electronic examinations whether in classroom or in remote locations, synchronous or asynchronous. At this time we are not yet familiar with all the effects of performing exams out of defined time and controlled location. So our further research will go in this direction.

The research showed that the majority of students support the aspiration for introducing e-examinations. Most of the problems arise on the side of teachers and institutions that are not capable of performing this kind of examinations because of insufficient knowledge and too little support. Therefore it is necessary to provide them technical support by preparing and performing electronic exams. With introducing of e-exams teachers will save on time. Students will gain on the objectivity because of the automatic test generation and institutions can assure the integrity of knowledge testing and reduce differences of testing in the scope of particular courses. That motivates students for learning and results in higher quality of educational process.

Motivated by the results we decided to use e-examinations by most cases where this is possible. To ensure the appropriate performing of e-exams and to reduce students' fear we will start with the combination of electronic and classic testes. By that we hope to increase students' trust in e-examinations and reduce fear from novelties and enable a fearless performing of e-tests also to those who are afraid of up-to date technology.

References:

[1] E-LEARNING CONSULTANT (2003) Glossary. Retrieved January 10, 2005,

[2] CHUNG, Q. (2005) Sage on the Stage in the Digital Age: The Role of Online Lecture in Distance Learning, Electronic Journal of e-Learning 3 (1), 1-14.

[3] THOMAS, P., PRICE, B., PAINE, C., & RICHARDS, M. (2002) Remote electronic examinations: student experiences, British Journal of Educational Technology, 33, 5, 537-549.

[4] SHERMIS, M.D, MZUMARA, H.R, OLSON, J., & HARRINGTON, S. (2001) On-line Grading of Student Essays: PEG goes on the World Wide Web, Assessment & Evaluation in Higher Education, 26, 3, 248-259.

[5] KLJAJIĆ, M., BERNIK, I., & SKRABA, A. (2000) Simulation Approach to Decision Assesment in Enterprises, Simulation, 75, 4, 199-210.

[6] GROUPSYSTEMS (2005) Retrieved January 5, 2005, http://www.groupsystems.com.

[7] JEREB, E., & BERNIK, I. (2005) Electronic examinations: student readiness. In A. Szücs and I. Bø (eds.), Lifelong E-Learning, Published by the European Distance and E-Learning Network, 526-531.

[8] PERCEPTION (2005) Getting Started with Perception Version 4. Questionmark Computing Ltd.

[9] JEREB, E., & SMITEK, B. (1999) Using an electronic book in distance education, Informatica, 23, 4, 483-486.