

# **E-LEARNING FOR E-LEARNING: REFLECTION ON TEACHER AND STUDENT EXPERIENCES IN AN E-LEARNING COURSE**

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*The paper discusses design and implementation issues of a university course on e-learning, delivered in mixed mode. Reflections on teacher and student experiences are made and conclusions are drawn with regard to content, delivery mode, instructional materials and online support.*

**Key words:** *e-learning, course support systems, e-learning standards*

## **INTRODUCTION**

The terms *flexible learning* (Van der Brande, 1993), *online learning*, *tele-learning* (Collis & Moonen, 2001), *e-learning* (Rosenberg, 2000; Cross & al, 2002; Clark & Mayer, 2003; Khan 1997), *blended learning* (Bielawski & Metcalf, 2002) have gradually penetrated the education systems worldwide. In Bulgaria, as well, more and more university teachers offer e-learning support to their traditional courses - the authors' first steps in integrating elearning elements in their teaching practices date back in the last decade (Nikolova & Collis, 1998; Nikolova, 1999; Nikolova, 1999a). Many universities in the country have developed their own e-learning platforms (*ARCADE, PeU, MSCS, ElSe, FLAME*). A *Bulgarian Virtual University* was established as a result of a national academic initiative, supported by the Ministry of Transport and Communications.

E-learning is nowadays a widely exploited topic for almost everyone involved in higher education or corporate training. Those who have experience with e-learning, already know that its design, development and delivery require a lot of thinking and a lot of effort. They have experienced the need of institutional support and of course support systems to facilitate course design and delivery. Learners exposed to e-learning have also their positive and negative experiences. It is time to reflect on the way through and inform with lessons learned those who will follow the e-learning wav.

This paper discusses design and implementation issues of a university course on e-learning delivered in mixed mode. Reflections on teacher and students experiences are made and conclusions are drawn with regard to content, delivery mode, instructional materials and online support.

## **COURSE DESCRIPTION**

**Target group.** The course "*eLearning*" (<http://www-it.fmi.uni-sofia.bg/courses/elearning2004/>) is an elective course for undergraduate students in Informatics, Mathematics and Informatics, and Applied Mathematics at the Faculty of Mathematics and Informatics, University of Sofia, offered in 2004 and 2005. It is a successor of the course "*Telematics and Distance education*" (<http://tdo.hit.bg>), which has been offered 4 times. So far both courses have been followed by approximately 150 students.

**Course goals.** The course is intended to help students build knowledge and practical skills to critically assess, design, develop and implement e-learning solutions.

**Course content.** During the course main e-learning concepts and issues are discussed, such as: notions and terms; models and methods; standards; technologies and software tools; design, development and evaluation of e-learning; student assessment and learning effectiveness; planning, organization and management of e-learning. Course examples are demonstrated and analyzed and

pro's and con's of e-learning are identified. E-learning course design and development methodologies are discussed and course support systems are studied and critically analyzed. These include Course Developer, TeleTop, ARCADE, e-College, Microsoft Class Server, Moodle, etc. Principle of modern Content Management Systems (CMS) and Learning Management Systems (LMS) are discussed.

**Student assessment.** To successfully complete the course the students are required to:

- prepare several assignments during the course and submit them to the instructors (via e-mail or through the virtual course environment), according to a pre-defined time schedule
- develop a final project – individually or in groups of two, present and defend it in front of the course participants.

Each assignment is graded individually and the final grade is a weighted score of the assignments' grades and the project grade, the latest having the highest weight.

**Delivery mode.** The course is delivered in mixed mode: weekly face-to-face sessions, supplemented by online and offline self-learning activities. In 2003 and 2004 the delivery of the course was mediated by specially developed course websites - <http://tdo.hit.bg> (2003) and <http://www-it.fmi.uni-sofia.bg/courses/elearning2004/> (fig. 1), while in 2005 the course was integrated in the open source e-learning platform MOODLE, <http://e-learning.fmi.uni-sofia.bg/moodle/> (fig. 2).

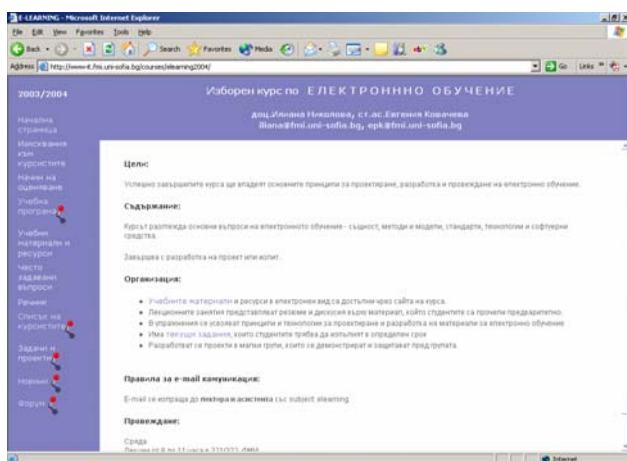


Fig. 1. E-learning 2004 course Web site Fig. 2. E-learning 2005 (integrated in MOODLE)

In this paper we focus on the 2004 course issue. The *News* section and the *online forum* embedded in the course Web site, as well as the standard e-mail, implemented the **course communication** between students and instructor and among students themselves. **Observation 1:** The traditional course horarium (2 lectures + 2 labs per week) doesn't fit more flexible learning modes, like e-learning. A better approach would be to define the overall student load for the course, e.g. 90 hours, and specify the expected distribution, e.g. 45 hours for face-to-face sessions, 15 – for offline self-study, and 30 – for online self-study activities. On the instructor's side: a new way for calculating the overall effort is needed, taking into account the different roles of the instructor in the course and the online support for the course – if it is already there (i.e. *a new issue* of an existing course) or it has to be built (*a new course*). **Observation 2:** This delivery mode was well accepted by the students, as the face-to-face sessions prevent them for “losing the link” and offer the possibility to discuss course issues and get immediate response, guidance and support by the instructors, while the rest of the course activities are flexible in time and can be scheduled at their own convenience.

**Instructional materials.** Course materials (fig. 3) were available online in the form of Power Point presentations (for the face to face sessions), Word or PDF files (for self-study) and links to external resources from the Internet (for the online activities). Next to this, on students disposal was a Course Reader (a collection of readings in hard copy; which contained mainly resources not

available electronically). The core material was specially developed for the course by the instructors. **Observation 3:** Protecting authorship and preventing unauthorized use of teaching material is an important issue, which we have left open for the moment.



Figure 3: Course materials and resources

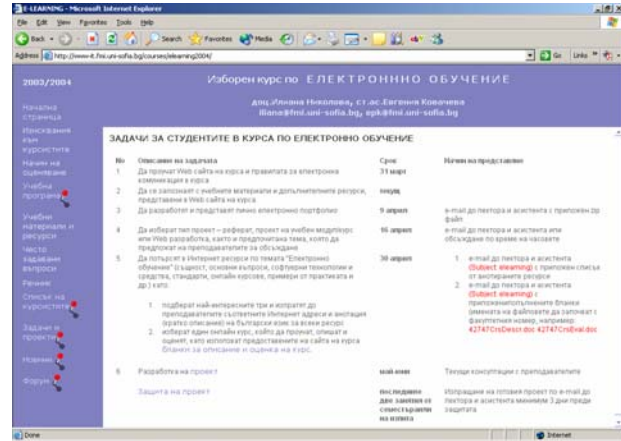


Figure 4: Student tasks

**Student activities.** Along with interaction with course materials and participation in face-to-face sessions, the student had to submit several assignments at certain moments in the course - the list of students tasks, deadlines and ways of submission were published in the course web site (fig. 4). The assignments included:

1. Prepare *an electronic CV* and submit it via e-mail to the instructors;
2. Develop *a personal Web page* and *a personal e-portfolio*
3. *Study the course web site structure and communicate the level of orientation* in it, including comments and recommendations for improvement;
4. *Search for e-learning resources* on the Internet, select 3 to 10 most interesting, study them in more depth, *annotate and recommend them* to the rest of the group (via e-mail to the instructors first, after which the annotated list of resources suggested by the students is published on the course website to be accessible for all course participants);
5. *Study, describe and evaluate two online courses.* This was probably the most unique and practically useful exercise during the course. The students were offered a list of courses, together with their URLs, from which to choose two courses for review. It was also possible to choose a course by themselves. Table 1 lists the evaluated courses. To guide the course analysis process and foster the attention of students to most important course design features, the instructor developed detailed forms for course description and course evaluation. These were explained at the face-to-face session, sent via e-mail to the whole group and were also available from the course website for download. Through this practical exercise the students got a deep insight on the course design, development and delivery aspects and developed skills for critical analysis and evaluation. The filled-in forms were submitted electronically to the instructors. They were later analyzed and summarized by one of the students within her final project.

Table 1: List of evaluated courses

HCI, Internet Technologies, Office Technologies, Instructional media and ICT in education, Telematics and Distance Education (DE), Multimedia in DE, Design, management and implementation of DE (DEMAND), Business on the Internet, Business telecommunications, ASP Programming, PERL Programming, Object-Oriented Programming with UML, Web databases, Mathematics morphology and applications, Fuzzy Sets.
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6. *Participate in two online discussions* through the course forum: “*Pro’s and con’s of e-learning*” and “*Basic skills, required for successful integration in the information society*”

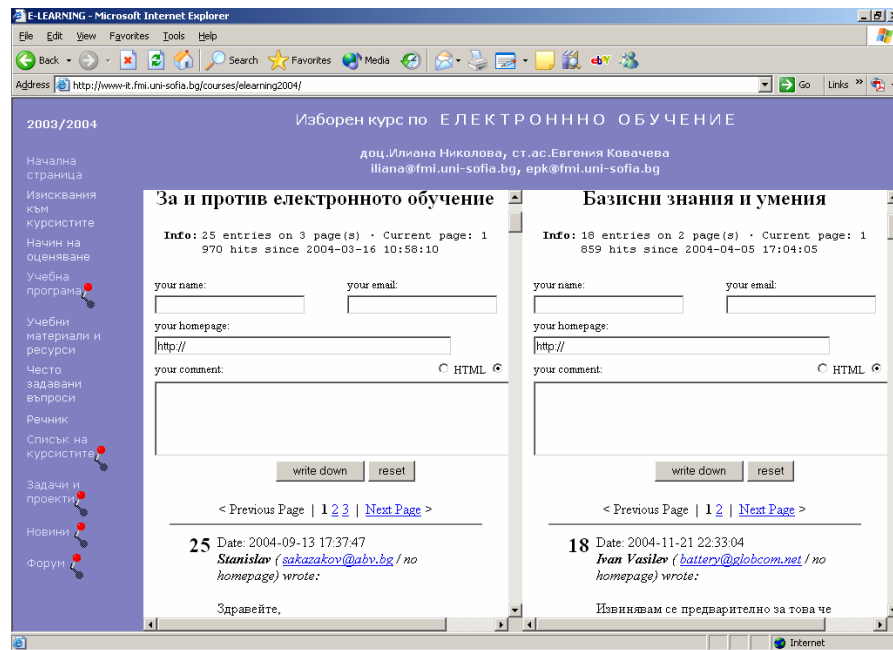


Figure 4: The online forum for participation in two thematic discussions

7. **Develop and defend a final project.** Each student had to choose a topic for the final project from a list of possibilities, suggested by the instructors, or propose and discuss with the instructors a self-chosen topic. The students could choose the *type* of the project (research or development) depending on their preferences and abilities (some students were more confident in developing internet applications, others weren't that experienced). Despite of the type, all topics were related to e-learning and allowed for the students to learn something new and/or deepen their knowledge and understanding for certain aspects of e-learning. All students had to consult their project work with the instructors through the process, improve it according to the feedback received, submit the final version electronically for upload on the course website and, finally, present and defend the project in front of the course audience. The last few sessions of the course were devoted to final project presentations. After each presentation there was a whole group discussion on both the project implementation and the way it was presented. This was another exciting and useful experience, as the students had the opportunity to learn from each other – both from achievements and from mistakes. They were encouraged and taught how to make constructive criticism without insulting the authors, as all of them made a significant effort to come to this last point in the course. Table 2 gives an orientation about the course projects.

Table 2: Project topics

<p><b>I. Research Projects (Papers/Presentations)</b>  Distance Education – is it relevant for Bulgaria?; Distance education for disadvantaged students;  Summary of course evaluations done by students; How to design Web-based courses;  Overview of eCollege Course Support System; Overview of Microsoft Class Server  Overview of WebCom Course Support Tool; Transferability of courses (migrating a course to ARCADE)</p> <p><b>II. Development Projects:</b></p> <p><b>a) e-Learning Courses</b> (course starters, not full courses; the emphasis is more on the course design and features of the online environment, rather than on the content):  An eLearning Course on Infinite sequences  An eLearning Course on MS Access: Interactive tables and publishing on the Web  An eLearning Course “Italian for Bulgarians”  An eLearning Course on Java  An eLearning Course on Java Data Objects  An eLearning Course on Prolog  An eLearning Course on SQL</p> <p><b>b) Course Support Tools (CST):</b>  A prototype for a web-based CST</p>
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**Job aids.** A number of *job aids* were developed by the instructors to help students in their work in the course. For example: *Course description* and *Course evaluation forms* (Table 3 and Table 4), a template for the final project description, etc.

*Table 3: Course description form*

This form required the student to carefully study the design of the selected course and to describe: target group, course objectives, entry requirements, duration, delivery mode, content organization and structure, presentation of course materials and resources, course interaction and communication, student assessment method, roles of the students and the instructor, employed software technologies and tools. Finally, to provide a summary of the course and an overall evaluation, indicating the strong and weak aspects of the course and stating recommendations for course improvement.
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*Table 4: Course evaluation form*

This form required the students to provide quantitative assessment of certain aspects of the course according to a 5-grade scale, as well as an overall score. The aspects to be evaluated were: clear definition of course objectives; clearly presented content; relevant course organization, course materials and learning activities, student tasks; course communication, level of interactivity, quality of the online course environment.
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**Reflection on teachers' and students' experiences.** The mixed delivery mode is more flexible and convenient for the students, but more engaging and time consuming for the teachers. Below students' course evaluations are summarised.

The highest graded aspects are *course content* and *its web-presentation*. Almost all students think that the content provided is very rich and thorough, and well structured and sequenced. Content presentation and navigation through it is adequate and intuitive. Course goals are not always clearly specified. Entry and final testing, as well as material for self-testing, is reported as desirable by students, but not frequently observed. Same goes for certification. Shortage of practical assignments is mentioned in isolated cases.

The lowest graded aspect is the *course communication* (when interpreting this, it should be taken into account that most of the evaluated courses are not intended to be delivered fully online – there is face-to-face instruction as part of the study process, i.e. the communication embedded in the course web site, if any, is not the only communication in the course). The majority of students express dissatisfaction about the course communication. They mention that two-way communication with teachers, online forums, and communication among students themselves should be embedded in any online course environment.

Finally, the students outline the following positive sides of e-learning: flexibility in time and space, access to huge amounts of useful information, easy and intuitive navigation through the learning material, interactivity of the course environment. As negatives they point out the insufficient feedback and communication, shortage of practical assignments, unclear requirements about the entry knowledge, lack of monitoring and control by the teacher over the learning process, lack of certification, slow loading of online materials.

At the end of the course, after receiving their final grade, the students were asked to fill in a *final course evaluation questionnaire*. They were asked to share their overall opinion about the course and to evaluate the content, organization and delivery, quality of teaching and usefulness of the course. They were invited to point up to 3 strong and up to 3 weak aspects of the course and to give recommendations for improvement. Finally, they were asked to compare the effectiveness of e-learning and traditional learning and to express their attitude towards e-learning.

## CONCLUSIONS

*From student perspective:* The overall opinion of students is that online courses offer a convenient way of learning, but some course aspects need better handling. Without any doubt, there are aspects of the traditional way of learning, which are irreplaceable, e.g. the direct contact with the teacher with immediate feedback, but the flexibility and accessibility of e-learning is something that can not be ignored, as it provides for better self-management of the learning process.

*From teachers' perspective:* Utilization of functionally rich and robust CMS/LMS, supporting modern e-learning standards and specifications (SCORM, QTI, IEEE) is necessary in order to

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support sharing and reuse of learning objects and to ease the transferability of courses across platforms and institutions. Quality assurance, cost effectiveness, protection of authors' rights are important issues which are still open in many practical cases.

#### REFERENCES

1. Bielawski, L., Metcalf, D. (2002). *Blended eLearning*. Human Resource Development Pr. ISBN: 0874257174.
2. Clark, R. C., Mayer, P. E. (2003). *e-Learning and the Science of Instruction*. Pfeiffer, ISBN: 0787960519
3. Collis, B., Moonen, J. (2001). Flexible learning in a digital world: Experiences and expectations. London: Kogan Page.
4. Cross, J. A., Dublin, L., Cross, J. (2002). *Implementing E-Learning*. American Society for Training and Development (ASTD).
5. Khan, B. (1997). *Web-Based Instruction*. Englewood Cliffs, New Jersey
6. Nikolova, I. (1999) Reshaping Academic Practices through Multi and Hyper Media. In *Collis, B, Oliver, R. (Eds.) Proceedings of ED-MEDIA '99*, pp. 36-49. AACE, USA.
7. Nikolova, I. (1999a) Teaching and Learning via WWW: Methodology and Tools. In *Book of Abstracts, Euro-Med Tele'99 conference*, Tel Aviv, Israel.
8. Nikolova, I., Collis, B. (1998) Flexible Learning and Design of Instruction. *British Journal of Educational Technology, ISSN 0007-1013*. Vol. 29 (1), pp. 59-72.
9. Rosenberg, M. J. (2000). *E-Learning: Strategies for Delivering Knowledge in the Digital Age*. McGraw-Hill Trade.
10. Van den Brande, L. (1993) *Flexible and distance learning* Chichester UK: John Wiley.

#### Internet sources:

1. ADL SCORM (<http://www.adlnet.org/Scorm/>)
2. Dublin Core (<http://purl.oclc.org/dc/>)
3. IEEE LTSC LOM (<http://ltsc.ieee.org>)
4. IMS Global Learning Consortium (<http://www.imsproject.org>)
5. Bulgarian Virtual University (<http://ecet.ecs.ru.acad.bg/bvu/>)
6. ARCADE, Sofia University e-learning platform (<http://e-arcade.net>)
7. ElSe, Rousse University e-learning platform (<http://ecet.ecs.ru.acad.bg/else/>)
8. MSCS, Technical University-Sofia e-learning platform (<http://demlab.tu-sofia.bg>)
9. PeU, Plovdiv University e-learning platform (<http://peu.acad.bg>)

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