

Real Quality Distance e-Learning – Real Challenges: Case in Faculty of Mathematics and Informatics, Sofia University

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Abstract: *This paper presents shortly actions performed in the process of preparing for academic accreditation of Master of Science programs at Faculty of Mathematics and Informatics at Sofia University (FMI-SU), Bulgaria. The main issue researched is how to guarantee provision of education in distance e-learning form at FMI-SU with required level of quality, corresponding to the National Evaluation and Accreditation Agency (NEAA) criteria in Bulgaria and to the traditions of the FMI-SU as leading institution in the field of Mathematics and Computer Science. It focuses on NEAA requirements and their implementation at the level of the e-learning distance course. The illustration of the steps done is by an experimental e-learning distance course, challenges faced during its pilot delivery and solutions chosen.*

Key words: *electronic distance education, e-learning, quality of e-learning distance education*

INTRODUCTION

In the era of computer networks when the things connected to the Internet exceed the number of people in the world [2] and expectations for the very near future are people, processes, data and things to become the four 'pillar' of the Internet, the young generation expects a new, more dynamic and mobile form of learning, ensuring to the students full access to course content at any time from any place. The project "Development of electronic forms for distance learning in the system of higher education" is an attempt to give the beginning of the accredited electronic distance learning in the Faculty of mathematics and informatics of the Sofia University. FMI-SU has long traditions in use of e-Learning as a part of the regular university learning process. In particular, the department of Information Technologies developed its own learning models and frameworks as early as in 1996. Since 2002, the Moodle system is used to support online courses in FMI-SU, but it was not applied in a real distance education (DE) form.

The above mentioned project aims to prepare distance form of several Master of Science programmes, offered by FMI-SU ("Elearning", "Information Systems", "Distributed Systems and Mobile Technologies", "Technologies for Education in Mathematics and Informatics") for accreditation by the Bulgarian National Evaluation and Accreditation Agency (NEAA).

The main research goal of this paper is to investigate the process of preparing for accreditation in e-learning distance education in Bulgaria. For this purpose one example course was designed complying with the requirements of Bulgarian NEAA, challenges faced during its pilot delivery were described, solutions chosen were presented and analysis of results was made. The paper is structured as follows. We start with short presentation of state of the arts in distance education accreditation. In the next section we outline the main Bulgarian NEAA criteria for distance education accreditation and show in parallel how one example DE course in FMI-SU complies with these requirements. After that we outline the piloting workflow and briefly describe the environment and tools for delivery of DE courses. The last section presents DE e-learning challenges faced during the piloting and solutions chosen. Finally, results were analyzed, conclusions made and future plans outlined.

STATE OF THE ART

On September 2001 in Brussels a seminar on the topic "EU Policies and Strategic Change for e-Learning in Universities" was held from almost all EU Member States. This seminar ended with the conclusions:

- While accrediting Universities within EU, the extent to which they use ICTs in their educational and scientific activity shall be evaluated on the first place.

- A numerical criterion for determining the extent to which ICTs are used was formulated – the number of Web-based courses offered.

- General requirements on the web-based courses offered by a University were specified. According to these requirements, a web-based course must contain annotation of the subject matter; course syllabus; recommended bibliography; lecture notes; seminars; assignments and test for self-control and control by a mentor; exam synopsis; information on the team of course lecturer(s), course assistant(s), course instructor(s); classes schedule ; current announcements.

- The concept of “Virtual Laboratory” was defined as a set of web-based programming models of real devices and systems, with which students work within order to improve their theoretic knowledge and practical skills”.

This topic was investigated in many research papers ([3], [4], [5], [6], [8]).

At Europe several associations were founded to deal with distance education quality and standards: European Association for Quality Assurance in Higher Education (ENQA), European Association of Distance Teaching Universities (EADTU), European association of distance learning (EADL), The European Distance and E-Learning Network (EDEN), The European Foundation for Quality in E-Learning (EFQUEL).

The current trend is each European country to delegate this quality assurance task to their own national accreditation organisation following ENQA policies, standards and practices. In Bulgaria the respective organization is National Evaluation Accreditation Association. It published their new standards regarding distance education accreditation in the summer of 2013.

NEAA CRITERIA FOR DISTANCE EDUCATION AND THEIR IMPLEMENTATION

The specific requirements of the Bulgarian NEAA for successful accreditation of a program of study in distance form of education were published in the summer of 2013 [1]. These specific requirements include four specific groups:

- educational goals and documentation (quality of documentation and adequate admission rules and practices);
- quality of the team (all needed roles covered and each member has the needed competences);
- infrastructure (technical quality and sustainability);
- contemporary and innovative educational methods (actuality, quantity and quality of learning resources, implementation, methodology, support).

For each specific sub-group set of measurable indicators were proposed and used for the overall evaluation of the program.

We choose one of the implemented e-learning courses (“Introduction to computer networks”) to demonstrate how all needed features are made available. Below we shortly describe the measures taken to guarantee that in this template course we were able to meet each particular performance indicator for each quality sub-group.

To meet the performance indicators for the first criterion (educational goals and documentation), the exemplary course is registered in the learning environment and in its common section the following blocks were published (Fig.1):

- main goals, expected results and topics discussed in the course;
- course annotation which explains the subject of the course;
- curriculum references;
- list of knowledge and skills as preliminary requirements for course attendance.

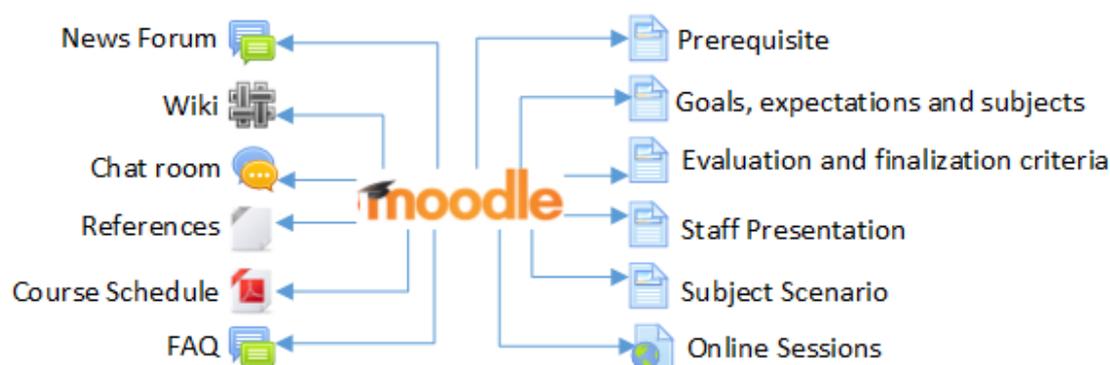


Fig.1. NEAA required components of an e-learning course

In order to meet the second group of requirements (the staff and its competences for preparation, implementation and supporting DE), we developed a register with clear specification of the team members' roles and responsibilities (Fig.1). The described e-learning DE course template contains a detailed list with (1) professors and assistants, (2) administrators accountable for technological and logistic support, and (3) technical people responsible for maintenance of technical equipment and ensuring seamless communication. In addition to the official duties this record links to YouTube channel with short movie presentations of each staff member.

The third group of requirements (infrastructure establishment and its sustainability) was addressed by informing students about the used DE technical and communicational tools and providing them with a guide to information resources and access organization (Fig. 1). In the virtual learning environment for the pilot course documents were provided with full description of communication methods, complete list of technology tools with URLs for downloading them, and course schedule with all actualisations if any. An archive copy of the course is stored in a backup server for restoring the infrastructure in case of failure or damage.

The last NEAA DE requirements refer to the actuality and sufficiency of the developed virtual learning resources, the various forms of synchronous and asynchronous communication, the individual and group interactions between learners and professors in using DE resources (Fig. 1). In addition we established a special methodological group for assistance and consulting services to course authors and teachers in creation of the curricula. The described experimental course was created and conducted with the full support of this unit and following its recommendations. This group developed contemporary methodology guide to be used from all faculty staff with latest educational innovations using the best examples from the literature as well as the experience of all the faculty staff gained in numerous international research projects in this field.

WORKFLOW, ENVIRONMENT AND TOOLS OF E-LEARNING COURSES

For the pilot delivery of courses we used the open source e-learning software platform Moodle (<https://moodle.org/>). It provides rich set of user roles to satisfy all stated in the previous chapter NEAA requirements.

The example course has been used as a template to create all other courses in the e-learning platform. Especially developed support centre [7] helped to create courses in the system and register all participants with their respective roles.

After the creation of the pilot courses, their advertisement started through different online media and channels. Special Facebook page is created (Fig. 2). DE announcements for forthcoming courses are publishing to variety internet channels - Sofia University official website, FMI website, FMI Student Council website, DE project Facebook group, DE project Facebook page, DE project Google+ page and other

Facebook pages and groups. To make courses as open as possible for students at Sofia University, the announcements contain all required data to access DE courses – online address, enrolment key and prerequisites.

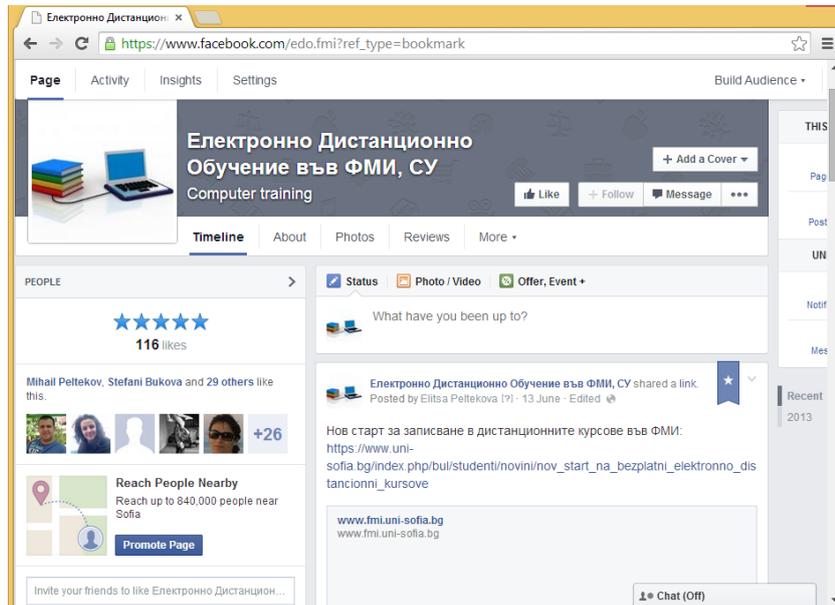


Figure 2. FMI e-learning DE Facebook Page

The very first thing newly subscribed students have to do in each e-course is to complete an online questionnaire on preferred day of the week and start time for the online classes. The proposed options in this poll are most consistent with the loaded students' curriculum during the semester and with the fact that many of them work in business.

During the delivery of DE classes a wide range of synchronous and asynchronous training tools intertwine and complement: the whole range of student-centred tools beyond the time limitation - discussion forum which enables teachers and students to exchange group message, news forum for general announcements, frequently asked questions pages, a wiki module with a collection of collaborative web documents, files download and upload, exercises and control assessments, quizzes and records from online session.

For better teaching and learning process the course includes real-time communication and collaboration tools like virtual online classroom such as Cisco WebEx (<https://ciscolearning.webex.com>), BigBlueButton (<http://bigbluebutton.org>) and their components. For live conversations Moodle chat room is used as well.

According to NEAA requirements, few face-to-face sessions were included in courses: the first meeting at which students get acquainted with all electronic resources they need to know for classes' participation; face-to-face consultations; and course exam including the final theoretical test and skill assessment.

At the end of each course students receive course completion certificates and give their feedback for future DE improvements.

E-LEARNING CLASSES CHALLENGES AND SUGGESTED SOLUTIONS

Creating and maintaining courses in electronic distance form in Faculty of mathematics and informatics raises questions and challenges for discussion. It is possible to divide them into two categories: organizational issues and methodological challenges.

The most obvious organizational issue was to guarantee for each participant working place, satisfying minimal hardware and software requirements. For this purpose

these requirements should be made clear and explicit in the course description in the e-learning platform. In addition, for face-to-face sessions FMI provided computer rooms for free access to students satisfying all these requirements. A virtual environment was provided helping students to download and install the needed software.

Other minor organizational issues include how to communicate with students willing to participate in a course, how to enrol students having no user account in the course management system, and how to communicate with students facing various organizational problems like missing learning tasks, lacking time, etc. To solve these problems we use the corresponding strong features of the Moodle system for communication and enrolment.

Most difficult challenges were related with various methodological issues – how to help university professors to use modern electronic tools, to improve significantly their computer literacy, to help them to redesign course materials in order to explore the full strength of the new e-learning platform, and to introduce new interactive forms of communication and monitoring student's progress. Another important methodological challenge was related to improve the course designers' competences to work with new media (text, images, voice, animations and video) and how professors to use video lectures and online discussion tools. In order to solve these issues a series of short courses for course designers and lecturers were performed, and experts in special methodology support centre were provided to help university professors on demand. With its four units this centre assist in (1) developing of DE courses and establishing criteria for assessing the quality of education, (2) providing administrative services, (3) technology maintenance and systems administration and (4) ongoing support of professors and students in conducting electronic DE.

Another challenge to course instructors was how to simulate practical activities and laboratory studies. To solve these challenges we needed to install additional open source simulation applications which enable practical activities and labs or take the advantages on free online simulation websites.

Online exams and tests were the most difficult issue. We needed to provide the full strength of the Moodle platform together with modern authentication techniques to guarantee that all students are taking seriously and honestly all their responsibilities. A large database with quiz questions was created to guarantee rich enough variety of exam versions for every individual student.

RESULTS, CONCLUSIONS AND FUTURE WORK

The presented research shows that distance e-learning at FMI-SU is well ground and prepared for academic accreditation.

At the time of writing this article 44 DE courses have been developed and conducted with about 1300 university students, some of them studying abroad for a term benefitted from Erasmus programme. Based on the feedback surveys' results most of the students evaluate DE courses at 'great level'. Learning materials are assessed as 'strictly classified', the anytime access to them, flexible schedule, saving time and the availability of records from online sessions are regarded as one of the greatest benefits of DE. The use of simulation software as replacement of using real technical equipment is estimated as important improvement in relation to pure distance mode. Currently 100% of students declare their desire to participate in more DE courses and express their gratitude to the teaching staff.

It is very important for lecturer to be agile, attractive and systematic in his/her teaching attitude in new electronic environment. Adapting from traditional form and methods of education requires from teacher to adjust teaching style to the new environment not allowing students to feel isolated by the trainer and classmates.

The constant uninterrupted provision of online assistance to the DE e-learning participants is planned also to be available for the next semester. In that direction the

Kayako open source system (<http://helpdesk.fmi.uni-sofia.bg/>) has been tested and is going to be used. It will allow providing help desk and customer service for distance education form in FMI via e-mails, live chat, web and phone conversations.

Next year the NAAE will evaluate all efforts to put the strong ground for provision of the high quality of distance e-learning education at FMI-SU. The research described makes us confident that the FMI-SU will be ready to answer of all the requirements. But for us it is even more important to answer of the nowadays learner expectations and to be ready to face newly coming challenges.

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The paper has been reviewed.