

eLearning program financed by ADA



eLearning Toward Effective Education and Training in the Information Society

Proceedings of the eLearning Conference

July 2007,
Belgrade, Republic of Serbia



Chair and Editor: Danijela Scepanovic,

Contributors and Participants:

Bajcetic Milos	Lazarevic Bojan	Stefanovic Milentije
Baltic Vladimir	Lazarevic Sasa	Stevanovic Dragan
Baric Karmelka	Mandic Vesna	Stevenovic Dragoljub
Borota Jelena	Mikic Vesna	Stojanovic Vladimir
Borovic-Labudovic Milica	Milislavljevic Slobodan	Tingle Jasna
Bosic Martina	Milivojevic Vladimir	Vuckovic Dusan
Bugarski Dusan	Milosevic Milos	Vulovic Dejan
Cvjetkovic Vladimir	Mitrovic Slobodan	Vulovic Snezana
Ceh Arpad	Naumovic Milica	Zimmer Kristijan
Cicovacki Milica	Nedeljkovic Nebojsa	Zivic Fatima
Davidovic Mirjana	Franz Niederl	
Devedzic Goran	Nikodijevic Ana	
Drakul Goran	Ostojic Goran	
Drakulic Ratko	Pavlovic Nenad	
Djordjevic Biljana	Pejcic Tarle Snezana	
Djordjevic Igor	Ponjavic Zoran	
Eric Milan	Predic Biljana	
Feiner John	Predic Bratislav	
Filipovic Luka	Pribela Ivan	
Gogov Kosta	Radulovic Aleksandra	
Grujovic Nenad	Rakic Dragan	
Jakovljevic Zoran	Rankovic Vesna	
Jankovic Dragan	Santrac Petar	
Janjic Mileta	Saucovic Ivana	
Jovanovic Slobodan	Stanic Bozidar	
Komlenov Zivana	Stankovic Dejan	
Krstajic Bozo	Stefanovic Miladin	

For further information, please contact:

Wus Austria, Office Belgrade
Ohridska 11, 11 000 Belgrade, Republic of Serbia
Phone: +381 11 2432 084
Fax: +381 11 2438 991
E-mail: belgrade@wus-austria.org

The authors are responsible for the choice and presentation of facts contained in this publication and for the opinions therein which are not necessarily those of WUS Austria.

Table of Contents

Foreword	5
Executive Summary	7
E-Organization-The Outback Becomes Standard “eLearning at the Organizational Level” <i>F. Niederl, J. Feiner</i>	9
eLearning of Engineering Graphics <i>Z. Zivkovic, N. Pavlovic, M. Milosevic</i>	17
Development Of Metal Forming Electronic Instructional Resources <i>V. Mandic, M. Stefanovic, F. Zivic, M. Plancak, M. Janjic</i>	24
Laboratory Experimental Setups for Measurement and Control via Internet <i>M. Stefanovic</i>	32
Results of Transformation of Traditional “Linear Structural Analysis” course into the eLearning course <i>M. Zivkovic, R. Slavkovic, S. Vulovic, R. Vujanac</i>	41
The Introduction Of eLearning In Business Law Course <i>A. Nikodijevic</i>	47
Experiences and achievements <i>D. Stevanovic, M. Ciric, S. Simic, V. Baltic</i>	53
Web-based course-supporting and eLearning system for courses in informatics <i>Z. Budimac, M. Ivanovic, Z. Putnik, Z. Komlenov, I. Pribela</i>	63
Creation of eLearning content for Rapid prototyping course <i>N. Grujovic, D. Divac, V. Milivojevic</i>	69

Introducing eLearning concept at the Faculty of Transport and Traffic Engineering, Belgrade University - small steps towards big achievements <i>S. Pejcic-Tarle, S. Cicevic, M. Davidovic, D. Petrovic, N. Bojkovic</i>	74
ELITE - eLearning IT environment <i>D. Jankovic, D. Vuckovic, P. Rajkovic</i>	80
Web Point for Teachers <i>M. Ristic</i>	88
eLearning and online course development - Andragogy of Communication and Media <i>B. Lazarevic</i>	91
Thoracic Surgery eLearning course <i>S. Milisavljevic, D. Vulovic, N. Milivojevic</i>	97
Development of University professors eLearning skills Introduction to eLearning and LMS - Blended Course <i>M. Bajcetic, J. Zugic, L. Stergioulas, M. Bosic J. Kostic, M. Labudovic-Borovic, J. Marinkovic</i>	105
Internet-Mediated Process Control Laboratory <i>M. Matijevic, V. Cvjetkovic, M. Stefanovic, V. Rankovic, D. Stevanovic</i>	111
Implementation of eLearning at the Faculty of Civil Engineering, Subotica, Serbia - Should the creators of long distance learning courses become aware of didactics guidelines for advanced training? <i>K. Baric, P. Santrac, D. Kukaras</i>	118
Remote Experiments In Control Engineering Education Laboratory <i>M. Naumovic, D. Rancic, V. Stojanovic, K. Gogov, B. Predic, A. Dimitrijevic, D. Mijic</i>	129
Implementation of the eLearning Project on University of Montenegro (eLearning Centre Podgorica) <i>B. Krstajic, A. Radulovic</i>	135
Annex 1	139
Annex 2	143
Annex 3	146

Foreword

In emerging complex societies, there is a clear need for sound education systems equipped with effective means to create and distribute knowledge. Therefore, in most developed countries, issues related to education and training are getting more attention and are often placed on top of the policy maker's agendas.

In transition countries such as Republic of Serbia and Republic of Montenegro, education still doesn't have full attention, usually being overshadowed by other burning issues related to stability, democracy, economy, etc. Nevertheless education community uses its creativity and strength to come out with various education development programs although relying on scattered initiatives and enthusiastic leaderships. A great part of those efforts wouldn't be possible without donor support present in the region for almost a decade and intensified since 2001.

One of such programs is eLearning Program implemented from 2005 to 2007 by WUS Austria and financed by Austrian Development Agency.

eLearning Program aimed at widening access to educational resources and improvement of education services. It was designed to contribute to the development of eLearning in the area of Higher Education.

Program had four main components:

- 1. Support to eLearning Task Force** - counselling activities, knowledge transfer and support to eLearning policy development at the national level.
- 2. Support to eLearning Centres** - support to institution development at the university level.
- 3. Grants for eLearning Projects** - grants for projects developed at the faculty/university level.
- 4. eLearning Conference** - meetings, seminars and final conference organized by WUS Austria aiming at information sharing, dissemination of knowledge, capacity building, etc.

More than 150 university teachers and experts were involved in the eLearning Program that contributed to strengthening of role of open and distance learning, diversification of educational delivery systems and technology use in teaching and learning process.

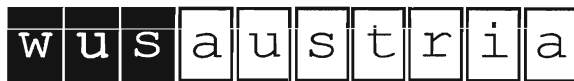
This book contains the Proceedings of the eLearning Conference organized by WUS Austria, in Bijela, Montenegro, from 30th June to 1st July 2007. The conference served as platform for:

- presenting overall achievements of the eLearning Program and activities of university eLearning centres,
- presenting achievements of the eLearning Project Groups that have implemented eLearning Projects at the university/faculty level,
- information exchange and discussions coming after expert inputs (presentations),
- development of recommendation papers at the workshops held during afternoon sessions.

Also, presentations and discussions at the eLearning Conference served as milestone for evaluation of achievements and setting up directions for further activities in this area.

WUS Austria would like to express its sincere thanks and gratitude to all experts, moderators, representatives of university managements and participants of the eLearning Conference, particularly to coordinators of eLearning Centres coming from Universities of Belgrade, Kragujevac, Nis, Novi Sad and Podgorica.

WUS Austria



right to education

financed by

Austrian

 Development Cooperation

World University Service - Austrian Committee
Head Office Graz, Heinrichstrasse 39, A-8010 Graz

Local Office Belgrade
Ohridska 11
11000 Belgrade
Phone: + 381 11 243 2084
Fax: + 381 11 243 8991
belgrade@wus-austria.org
www.wus-austria.org

Local Office Podgorica
Cetinjski put b.b.
81000 Podgorica
Phone: + 382 81 245 007
Fax: + 382 81 245 007
podgorica@wus-austria.org
www.wus-austria.org

Creation of eLearning Content for Rapid Prototyping Course

Nenad Grujovic, PhD

Faculty of Mechanical Engineering, University of Kragujevac

Dejan Divac, PhD

Faculty of Civil Engineering, University of Belgrade

Vladimir Milivojevic, BSc

Faculty of Mechanical Engineering, University of Kragujevac

1. Introduction

This paper presents results achieved within realization of WUS Austria eLearning programme project entitled "Creation of eLearning content for Rapid prototyping course". At the beginning of the project, an analysis of existing teaching methodology was carried out with eLearning and LMS use in mind. The results of the analysis were new course features identified as suitable for use with LMS (multimedia presentation, forums, self-evaluation, and electronic test). According to these results, the creation of eLearning content was initiated. The material was created within planned activities, and was made available to students attending the course in winter semester of school year 2006/07.

2. Connection with previous activities

The development of Rapid Prototyping course, which preceded this project, was also in cooperation with WUS - Austrian Committee. The project was in framework of Course Development Plus Program (CDP+) No. 141/2004 by the title "Rapid Prototyping". At closing ceremony of CDP+ 2004/2005 programme, World University Service - Austrian Committee issued a document in recognition of the efforts made by Prof. Nenad Grujovic, of The Faculty of Mechanical

Engineering, Kragujevac, to produce the best course "Rapid Prototyping" within the CDP+ 2004/05 for the universities in Serbia.

From year 2002 - 2005 Prof. Nenad Grujovic successfully coordinated Tempus Joint European Projects UM-JEP-17119 entitled "Educational Network Based on Information Technology" which was aimed at establishing distance learning facilities (teleconferencing rooms) and introduction of eLearning with development of web course management system. In accordance with this project, eLearning Centre at University of Kragujevac was founded with help of WUS Austria eLearning grant.

This eLearning project may be recognized as continuation of above mentioned CDP+ project N°141/2004 and Tempus UM-JEP-17119.

3. Rapid Prototyping eLearning Project

Rapid Prototyping is the automatic construction of physical objects using solid freeform fabrication. The first techniques for rapid prototyping became available in the 1980s and were used to produce models and prototype parts. Today, they are used for a much wider range of applications and are even used to manufacture production quality parts in relatively small numbers. Also, some sculptors use the technology to produce complex shapes for fine art exhibitions.

These methods are developing quickly and steadily and have progressed from being tools for fast product development to becoming tools for fast product formation. The entire product formation process comprising product development, development of production facilities and production it self is therefore considered here. Nevertheless, the early stages of product development have special significance for success of a product in the market.

Rapid prototyping takes virtual designs from computer aided design (CAD) or animation modeling software, transforms them into cross sections, still virtual, and then creates each cross section in physical space, one after the next until the model is finished. It is a process where the virtual model and the physical model correspond almost identically.

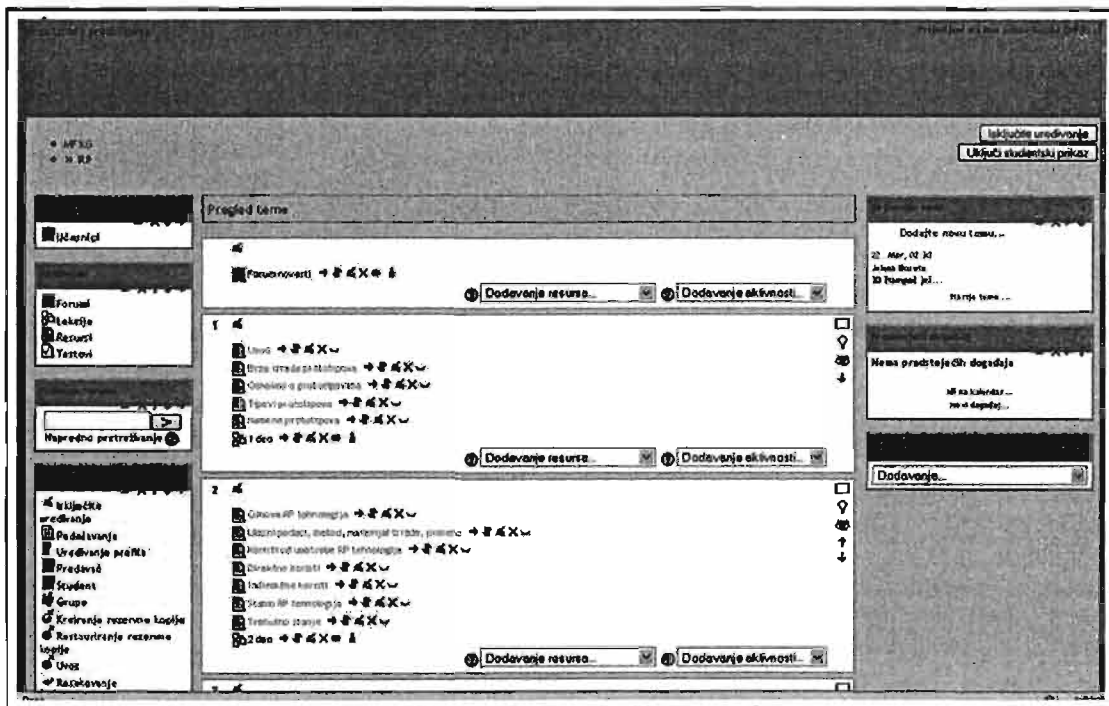
In additive fabrication, the machine reads in data from a CAD drawing and lays down successive layers of, in our case, powdered material, and in this way builds up the model from a series of cross sections. These layers, which correspond to the virtual cross section from the CAD model, are glued together or fused (often using a laser) automatically to create the final shape. The primary advantage to additive construction is its ability to create almost any geometry

(excluding trapped negative volumes).

The standard interface between CAD software and rapid prototyping machines is the STL file format.

The word “rapid” is relative: construction of a model with contemporary machines typically takes 3 to 72 hours, depending on machine type and model size. Used in micro technologies “rapid” is correct, the products made are ready very fast and the machines can build the parts in parallel.

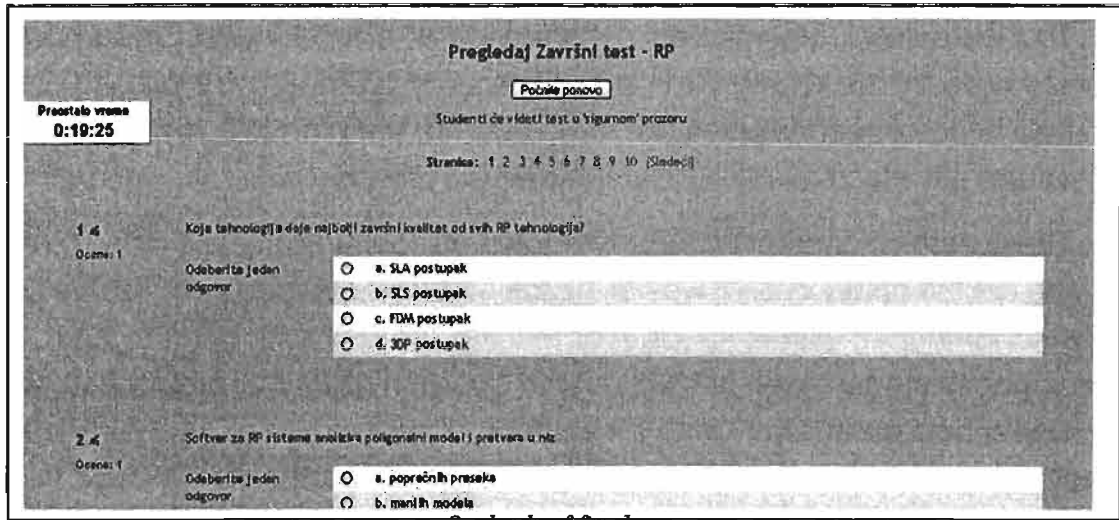
The eLearning content for Rapid Prototyping course is created within Moodle LMS. The course duration is 15 weeks, so the material is divided in 15 topics. Each topic is subdivided to pages suitable for reading using branch table system, and between pages students are presented with question related to previously shown page. Depending on answer given by student, either next page will be displayed (correct answer), or student will be instructed to reread the same page (minor misunderstanding of the matter) or even the whole topic (major misunderstanding of the matter). This way the student is provided with methods for self-evaluation, and the teacher can monitor students’ activities within a topic.



Rapid Prototyping course on www.eLearning.kg.ac.yu/mfkg/

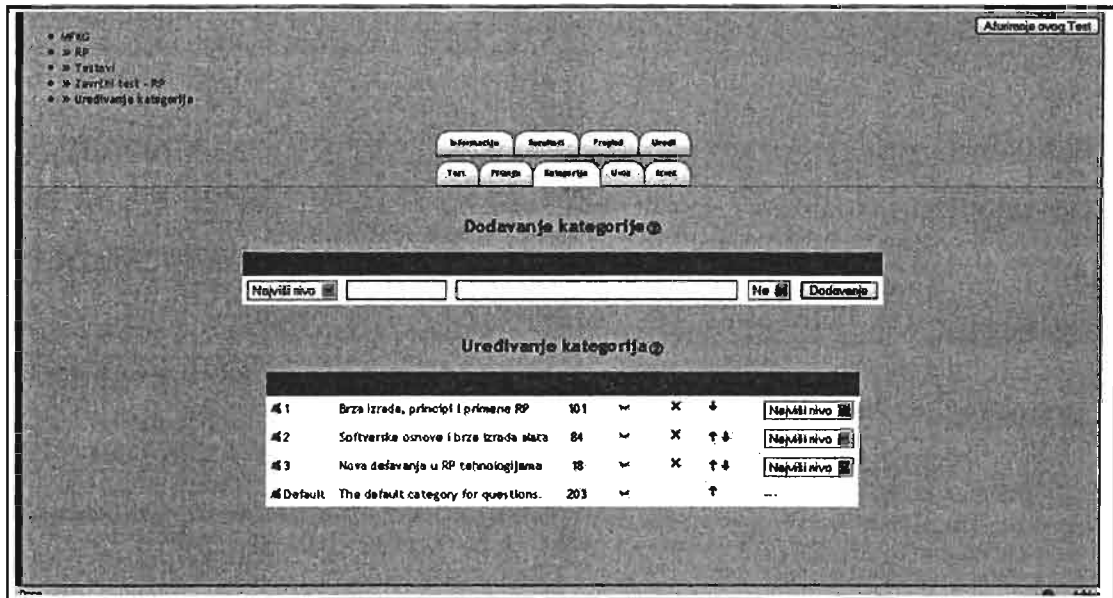
Total number of created pages is 76, there are also several short videos, and SMIL multimedia content. Within SMIL content students can watch video demonstration of basic operations on 3D printer, along with narration and slide presentation. The streaming content is synchronized and bookmarked, so the

students can easily navigate through it. The only requirement is RealPlayer, which can be downloaded for free from the Internet. This SMIL content provides students almost full experience of laboratory practice.



Outlook of final test

A discussion board is set up for students to consult each other and teachers on certain topics. The earlier discussions are archived, and can be read at any time.



Rapid Prototyping - Question categories

Students have to take two control tests throughout the duration of the course, and there is also a final exam, all of which are taken in electronic form through Moodle LMS. The scores from the tests make 50% of the final grade.

Through connection of Centre for Information Technologies at Faculty of Mechanical Engineering (which is the coordinator of eLearning projects at University level) with EAR project Virtual Manufacturing Support for Enterprises in Serbia, 04-SER01/10/016, a possibility is provided for industrial experts to learn about most recent technologies in rapid prototyping (www.cevip.kg.ac.yu). Demo version of Rapid Prototyping course is set up on Moodle LMS for this purpose.

4. Conclusions

Centre for information technologies at Faculty of Mechanical Engineering is coordinator of eLearning projects at University of Kragujevac. The centre is constantly encouraging eLearning activities at the University level. Considering the reform in higher education, eLearning is going to have a very important relevancy, especially for remote and disabled students. With help of Centre for Information Technology, further improvement is expected in eLearning and blended learning methodology in this and other courses.

In general, impressions about eLearning Program are very positive. The collaboration with eLearning centre at University of Kragujevac was intense and productive, and communication with experts through seminars and Internet was more than useful. Through realization of this project it has been noticed that increased communication with students in order to learn about their needs and experiences from first-hand may help in development and implementation of successful eLearning course.

References

- eLearning Task Force Serbia, Recommendation for development of eLearning in Serbia, Cetinje, 2005.
- Andreas Gebhardt, *Rapid Prototyping*, Hanser, Munich, 2003.
- The eLearning Action Plan: *Designing tomorrow's education*; Implementation of the eEurope 2005 Action Plan, European Commission, 2000.
- About Rapid Prototyping http://en.wikipedia.org/wiki/Rapid_prototyping
- Moodle - official presentation, www.moodle.org