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# INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the "Vojvodina" Hotel in Zrenjanin on July 1<sup>st</sup> 2011.

**The International conference on Information technology and development of education** has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Curriculum of contemporary teaching
- Methodical questions about the realization of natural and technical sciences teaching
- Lifelong learning and professional upgrading of teacher
- E-learning
- Management in education
- Information technology development and its influence on education

All submitted papers have been reviewed at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, technics and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

***The Organizing Committee of the Conference***

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# ADAPTIVE E-COURSES DESIGN BASED ON WEB MINING

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**Abstract** – In this paper the recommendations in designing adaptive e-course are given. Also, a model for time adaptivity of e-course is given. The results are based on appliance of web mining techniques. Research was done at Technical Faculty Čačak, on Moodle learning management system. Results confirm that students spend different time on different activities. The future work relates to applying model in design adaptive Moodle e-course.

## I INTRODUCTION

E-learning, as a key part of distance education, is realized by using modern technologies, particularly Internet. Online learning (E-learning) systems accessible through the Internet are intranets that represents self-contained versions of the data warehouses and human behavior found more broadly across the Internet [1]. E-learning can be used on all level of education and are used just as well in the combination with the traditional teaching as in the distance learning. That is why knowledge about users of electronic courses is essential for understanding their ways of learning and their learning approach.

Nowadays, slight modifications and supplements to e-learning systems are not enough to ensure successful e-learning outcomes, because other important elements for e-learning success are missing such as flexibility of the system, adaptability towards students needs, effective and official design of electronic content (e-content) [2].

An e-learning system is considered to be adaptive [3] if it is capable of: monitoring the activities of its users; interpreting these on the basis of domain-specific models; inferring user requirements and preferences out of the interpreted activities, appropriately representing these in associated models; and, finally, acting upon the available knowledge on its users and the subject matter at hand, to dynamically facilitate the learning process.

To achieve this advanced e-learning applications it is necessary to build model and then design adaptive e-courses. In this paper we proposed web mining as a concept for designing recommendations for adaptive e-courses. Also, here is given model based on the results of applied web mining techniques.

In [3] is examined the sufficiency of existing e-learning standards for facilitating and supporting the introduction of adaptive techniques in computer-based learning systems.

Paper [4] presented the implementation of adaptive environment by extending open source learning management system Moodle.

In [2] is provided an approach to creating adaptive environment for e-learning courses. Also, there is proposed generic model and architecture of an adaptive e-learning system.

### A. Web mining and adaptive e-courses

Web mining is the application of data mining techniques to extract knowledge from Web data, where at least one of structure (hyperlink) or usage (Web log) data is used in the mining process (with or without other types of Web data) [4]. Web mining can be categorized into three different classes based on which part of the Web is to be mined.

Web content mining concerns discovery of useful information (and accessing information) from web sources [5]. For the discovery it uses the techniques of Artificial Intelligence (AI), Database and most specifically Data Mining (DM).

Web structure mining is the process of discovering structure information from the web [6]. Web usage mining focuses on techniques that could predict user behavior while the user interacts with the web [7]. Web Usage mining is a very important













