



A web-based intelligent report e-learning system using data mining techniques[☆]

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ABSTRACT

This paper presents a PDCA (Plan, Do, Check, Act) method of improving web-based intelligent reports of an e-learning system as intelligent system, which was created and implemented at the Technical Faculty in Cacak, University of Kragujevac. The focus is on improving LMSs (Learning Management Systems) or e-learning systems by predicting behavior patterns of students and adjusting the structure of these electronic courses. An existing learning management system is improved by using data mining techniques and increasing the efficiency of the courses using custom modules. This study presents the design, implementation, and evaluation of the system. Future work should relate to the continued improvement of the PDCA-created system, as well as the introduction of additional modules and a comparative analysis of the presented and future results.

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1. Introduction

The expansion of e-learning has led to the increased use of systemic and continuous improvement of e-learning systems. This is also evident on the examples of Electrical Engineering teaching courses. The use of these systems has resulted in a need for monitoring and enhancing behavior patterns of all participants, with the aim of continuous improvement of the teaching process and ultimate results – education services. The paper presents the creation of a web-based intelligent report e-learning system using data mining techniques with PDCA (Plan, Do, Check, Act).

Learning Management Systems (LMSs), with numerous opportunities in the PDCA, have the ability to track and analyze user activity. Here, administrators can get reports on the activities of participants and statistical approaches at the level of each course (i.e. responsible teacher), as well as at the level of the entire system.

Each LMS has a database that contains records on the activities of each user. This characteristic of the system is very significant, with “plenty of information readily available, just a click away” [1, p. 2]. However, many of these records require a special tool for processing and extracting useful information. Such tools have limited capabilities and their use is mostly limited by the administrator’s choice, depending on the type of information. A universal solution for this problem lies in the use of data mining techniques, with the possibility of improving LMS [2,3]. Data mining or knowledge discovery in databases (KDDs) is the automatic extraction of implicit and interesting patterns from large data collections [4].

Part of the LMS report also requires improvement in terms of including web intelligence to detect significant patterns of behavior [5]. The need for such a solution includes intelligent and web-based aspects to meet the following requirements (in increments – the PDCA spiral):

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