

# Enhancing the E-Learning Process by mining its Data

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**Abstract:** Many e-learning systems have been developed and are in use around the world. Learning Content Management Systems (LCMS) store lots of data such as students' profiles and students' activities and interactions with the system, in addition to courses contents. This makes it almost impossible to manually analyze the data for valuable decision-making. This brings the need for automating the analysis of such data to reach quality decision making. There are many ways to do automated analysis on huge databanks; one of them is data-mining.

By data mining the LCMS database we can get a wealth of results. In this paper we focus on how data mining techniques can enhance the overall qualities of e-learning processes. Specifically, data mining is used to predict students performance based on their usage of the system, which is saved in the system's database. Attributes of performance are selected based on their direct impact on the quality of learning process based on archived data of the previous course intakes.

## 1. Introduction

The World-Wide Web is widely used (several billion of pages and more than 300 millions of users globally). The increased popularity and ease of use of its information browsing tools as well as the simplicity of deploying and maintaining resources have made the World-Wide Web an important media for collecting, sharing, and distributing information. Many organizations and corporations provide information and services on the Web. The WWW is becoming an ordinary tool for everyday activities of most people. So, it is not surprising that the Web is the means of choice to architect modern advanced distance education systems. Distance education is a field where web-based technology was very quickly adopted and used for course delivery and knowledge sharing. For all forms of web-based education the term e-Learning becomes a standard for them. It means: using computer and computer networks to create, deliver, manage and support online-learning courses. E-learning systems have great potential to improve education through extending educational opportunities for those who cannot use time- and place-bound traditional education. In addition, e-learning can also enhance the traditional education systems through offering new interactive learning services and functions that enhance the traditional classroom. E-Learning systems offer instructors and students ways to communicate with each other both synchronously and asynchronously. E-learning systems provide multiple ways of learning, such as self paced, collaborative, and tutorial, within a common application.

Typical e-learning systems, such as Virtual-U and Web-CT, include course content delivery tools, synchronous and asynchronous conferencing systems, polling and quiz modules, virtual workspaces for sharing resources, white boards, grade reporting systems, logbooks, assignment submission components...etc. These e-learning systems also can keep records of student activities involved with the e-learning environment, such as reading, writing, taking tests, performing various tasks, and even communicating with peers. The database of these e-learning systems also stores personal information (profile) about both students and instructors. Consequently e-learning systems accumulate a vast amount of information which is very valuable for analysis and could create a gold mine of educational data. However, due to the vast amounts of data generated daily, the complexity of the information as well as the difficulty of the information extraction; it is very difficult and time consuming to manage manually. Instructors demand tools to assist them in analyzing these data, and thoroughly track and assess all students' activities while evaluating the structure and contents of the