

# Chapter 10

## New Frontiers for E-Learning in Education: A Big Data Application

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### ABSTRACT

*Big Data research is playing a leading role in investigating a wide group of issues fundamentally emerging concerning Database, Data Warehousing, and Data Mining research. Analytics research is intended to develop complex procedures running over large-scale data repositories with the objective of extracting useful knowledge hidden in such repositories. A standout amongst the most noteworthy application situations where Big Data emerge is, without uncertainty, logical figuring. Here, researchers and analysts create immense measures of information everyday by means of investigations (e.g., disciplines like high vitality material science, space science, bioinformatics, etc.). Nevertheless, separating helpful learning for basic leadership purposes from these enormous, vast scale data repositories are practically inconceivable for genuine Data Base Management Systems (DBMS), is inspired investigation tools.*

### 1. INTRODUCTION

For a methodological point of view, there are also research challenges in any information system. Another approach is required for changing Big Data; keep in mind heterogeneous and distinctive in nature information sources, into an organized, subsequently well interpretable configuration for target information analysis. As a result, information driven methods can be used to develop education systems. Educational End-user application development, and in particular, decision support applications development, is one of the vital factors for increasing productivity in the management information system. It reduces the demand for conventional systems development projects, and provides faster response to user needs, such as if an

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administrator wants to get statistics on students and faculty members. In this case study, a new approach for end-user application analytics system, is discussed and a methodology for developing model oriented decision support application using this approach is proposed. In an educational system, data analysis tools make it easy to perform statistical analysis about students and faculty members, as well as create simple charts and other reports for the user. Students can view their academic records, registration information, financial records, campus life and modify their profile. Faculty can upload course information, upload grades and communicate with students. Finally, the administration can view the statistics on courses, students, faculty, etc. This system can be used by management for decision-making.

A definitive objective of joining big data analytics in education and training is to enhance understudy (students) results, by implementing some regular measurements such as end-of-grade testing, encouraging participation (attendance), ... etc., and as a result this could help to lower the dropout rates. As of now, the training segment's use of big data analytics is to make "learning expository frameworks" – here characterized as an associated structure of data mining, modeling, and use-case applications. The hope of these systems is to offer educators better, more accurate information on answering the "how" question in student learning. Is a student performing poor because he/she is distracted by his/her environment? Does a failing mark in a course mean that the student did not fully grasp the course material, or was he/she having an off day? Therefore, learning analytics can help provide information to aid educators answer some of these tough, real world questions.

Educational information mining is a noteworthy part in the move towards big data learning analytics. Recent trends in education have permitted analysts to gather substantial volumes of unstructured information. Organized information has been gathered for a considerable length of time in the instruction part, normally as evaluations (grades) or participation (attendance) records ... etc. New strategies for intuitive e-learning have prompted to more unstructured information through wise e-learning frameworks, recreations, and e-learning games. This considers the accumulation of wealthier information sets than already conceivable, making new research openings into understudies' learning surroundings.

Thus, in online exams when a student answers a single question, several variables are being simultaneously analyzed, such as, key-strokes, time, answer, session, etc. For example, if we consider time as a factor, Do large breaks between answering correct questions translate into better/correct answers? Does a student spend too much time on the first parts of exams only to rush the latter parts? The order, sequence, and context in which the questions are answered provide even greater amounts of data, which researchers can use to uncover patterns in student learning. Students may perform better when asked a series of questions with increasing difficulty, but related questions rather than randomly selected questions from a common pot. The move toward adaptive testing in the GRE (standardize testing for graduate school) shows a trend toward this effort [Wendler et al., 2014].

Researchers can use all of this data to answer important questions about what makes the best learning environment for students. Understanding important factors can help educators create models about student learning efforts. Therefore, with the help of big data analytics such models can be used in predicting the usefulness of the learning outcomes, improving the online examination system, increasing the communication between the faculty and students, providing a suitable monitoring system and decision-making system.

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