Chapter 5
Data Mining in Global Higher Education: Opportunities and Challenges for Learning

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ABSTRACT
Historically, educators in higher education have searched for reliable means and methods to increase student learning. Many techniques and strategies have been used and even some have taken the form of laws to incorporate certain approaches to learning. However, there has not been one method proved effective in all situations for all students. One of the biggest challenges that global educational institutions face is the explosive growth of educational data and how to use this data to improve the quality of instructional and managerial decisions. Global higher education leaders embraced data-driven practices as an opportunity to improve efficiency, objectivity, transparency, and innovation. As a result, global higher education institutions are producing a large amount of student related data every year. Technology has given educators in higher education access to methods for assessing learning and engagement. Educational data mining is a relatively new process in global higher education that provides a tool to analyze this data and extract valuable information.

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INTRODUCTION

Education is an essential element for the improvement and progress of a country (Martin, 2017). For years, higher education institutions have been expected to demonstrate that students were learning and achieving success by outcomes attainment, retention and/or graduation, and career occupation (Altbach, 2016). The increasing use of technology has led to tremendous change in the way global higher education institutions modify and adapt to satisfy societal and governmental demands for accountability (Mu-azu, 2019). Educators are experiencing a new world of higher education; the nature of learners and learning is changing dramatically because of the development and wide availability of the new technologies in this global world (DiCerbo, & Behrens, 2014). The increased use of technology-based learning systems has also amplified the amount of data available (Clichici, Moagar-Poladian, & Dragoi, 2017).

Lack of adequate knowledge in higher education institutions about how to use data may prevent the achievement of the quality objectives and demands (Aldowah, Al-Samarraie, & Fauzy, 2019). One technique that is now readily available to institutions is data mining methodologies that can help bridge knowledge gaps in higher education (Goyal, & Vohra, 2012). Data mining in education can provide new methods to discover knowledge from educational databases in order to analyze student’s performance and assist in their learning (Manek, Vijay, & Kamthania, 2016).

Extracting knowledge from collected data offers many new opportunities and guides the higher education institutions to make decisions based on student needs (Jindal & Borah, 2013). Data mining is known for its powerful role in uncovering hidden information, parsing out data patterns, organizing information about hidden relationships, and revealing many findings that are not easily produced by manual manipulation of data or even classic computer-based information systems (Slater, Joksimović, Kovanovic, Baker, & Gasevic, 2017). Data mining has huge transformational potential for global higher education: discovering how people learn, predicting learning, and understanding real learning behavior (Chaurasia, Kodwani, Lachhwani, & Ketkar, 2018). By achieving these goals, educational data mining can be used to design better and smarter types of learning technologies and to better inform learners and educators (Wise, 2019). Noteworthy emerging data mining applications include student needs assessment, retention management, enrollment management, performance prediction and improvement of placement tests (Dhekankar & Datar, 2015).
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