

Big Data, Dashboards, and Data-Driven Educational Decision Making

Todd Price

Florida Atlantic University, USA

INTRODUCTION

The world is getting smarter. This evolution can be seen everywhere and no industry or sector is immune (Marr, 2015). The information contained within this chapter details a comprehensive process of understanding how data warehouses are vital to the successful implementation of a knowledge information system and visualization technology. Managers of tomorrow need to understand data warehouse design, but they also must possess the skills necessary to relate to the effective and strategic application of these technologies to advance the quality of problem identification and the associated solutions (Marakas, 2003). Consider the following. There were 5 exabytes of information created between the dawn of civilization through 2003, but that much information is now created every two days (Marr, 2015). You have now been introduced to Big Data, a simplistic yet intricate term that most persons underestimate the importance and misunderstanding of said term. However, at this point Big Data shall be shelved in order dig deeper into how to one can make decisions with tools to mine data.

Course interface, usability, testing, data warehousing, and business analytics detail concepts important to the successful implementation of a knowledge information system for higher education. The theory behind the implementation of the process documented within this chapter will hold that online student success will increase as online learning suffers from much higher dropout rates than traditional face-to-face learning. As more data becomes available for the course(s) analyzed through the process of data warehousing and business analytics, abundant variables will be aggregated and analyzed to quantify what efforts must be made to lead to online student success. If practicable and if results produce sound analytics, this project proposal will be conveyed to the college's Office of Information Technology and the Center for eLearning which functions as support for the Learning Management System provided for online delivery of courses.

For various organizations in our societies to survive and thrive within our society, leaders and managers turn to leadership theories and management science for any needed guidance (Wang). Encyclopedia of Strategic Leadership and Management topics for this chapter focuses on the academia establishment of professional scholars who are engaged in higher education and research where management, the ways managers lead, performance management, managing creativity, and decision making and leadership are probed. As an enterprise grows larger, hundreds of computer applications are needed to support the various business process (Ponniah, 2010).

Before delving into the applications and definitions of decision support systems, management information systems, and learning management systems to support leadership initiatives, let's take a simple scenario based on an educator's dilemma of whether learners are meeting course objectives. Although this setting might seem trivial taking into consideration the strategic information, it is at this stage that we can begin to understand the importance of data, misconceptions, and faulty conclusions.

As a full-time Instructional Designer and online Adjunct Instructor at a higher institution for the past five years, the information presented forthwith addresses issues surrounding online learning. First, online learning suffers from much higher drop-out rates than traditional face-to-face learning. Based on a survey completed by more than 200 North American school officials in 2013, Poulin found that course completion rates averaged three to five percent better for on-campus courses than for online courses (Haynie, 2015); thus, retention efforts must be addressed. And second, continuous improvement within course developmental framework provides quality assurance efforts in online learning, which eventually measures learner experiences and outcomes set forth by curriculum development. Now the question begs, where does one start to explore statistics aforementioned and improve performance? The answer lies within data.

Now to define the three systems aforesaid. Although decision support systems, management information systems, and learning management systems are broad technologies to manage and process information, they are all unique in their individual business functions. According to Sprague and Watson (1996) conceptual models or frameworks are crucial to understanding a new and/or complex system (Sprague, 1982). They define Decision Support Systems (DSS) generally as an interactive computer based system that help decision-makers use data and models to solve ill-structured, unstructured or semi-structured problems. DSS provides varying analysis without much programming effort and is usually directed towards non-technical users/managers (Louw, 2002). Management Information Systems (MIS) is a general name for the business functions and academic discipline covering the application of people, technologies, and procedures - collectively called information systems - to solve business problems (Baltzan, 2013). The third system, and most misunderstood, centers around the learning management system (LMS). According to Wang and Chen (2009), “an LMS employs a range of information and communication technologies to offer an online platform over the Internet, where a whole course can be planned, facilitated and managed by both the teacher and the learner” (Azevedo & Babo, 2012). One can now see the similarities of all three systems and how although each is uniquely defined, combine to produce a robust decision making application for leaders and managers. Although other applications will be introduced shortly, it is these three systems that are the backbone of any automated decision making process. Consequently, it is through this process that strategic leadership and management can be potentially discovered.

This chapter will now focus on the LMS and how data from DSS and MIS can positively influence decision making. However, please note that there are a lot of ways data can be misinterpreted, and business leaders need to understand how and why it can happen (Morgan, 2015). To capture online student data and assessment results, a web-based LMS must be reliable. The LMS features course management, customizable open architecture, scalable design, and integration with student information systems and authentication protocols. The LMS’ virtual learning environment and course management system adds online elements to courses traditionally delivered face-to-face. Student and assessment data has been captured into one of the most popular and premiere platforms for educational communication and content sharing. The LMS course management system offers educators and instructional designers a solid platform to build a better online educational experience for learners. Although each LMS’ platform is proprietary, most provide value to developers as they are given open functionality to build customized building blocks to achieve their institution, program, or courses’ strategic plans or outcomes. As improvements and upgrades are regularly scheduled, LMS’ has created cohorts to offer upgrade advice and the opportunity to network with others to seek the latest and best practices which will in turn serve its client, defined as the educator.

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