

Learning Analytics Reflection

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Big Data and Learning Analytics

The integration of big data and learning analytics in education has transformed the traditional models of the way higher education institutions increase efficiency and improve individual student success. The rapid use of technology in education has made it easier for institutions to analyze, access, and manage large volumes of big data. Educational institutions that use online learning systems can collect large volumes of big data at a higher velocity (Center for Digital Education, 2015). Through the analysis and collection of big data, institutions can improve instruction and the learning process. For example, big data has the potential to “create better outcomes for students by helping educators understand the why” (Center for Digital Education, 2015, p.4). Why did a student fail a course? When big data is being analyzed, it can be a complicated process because it is examining large amounts of information from a variety of sources to uncover hidden patterns. These hidden patterns provide key stakeholders insight into tracking student’s performance in real-time and improve the institution's operations by “increasing efficiency and productivity” (Center for Digital Education, 2015, p.7).

Learning analytics seeks to understand a more specific group of students through a statistical evaluation of massive amounts of data collected to reveal particular patterns or trends. The goal of learning analytics in education is to improve student success, retention, graduation rates, and provide struggling students with additional support services (Educause, 2010). Some of the algorithms can detect if students are falling behind in their courses and invoke specific actions; such as an email to inform the student of tutoring services or missing assignments (Educause, 2010). Through analyzing student’s data, learning analytics can make predictions of impending challenges for both the University and its students. Lastly, the use of technology and learning analytics creates more opportunity for student interaction and instructor interaction

online and collects data from those interactions to draw conclusions about student retention and success (Educause, 2010).

Big Data and Learning Analytics Audiences

Learning analytics and big data within education has proven to be beneficial for a variety of audiences, including students, faculty, administrators, and course designers. For students, the data collected around their performance on assessments, assignments, and projects provide insight into their understanding of the material. While this may not seem significant, having this feedback readily available for students means they can seek tutoring services and correct their misunderstandings while the topic is still current (NMC Horizon Report, 2018). Additionally, the data collected allows students to see how they compare with their classmates or other cohort members (Sclater, Peasgood, & Mullan, 2016). This data can serve as a strong motivator for students to consistently do well and remain at the same level as their peers.

Another vital audience with an interest in learning analytics is educators and facilitators. Besides students' assessment scores, they are also focused on how students interact with the course materials. For example, virtual learning environments (VLE) track the time and frequency that students access the readings, assignments, and videos (Sclater, Peasgood, & Mullan, 2016). Educators and facilitators also consider the data gathered from student feedback surveys (Murali, 2014). All of the aforementioned data sources along with students' performance on course activities, help reveal any potential learning gaps, and make necessary adjustments to their instruction and learning materials. They also help facilitators to identify at-risk students and provide appropriate interventions before it is too late (Sclater, Peasgood, & Mullan, 2016).

Administrators and course designers also benefit from learning analytics. The data collected helps administrators determine how to allocate financial and personnel resources

(Clarity Innovations, 2015). Course designers, like educators, focus on student performance and interaction with the materials (Strader & Thille, 2012). Therefore, this allows them to refine the course materials and make them more beneficial for students to use. Ultimately, learning analytics and big data are advantageous for a variety of audiences, but in the end, all of these individuals are focused on using data to improve the learning experiences of students.

Potential of Big Data and Learning Analytics

The potential of big data and learning analytics lies in the ability of technology to collect and analyze large volumes of data (Center for Digital Education, 2015, p.3). The data can be used to analyze how students are currently performing and how they may perform in the future of the course. The power that technology has brought to the field of education has endless implications for the improvement of learning and has already proved its' potential. Big data and learning analytics helps to improve the quality of teaching by providing immediate feedback. Teachers can learn immediately how students are performing within a lesson and make adjusts to the lesson to improve student experience and performance (Sclater, Peasgood, & Mullan, 2016, p.5). Another massive implication for big data and learning analytics in its' journey to improve learning is its' ability to identify at-risk students who are struggling. Struggling students are more likely to withdraw from a program and can instead be helped in their coursework and encouraged to continue (Sclater, Peasgood, & Mullan, 2016, p.8). This technology also develops student engagement and motivation. "At Nottingham Trent some learners report that seeing their own engagement is a positive spur to stay engaged" (Sclater, Peasgood, & Mullan, 2016, p.10). The potential of big data and learning analytics to improve learning is due to its' ability to collect data and present it to students and teachers, creating a rapid and more in-depth awareness of the learning process.

Connections between competency-based learning and learning analytics

Learning analytics in higher education can be used by students, faculty, administrators, and course designers to find success in their roles. In finding that success, competency-based learning is a way to pinpoint a stakeholders' proficiency or standards in meeting a specific goal. According to Johnstone and Soares (2014), competency-based education stands out in two ways: to reorient the educational process toward mastery and application of knowledge and skills; and for helping quality and affordability co-exist in higher education (p. 4). A connection between learning analytics and competency-based learning is how students and educators work to grow and prepare for a career after graduation. With technology evolving, the stakeholders must take advantage of learning analytics and big data to grow their competencies in higher education.

In an article written by Katie Ash (2012), it was found the Lindsay Unified School District in California uses “technology more effectively to personalize learning” (p. 1). In addition to connecting with students who use technology daily, faculty must be trained in the same technology to keep up with trends. New technologies help teachers differentiate instruction for students and track their progress at proper competency-based education standards (p. 2). Faculty members like to see consistencies in student competencies, develop them over time, and ensure students learn required material before moving on. In some schools, such as the Boston Day and Evening Academy, “all students must demonstrate competencies independently and multiple times to move on” (p. 4). In this case, another connection between competency-based learning and learning analytics is how the latter and big data can be manipulated by faculty to benefit their students. Students learn material in a reasonable time period, but it is up to them and their teachers to be pushed in the right direction.

Relationship between learning analytics and evidence-based learning and design

Evidence-based learning is often developed by researchers or educators to determine students' learning, specifically the effectiveness of methods and assessment of a larger scale. Using various task models, faculty may see repeated successes with students during an academic year or longer. By gathering evidence from these models, faculty can determine the effectiveness of a method and materials, and alter their course design accordingly. The relationship between evidence-based learning and learning analytics is when one considers the Open Learning Initiative (OLI). Established in 2002, OLI created an online course that took advantage of new technologies and explored how human learning worked in the classroom (Strader & Thille, 2012, p. 203). OLI uses evidence-based learning by providing and analyzing feedback to students, instructors, course designers, and learning science researchers. With the information, a series of feedback loops are created to compare the effectiveness of OLI students and traditional college students (p. 207). This method shows how new technologies can be implemented in the classroom and prove that they are effective using evidence-based learning.

Bror Saxberg, chief learning officer at Kaplan Inc., suggests students and faculty members would benefit from collaborating with other faculty and learning experts. Learning experts and engineers create complex education technologies “to make learning more affordable, reliable, available, data-rich, and personalized” (Saxberg, 2015, p. 2). While there is a challenge to use the technologies correctly, Saxberg believes Kaplan can revolutionize learning by generating more data (p. 3). The more data that is generated, the more likely faculty and administrators will be able to learn how students learn. They will be able to create helpful and proven evidence-based learning methods, lessons and curriculums. Learning analytics and data is a way to shift education so all students can succeed at their own pace.

Challenges with using learning analytics

There are several challenges imposed through the use of learning analytics in education. To begin, the applications may put student's privacy and security at risk in the event of a data breach. Institutions may also be charged with student profiling because the applications are making predictions/judgments about student's performance and behavior (Educause, 2010). For example, applications that detect at-risk students through the collection of student data could potentially place students in categories of failure. Also, the success of students depends on a variety of variables; such as, personal issues that the data cannot collect or make sense of (Contact North, 2012). Contrarily, intuitions could be seen as irresponsible for not reacting or providing services to at-risk students promptly (Educause, 2010). Furthermore, with all the data being collected from a variety of sources, it could potentially lead to data error if the institution is not investing in proper applications that can interpret the data to make it useful.

Moving forward with analytics

To increase the use of learning analytics, organizations must create an educational environment where students have access to retention programs. The environment must be open to change and continuous improvement. An organization should have the willingness and capacity to institute strategic initiatives around the following: building a technology infrastructure where users can access data; embedding policies and processes in the organization that leverage analytics; improving the learning analytics skills of all stakeholders; sustaining analytics financially; and crafting the data-driven mindset into the culture (Norris & Baier, 2013).

Faculty "buy-in" requires a culture change and behavior change. To increase the participation of faculty, "buy-in" would require allowing access to student data and training

faculty on the software. Faculty must possess the skills “to use automated support processes for student success but also the willingness to embed these processes and practices in daily work” (Norris et al., 2013, pp. 31-32). Also, they must be willing to change behavior and make decisions based on data rather than long-held opinions and conventional wisdom (Bichsel, 2012). To increase the participation of faculty, “buy-in” would require incentives and proof that technology is more time efficient, evidence-based, and valuable (Contact North, 2012).

In order to move educational organizations forward with learning analytics, leadership must implement learning analytics, gradually identifying an initial system that fits their culture. This involves understanding “the learning context, the learner context, and the context of the discipline to be learned” (Contact North, 2012, p.4). The organizations should provide frameworks, standardized techniques, and models that assist educators with the implementation. Departments should also align goals across departments for accurate problem diagnosis and data application (Contact North, 2012). Increased communication and collaboration across departments are needed for solution creation. As institutions grow, they should add more analytic applications addressing more intervention domains such as financial interventions, social interventions, etc.

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