Learner Analytics: Challenges and Trends

Michelle Waldron
Cal State Monterey Bay

Abstract

The collection of learner data is quickly becoming a trend in the world of instructional technology. Studies have been undertaken in countries across the globe (UK, US, Australia, Europe) as a means of understanding the ethical and moral challenges related to data privacy and ownership in education. This paper examines learner analytics in the realm of education. It further examines the challenges and opportunities related to learner analytics and how instructional technology is adapting to the enhanced need to analyze the data, create policy, and assess learner pedagogy.

Keywords: *analytics, education, ethics, privacy, assessment, LMS*

Identifying Learner Analytics

The Society for Learning Analytics Research (SoLAR, 2020) defines learning analytics as "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (n.d.). Duval (2012) summarized this definition of learner analytics as "collecting traces that learners leave behind and using those traces to improve learning" (n.p.). This concise interpretation of what analytics means in the context of this paper will provide the foundation for understanding how the data is created and managed.

In many cases, the collection of learner information (background, behavior, etc.) is gathered from the use of Learning Management Systems (LMS) (Wilson, Watson, Thompson, Drew, and Doyle, 2017). These systems have become a necessity during a period where many institutions need to migrate to online learning environments. Data collection on learners is not new. Instructors have always needed to evaluate student learning throughout a course. In-person learning allowed for regular evaluation and assessment to ensure that teaching and learning goals were met. In the world of eLearning, some researchers have claimed that the data procured has the potential to transform learning. Data collection on a large scale has many risks, such as ethical implications for learner tracking, disseminating and deciphering the data, and the overall implementation of a structured policy on how to use the data collected (Wilson et al., 2017).

In education data collection needs to add value to the teaching and learning process, not create additional or new obstacles. If a general or common approach to understanding big data in this context is expected to meet the needs of individual learners, then it could be assumed

that researchers consider the prior knowledge of students including social and behavioral

aspects (Wilson et al., 2017). This constructivist approach may be a segway to the use of

artificial intelligence related to big data or new challenges that have yet to be explored in the

field of instructional technology.

Challenges in Learner Analytics

Wilson et al. (2017) suggest that the inconclusiveness of empirical studies, the

generalized process for analysis of the data, and unique pedagogical differences may be

problematic for creating a process of wide-scale use of learner analytics. These concerns aside,

Tsai and Gasevic (2017) acknowledge these obstacles and assert that there are additional

challenges related to strategic planning and policy development concerning the use of learner

data. The core of these challenges relates to stakeholders. The institutions collecting data

exhibit knowledge gaps with an understanding of how to capture data, which leads to an

engagement shortfall. Another stakeholder challenge is training. Tsai and Gasevic note that "the

shortage of sufficient training leads to a lack of understanding of how learning analytics can be

beneficial" (2017, p. 236).

A final challenge outlined a shortage of specific policies for learner analytics. The

authors (Tsai and Gasevic, 2017) provide an example study by Drachsler and Greller (2016) that

assessed the Heads of the eLearning Forum in the UK. This study revealed that principles of the

ethical use of data as it relates to learner analytics were still in flux, with many institutions still

reviewing policy and conditions for the data collected. The findings of the Drachsler and Greller

(2016) study reflect that UK institutions collecting learner analytics data "lack clear guidance

that is designed for learning analytics-specific practice" (p. 236).

A better understanding of these challenges will help to inform practice and may result in the creation of learning models or theoretical foundations for eLearning and other modes of online learning. Each of these challenges is relevant and risky for the field of instructional technology as the landscape is rapidly changing and evolving. However, there is also a great opportunity to create tools, resources, and more importantly policy by overcoming these obstacles. This paper will now discuss the trends in learner analytics as a counterpoint to the challenges discussed in this section.

Trends in Learner Analytics

Beyond the ethical dilemmas, training issues, and developing policy related to learner analytics, there are genuine learner specific positives to big data in education. The data collected as part of the analytics process represents an opportunity to mine and evaluate learner datasets for "understanding learning theory, learner feedback, student support, learning technology, and future development of learner applications" (Greller and Drachsler, 2012, p. 43). Mentioned as a possible challenge, the idea of personalized learning can also be a reality if policy and practice measures are developed and collaboration is consistent across institutions. Greller and Drachsler (2012) suggest that personalized learning could lead to "more effective learning experiences, accelerating competence development, and increasing collaboration between learners" leading to a more diverse learning experience (p. 42). The ongoing creation of networks such as SoLAR is just one way that best practices policy will become uniform and institutions will begin to understand how to adapt analytics to each learner.

The idea that personalized learning is the aim of analytics is flawed. It would seem that there is a contentious point between learning alone and as part of a social structure. Biesta

(2009) defines a primary function of education as socialization. Once again, there is a constructivist underpinning in this concept (Lave and Wenger, 1991). People learn more from sharing our experience and from others, therefore learning is less a singular activity and more of a network of learners. This may suggest that the foundation for learner analytics should be grounded in this pedagogical approach.

Returning to the topic of ethics and data protection related to learner analytics, Sclater (2016) developed a code of conduct as a taxonomy that addresses ethical, legal, and logistical challenges related to data gathering and use. Also, in 2016, Rodríguez-Triana, Martínez-Monés, and Villagrá-Sobrino made recommendations to enhance Sclater's code. The additions included consent, transparency, access, accountability, data protection, validity, and avoidance of adverse effects (p. 44-46). As part of a SoLAR study, Rodríguez-Triana et al. (2016) utilized this opportunity to create an ethical framework that can be used across disciplines and education levels to facilitate consistency of learner analytics. This framework provides the basis for disclosure and invites further discussion related to how much data is too much, and poses the question, should data collected be shared with students? If so, what will students do with this information? This unknown has the potential to inform ongoing knowledge related to analytics, but also eLearning, student persistence, eAdvising, and learning theory (Romero and Ventura, 2013) while also highlighting the ongoing need to develop ethical processes and data protection.

Conclusion

The traces of learner data collected across time have caused a ripple effect in the world of ethics and data rights. The argument can be made that the challenges outlined in this paper are important for learner analytics implementation going forward. Challenges related to analysis and pedagogical differences stand out as critical to analytics as the data is already collected and a pathway to deciphering the information is still unclear. Issues related to knowledge gaps, training, and policy are similarly troubling. Each of these challenges impacts stakeholders at different levels. From students to faculty to IT professionals and instructional designers, the collection of data may be used in a variety of ways depending on the needs of the stakeholders. Institutions will need to outline clear objectives and uses for data, setting a plan in motion that will define for all stakeholders how and why learner analytics are important and necessary. The underlying ethical and data protection issues are also of paramount concern. While researchers are developing a clearer path to transparency, data protection is still at risk.

The trends outlined above suggest that the data being collected has the potential to enhance learning, develop learning theory, and thus improve pedagogical approaches to teaching. The importance of ongoing learner feedback and student support is central to the data collected from learner analytics. This is understandably a broad aim, but if institutions can capture data specific to individuals and develop personalized learning plans, this would be a worthy and needed advancement in education. Of equal importance is increased collaboration in learning as these enhanced partnerships may lead to positive outcomes for all stakeholders.

This paper examines the challenges and trends related to learner analytics in education. Within this area of learning analysis and measurement exists a complex web of outcomes. Students and faculty may see the potential for actionable insights into learning. Whereas,

institutional stakeholders may see data use for program development or marketing. The

decoded data has the potential to complement or reinforce teaching and learning practice as

well as institutional aims, as long as the traces of data are used ethically to transform the

educational environment holistically.

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