Chapter 4

Using Learning Analytics to Improve Engagement, Learning, and Design of Massive Open Online Courses

David Santandreu Calonge
Canadian University Dubai, UAE

Mariam Aman Shah
University of South Australia, Australia

Karina M. Riggs
The University of Adelaide, Australia

Tim A. Cavanagh
University of Adelaide, Australia

ABSTRACT

Academic research in the past decade has indicated that using data and analyzing learning in curriculum design decisions can lead to improved student performance and student success. As learning in many instances has evolved into the flexible format online, anywhere at any time, learning analytics could potentially provide impactful insights into student engagement in massive open online courses (MOOCs). These may contribute to early identification of “at risk” participants and provide MOOC facilitators, educators, and learning designers with insights on how to provide effective interventions to ensure participants meet the course learning outcomes and encourage retention and completion of a MOOC. This chapter uses the essential human biology MOOC within the Australian AdelaideX initiative to implement learning analytics to investigate and compare demographics of participants, patterns of navigation including participation and engagement for passers and non-passers in two iterations of the MOOC, one instructor-led, and second self-paced.

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INTRODUCTION

Numerous studies in the research literature have indicated that using data and analyzing learning in curriculum design decisions can lead to improved student performance and success. While learning analytics are used in many Massive Open Online Courses (MOOCs) to report on student retention, behavior, participation, and performance, active strategies to diagnose and monitor achievement of learning outcomes are often lacking. Learning analytics has been defined in the literature as the measurement, collection, analysis, and reporting of data about participants and their contexts for purposes of understanding and optimizing learning and the environments in which it occurs. Learning analytics can also provide impactful insights into learner behavior and engagement with resources in online courses such as MOOCs, allowing facilitators to make real time modifications to improve the learner experience. These may contribute to the design of more effective educational interventions.

A common issue with courses, such as MOOCs, which are facilitated online is maintaining active engagement and retention of participants. Studies have shown that only half the number of participants that sign up for a MOOC follow through to take the course. With low startup numbers, even fewer participants have been shown to complete the course effecting levels of engagement. Engagement often dramatically drops off in the first few weeks, leading to a trend known as the participation funnel. Learning analytics provides information about participant interactions which can be regularly reviewed at pivotal points in the course investigating patterns of engagement, highlighting pedagogic approaches and learning designs that prove successful in retaining participants. Learning analytics is also a mechanism for teachers to evaluate student progress in an online course, by reviewing their interaction with online materials, tools, and content to gauge levels of learning, interactivity, and engagement. The number of views, clicks, and posts along with performance in assessment tasks can be used to reflect, refine and adjust the learning design by feeding forward what has been learned to new iterations. Course and instructional design, along with intervention planning, plays a vital role in fostering student learning in higher education. This critical, actionable intelligence will help educators devise agile interventions to increase participant engagement and performance in a MOOC.

This book examines “Fostering multiple levels of engagement in higher education environments”. The use of learning analytics as examined in this chapter is a prominent example of that, as it identifies levels of engagement through the lenses of MOOCs in a higher education environment. To date, there are few studies that explore learning design for MOOCs in an Australian context. As such, this chapter
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