

ABSTRACT

BARKER, HEATHER A. Motivation, Engagement, and Professional Growth of Participants in Online Professional Development Courses for Statistics Educators (under the direction of Dr. Hollylynne Lee).

The increased statistics standards in K-12 mathematics curriculum, the rise of enrollment in Advanced Placement Statistics in high schools, and increased enrollment in introductory statistics courses in college, have led to a rising need of quality professional development (PD) for teachers of statistics. Online professional development (OPD) is a timely and convenient way to provide high quality PD for those that teach statistics as well as create an online community of educators. Massive Open Online Courses for Educators (MOOC-Eds) have been created to provide these opportunities. The increase of enrollment in MOOCs in general has led to research around what motivates people to enroll in such free open courses as well as investigate the behaviors of participants as they engage in courses. Less research has been done to investigate the ongoing professional growth of participants after they have engaged in a course. This study investigates the motivation, engagement and professional growth of participants who enrolled in two successive MOOC-Eds, *Teaching Statistics through Data Investigations (TSDI)* and *Teaching Statistics through Inferential Reasoning (TSIR)*. TSDI was offered 7 times from 2015-2018, and TSIR was offered 3 times from 2017 - 2019. The 1,592 participants of the study were those who accessed at least the first unit of at least one course.

This study uses a sequential mixed methodology that had two phases. The first phase used quantitative methods to group participants by factors based on motivation and engagement using cluster analysis. Motivation factors came from answers to an enrollment survey question asking about why participants enrolled in a course. Another source for motivation used topic modeling to identify themes for motivation from the discussion forum posts in an introductory

forum. Three groups of participants were determined, those that enrolled for reasons that aligned to course objectives (*professional learners for teaching statistics* and *statistics investigators*) and those that enrolled to gather resources (*teaching resource collectors*). Another cluster analysis was done to identify groups of participants by how they engaged in the course. Three clusters were found, *highly active course completers*, *consistent course completers*, and *least active course fizzlers*. There seemed to be no relationship between groups based on motivation and engagement, except when the data was disaggregated by those who enrolled in both TSDI and TSIR. People who took both courses that were *professional learners for teaching statistics* and *statistics investigators* seemed to have a higher proportion of people who were *highly active* or *consistent course completers*.

Phase 2 included a qualitative assessment of a follow up survey sent to the 1,592 participants. This survey was sent at least a year after any participants had enrolled in any of the courses. The survey included questions about how the course(s) affected their knowledge, beliefs, professional practice, and any salient outcomes such as student outcomes, ongoing changes to teaching, and influence on the community around them. Survey results were promising, showing that the courses had a positive impact on their professional growth.

The findings of this study suggest that offering OPD for statistics educators is a meaningful way to provide PD. Additionally, the impact of offering two successive courses is evident when looking at the higher engagement rate of those who took both courses. Results suggest that those offering OPD should consider this model of sustained duration when designing such courses. The findings also offer methodological insight for other researchers exploring participation in open online courses, such as topic modeling and cluster analysis.