Graduate Teaching Assistants' Evolving Conceptualizations of Active Learning

Elijah S. Meyer, Elizabeth G. Arnold, and Jennifer L. Green
Montana State University

Graduate teaching assistants (GTAs) play a critical role in undergraduate mathematics education, but most have no experience using active learning to promote higher-order thinking. This research investigates how beginning GTAs conceptualize active learning and how these understandings evolve as they engage in a teaching program. This poster describes the program, as well as the evolution of and variation in GTAs' conceptualizations and uses of active learning.

Keywords: Graduate Teaching Assistants, Teacher Development, Active Learning

Graduate teaching assistants (GTAs) play a key role in lower-division undergraduate mathematics courses (Speer, Gutmann, & Murphy, 2005). With the changing context of education, GTAs need exposure to new pedagogical strategies that may fall outside their prior experiences in order to learn how to effectively teach and create valuable learning opportunities for their students (Deshler, Hauk, & Speer, 2015). As researchers and teacher educators, we need to understand how best to help GTAs develop a refined understanding of how to implement active learning effectively, and explore the ways in which they enact it in their own classrooms. Our objective was to introduce new GTAs to active learning strategies during professional development and to research how their views and uses of active learning evolve. Our research questions were: 1) How do beginning GTAs conceptualize active learning? and 2) How do new GTAs' understandings of active learning evolve during professional development?

We adopt the perception that active learning is an instructional method that engages students in mathematical thinking (CBMS, 2016). Our study draws on Bonwell and Sutherland's (1996) conceptual framework that portrays active learning as a continuum where strategies range in difficulty and engagement. They argue teachers should "consider their course objectives and teaching style and to determine through self-reflection what active learning strategies best meet their individual needs" (p. 4) and where these strategies lie on the continuum.

The participants in this study were new GTAs in the first year of their graduate programs (n=20); 35% were female, and 20% were international students. All participants were assigned to be sole instructors of undergraduate lower-division mathematics courses. They completed a week-long teaching orientation before classes began and attended weekly workshops throughout the fall. The program focused on active learning and engaging students in the classroom.

We administered free response surveys at the beginning, middle and end of the fall semester to collect data on GTAs' descriptions and uses of active learning. We also conducted semi-structured interviews with GTAs, asking them to reflect upon their teaching experiences and how their conceptualizations and uses of active learning changed (if at all) over the semester. Qualitative analyses using Bonwell and Sutherland's (1996) framework are ongoing.

Preliminary results indicate that beginning GTAs varied in how they conceptualized and used active learning throughout the semester. Many associated it with an activity and group work, but others had a more nuanced understanding of the term, discussing the process of engaging and involving students in learning. This suggests GTAs need time to develop as teachers and learn how to effectively incorporate active learning strategies in their classrooms. Further research is needed to examine how GTAs' self-identified views and uses of active learning align with their actual classroom practices and continue to evolve with experience.

References

Bonwell, C. C., & Sutherland, T. E. (1996). The active learning continuum: Choosing activities to engage students in the classroom. *New Directions for Teaching and Learning, 67*, 3-16.

Conference Board of the Mathematical Sciences. (2016). *Active Learning in Post-Secondary Mathematics Education.* Retrieved from http://www.cbmsweb.org/Statements/Active_Learning_Statement.pdf.

Deshler, J. M., Hauk, S., & Speer, N. (2015). Professional development in teaching for mathematics graduate students. *The Notices of the American Mathematical Society, 62*(6)*,* 638-643.

Speer, N., Gutmann, T., & Murphy, T. J. (2005). Mathematics teaching assistant preparation and development. *College Teaching, 53*(2), 75-80.