

From Theory to Practice: Examining Pedagogical Development in Graduate Mathematics TA Seminars

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Graduate mathematics teaching assistants (GMTAs) typically have a great deal of the responsibility for the instruction of undergraduates but often have little opportunity to explore teaching methods beyond those they have personally experienced or seen demonstrated by their faculty mentors (Speer, Gutmann, & Murphy, 2005). Most students arrive to their graduate programs with little to no teaching experience (Speer et al., 2005). With little formal training and limited guidance, GMTAs are expected to help undergraduates bridge the gap between high school and college-level mathematics while managing the heavy demands of their own graduate coursework (Belnap, 2005). This unique challenge highlights a need for structured and supportive TA preparation that will help GMTAs be successful teachers and graduate students.

Through this study, we aim to add to the knowledge of GMTA preparation by examining how one training seminar prepares GMTAs for their teaching responsibilities. We conducted a case study on a teaching seminar course for beginning GMTAs at a large, public, research university in the Southern United States. Our data collection methods included observations of the seminar, semi-structured interviews with the instructor and GMTAs, and document analysis of instructor observations of GMTAs and course materials, which were triangulated to ensure reliability (Stake, 1995). This study aimed to answer the overarching research question: *How does a graduate mathematics teaching seminar shape GMTAs' development as educators, and how does it compare to established TA training frameworks?*

This study was framed using an adapted version of Justice’s (2020) framework for preparing GTAs to teach statistics. This framework emphasizes community-building, challenging teaching beliefs, and developing teaching knowledge. Selected for its STEM focus and alignment with the literature, the framework was modified to fit mathematics better and emphasize the importance of cultural understanding and inclusivity in teacher training (Felton-Koestler, 2020).

Analyzing our data through this lens, we found that the GMTA seminar provided opportunities for pedagogical growth through collaboration, approximations of practice, and technology training. The most valuable aspect, according to both GMTAs and the instructor, was the gradual shift toward legitimate peripheral participation. However, a significant challenge was the persistence of pre-existing beliefs, which limited the seminar's overall impact. GMTAs also expressed a desire for more informal spaces to discuss teaching, where they could share experiences, ask questions, and exchange advice. Additionally, some felt that the seminar's structure did not fully reflect the instructional strategies it aimed to promote, leading to frustration with the disconnect between its design and its goals. Addressing these concerns could strengthen the seminar's overall effectiveness.

The goal of our poster presentation is to engage RUME conference participants in discussing how we can support GMTAs in their dual roles as educators and students. The findings from this study have the potential to inform the (re)development of professional learning opportunities for incoming GMTAs and shape future research on how these professional learning opportunities impact GMTAs' development as educators.

References

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