

Graduate Teaching Assistants Can Affect Undergraduate STEM Retention Rates: A Need for Graduate Teaching Professional Development

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Extended Abstract

The first two years of college are the most crucial for undergraduate retention, and less than 40% of entering students actually complete a science, technology, engineering, and mathematics (STEM) degree (PCAST, 2012). Graduate teaching assistants (GTAs) play a vital role in biology departments across most universities by teaching the majority of introductory laboratories and discussion sections (Travers, 1989; Luft et al., 2004; O'Neal et al., 2007). Though GTAs are not directly attributed to attrition rates of undergraduate STEM majors, attrition rates can be linked with lab climate which is influenced by GTAs (O'Neal et al., 2007; Brown et al., 2009). However, most GTA teaching at universities and colleges is done without any formal training and this could have a serious effect on STEM retention rates (DeHaan, 2005; Tanner and Allen, 2006). This research examines the effects of a biology pedagogy course on GTA teaching confidence and teaching concept awareness. Biological pedagogy is a three credit course which is required to be taken the first semester a GTA is teaching. The course focuses on reflective teaching, mentorship by experienced GTAs, and professional development. Based on pre-assessment surveys, GTAs walk into their first day being confident in their teaching abilities; however, they had minimal knowledge of basic teaching concepts. Across all teaching concepts, GTAs felt slightly more than "I have heard of this" but much less than "I know this". GTAs are teaching important introductory courses with a minimal pedagogy foundation. After the course, there was a significant increase in both teaching confidence and teaching concept awareness, across all parameters. However most importantly, GTAs moved from an "I've heard of this" to an "I know this very well" understanding of teaching concepts. This means that at most universities and colleges, where no teaching professional development typically exists, most GTAs are teaching with an "I've heard of this" teaching mentality in the majority of introductory laboratories and discussion sections, precisely when undergraduate attrition rates are at their highest. The influence of just one biological pedagogy course on GTA performance can have a serious impact on undergraduate learning and retention during these crucial years of college. Over the course of this study, two years, between the new GTAs and GTA mentors associated with this biological pedagogy course, the average number of classes taught each semester by these GTAs, average number of undergraduate students per class the overall total number students impacted was potentially 13,464 undergraduate students. If poorly taught introductory courses contribute to the significant loss of STEM majors and GTAs teach with an "I've heard of this" teaching mentality it is no wonder that GTAs could have a serious effect on undergraduate STEM retention. If STEM retention rates are to improve not only must we look to the current faculty, we must also train our GTAs.

Keywords: GTA, Graduate Teaching Assistant, STEM retention, TA training

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