A Comparison of STEM and Non-STEM Graduate Teaching Assistants’
Cognition Related to Teaching

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Abstract
Graduate Teaching Assistants (GTAs) teach a large number of undergraduate students in many university departments yet receive few opportunities for teaching professional development (Gardner & Jones, 2011; Schuorser et al., 2015). Understanding how to design effective teaching professional development (TPD) requires scholars to first elicit pre-established cognitive variables that GTAs bring to the classroom. Yet, there is little research dedicated to measuring these variables related to effective teaching in GTAs (Reeves et al., 2016). With the number of students matriculating into post-secondary school increasing, and the wide spectrum of disciplines in which GTAs teach, it is necessary to evaluate measures of cognition related to teaching to enhance undergraduate education quality and formal preparation for careers (Gardner & Jones, 2011). This study investigates the potential differences in cognition variables between STEM and Non-STEM GTAs, as well as if there were changes between pre- and post-data on five instruments including: Teacher Beliefs Instrument, Pedagogical Discontentment Inventory, Teaching Efficacy Instrument, Goal Orientations Toward Teaching, and the Postsecondary Instructional Practices Survey. A Mann-Whitney U Test was conducted to compare STEM and non-STEM GTAs on these instruments, as well as with a Wilcoxon Test to investigate any changes in the total sample (n = 52) between TPD pre- and post-TPD at a large southeastern university.

Part I: Validation of Five Instruments

Part II: Differences in Cognition Related to Teaching

Part III: GTA Interviews - Attitudes and Beliefs Towards Teaching:

GTAs: Sociology, 4 Semesters of Teaching

"I really liked one session where they brought in professors from different backgrounds...English, science departments, history, and they all gave tips as to how they keep their students engaged, and the different types of methods they use. Every student is different".

GTAs: Chemistry, 4 Semesters of Teaching

"I always feel like there is another way I could teach something different...it helped me the most when we did actual teaching demonstrations. I liked that the other GTAs in the program...were not STEM at all...I liked to see how they taught...it made me think, ‘how do I relate this to them’?"

Part III: GTA Interviews - Attitudes and Beliefs Towards Teaching

Research Questions:
RO I: Is there a statistical difference between STEM and Non-STEM GTAs’ cognition related to teaching?
RO II: What changes in cognitive sub-scales on these instruments do we see between TPD pre- and post-data?

Results:
Part II: Differences in Cognition Related to Teaching

Directions for Future Research
Currently, qualitative interview analyses are being done with STEM and Non-STEM graduate teaching assistants which will allow us:

• to gather qualitative data, that is directly related to their experiences, which will help us understand how the beliefs, goals, efficacy, pedagogy, and practices toward teaching compare between STEM and Non-STEM GTAs.

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Discussion & Implications
Based on this sample, we conclude,

Reference Text

Figure 1. CFA of Teaching Efficacy Instrument, STEM GTAs: CFI = .94, RMSEA = .06, p = .12
Figure 2. CFA of Teacher Beliefs Instrument, Non-STEM GTAs: CFI = .87, RMSEA = .10, p = .05

Part II: Differences in Cognition Related to Teaching

Research Question I:

Mean Values of STEM and Non-STEM GTAs: A Measurement of Cognitive Scale Instruments

Part III: GTA Interviews - Attitudes and Beliefs Towards Teaching

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