Assessing a GTA Professional Development Program

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Introduction & Methods

Graduate teaching assistants (GTAs) are essential teaching staff for intro physics courses.
- GTAs supervise as much as half of the students’ in-class contact time [1]
- Providing GTAs with adequate preparation and support for teaching is crucial.
- Preparation has positive impact on teaching effectiveness [2-4]
- Teaching experience improves graduate students’ research skills [5]

Physics GTA Preparation at Georgia Tech
- 92 grad students since 2013
- Integration of physics, pedagogy, and professional development strategies
- Major goals:
  - GTAs develop and apply learner-centered teaching
  - Give/receive feedback
  - Manage classroom dynamics
  - Identify transferrable skills useful for their future careers

Assessment
- Orientation Survey - evaluate course content and determine self-confidence for teaching
- Approaches to Teaching Inventory (ATI) - pre/post research-validated instrument [6] to assess attitdes about teacher-centered and student-centered practices
- Final Survey - evaluation of all course topics and activities at the end of the semester
- Student Evaluations - end-of-semester evaluations of teaching completed by undergraduate students in intro physics labs/recitations

Final Surveys
- (2013-2014) GTAs asked to identify their top 3 most useful course topics
- (2015-2016) GTAs given five-point Likert survey to evaluate usefulness of every course topic/activity
- Microteaching is considered the most useful topic consistently across all four years of GTA prep course

Orientation Surveys
- Orientation Survey, questions in common 2014-2016
- GTAs consider Orientation useful and valuable (Likert survey)
- “How prepared do you feel for your first GTA assignment at Georgia Tech?” before and after Orientation (2016)
- GTAs feel better prepared for teaching after going through Orientation (2-sample K-S test, p=0.0031)

Student Evaluations
- 12 five-point Likert-scale items
- Available data for first-time GTAs:
  - before GTA prep started (2011-2012)
- First-time GTAs who participated in GTA prep received higher evaluation scores across the board
- Analysis (Mann-Whitney tests):
  - First Fall: statistically significant improvement (p<0.05) in all but 3 categories (labeled *)
  - First Spring: statistically significant improvement (p<0.05) in all categories

ATI Pre/Post
- 16 five-point Likert-scale items
- 2 categories, 8 items each:
  - teacher-centered
  - student-centered
- Calculate means in each category for every GTA, pre/post
- No difference in distributions of pre/post means for teacher-centered approaches
- Statistical difference in distributions of pre/post student-centered means (2-sample K-S test, p=0.032)
- GTAs’ approaches to teaching are more student-centered after one semester of GTA preparation and teaching experience

Discussion
- Our GTA Preparation course is well-liked by the grad students who have participated in it, and is effective at improving GTAs’ teaching skills.
- GTAs find the course useful
- The course effectively improves GTAs’ self-confidence in their teaching abilities
- The course effectively increases GTAs’ student-centered teaching practices
- GTAs generally give high ratings to course topics, but find practical activities the most useful, such as Microteaching, Midterm Evaluations, and Classroom Observations
- Students consistently give higher end-of-semester ratings to first-time GTAs who participated in the course than GTAs who received no formal GTA preparation
- Grad students who participate in the course are more effective first-time GTAs than grad students who predate the course, though we must keep in mind the subjectivity of student evaluations [7-10]

References
(1) G.E. Gardner and M.G. Jones, Science Education 95(3), 311 (2011)