Effects of a Professional Development Program on GTA Teaching Effectiveness

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Physics GTA Preparation

• Integration of **pedagogy**, **physics**, and **professional development** strategies

• One-credit course, approx. 17 contact hours
  - “JumpStart” before the semester (~12 hrs)
  - “Check-in Meetings” during semester (~5 hrs)
  - Classroom observations (instructor observes new GTAs; new GTAs observe experienced GTAs)

• Established in 2013; yearly assessments (e.g., surveys, evaluations) and curriculum revisions

• Number of grad students who have gone through the program so far: 92
Teaching Assistant Opinion Survey (TAOS)

• End-of-semester student evaluations; managed by GT Office of Assessment
• 12 Likert questions (5-point-scale), 3 free-response items
  o Oral communication skills
  o Written communication skills
  o Explained concepts clearly
  o Familiarity with course concepts
  o Respect for students
  o Attitude about teaching
  o Stimulated students’ interest in subject
  o Approachability
  o Preparedness
  o Classroom management
  o Actively engaged students
  o Overall effectiveness
PhD Student Population

- Spring 2016 snapshot

Bar chart showing the distribution of PhD students across different years:

- 1st Year: 25%
- 2nd Year: 15%
- 3rd Year: 20%
- 4th Year: 25%
- 5th Year: 10%
- 6th Year: 5%
- 7th+ Year: 0%

Bar chart indicating the year range from Fall 2009 to Spring 2016 with annotations:

- Leading lab or recitation
- Grading only (usually)

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TAOS Data

- Look at TAOS for *intro courses*, and focus only on first year of teaching
  - Pre-intervention group: first-year PhD students in 2011, 2012 (some have graduated already)
  - Post-intervention group: first-year PhD students in 2013, 2014, 2015 (some have left since then)

TAOS data available from 2011 and onwards

GTA preparation program starts in 2013
Data Analysis

• For each GTA:
  o 1 set of TAOS data for each section taught every semester (response rate varies)
  o Interpolated median for 12 TAOS items (Likert 1-5 scale) in each set

• Group score distributions for each item are not normal (skewed towards 5)
  o Mann-Whitney test used to compare distributions

• Main analysis: pre/post
  o Are there statistically significant differences in TAOS scores for first-time GTAs before and after the GTA preparation program went into effect?
  o First fall semester, first spring semester (independent samples)

• Other analyses: national vs international GTAs, differences by GTA assignment, time evolution of returning GTAs... and more in the future
First Fall Semester

(statistical difference if $p<0.05$)

Mean TAOS Score

- Oral comm: $p=0.030$
- Written comm: $p=0.013$
- Explained concepts clearly: $p=0.022$
- Familiarity with concepts: $p=0.003$
- Respect for students: $p=0.053$
- Attitude about teaching: $p=0.051$
- Stimulated interest: $p=0.017$
- Approachability: $p=0.014$
- Preparedness: $p=0.027$
- Classroom management: $p=0.103$
- Actively engaged students: $p=0.027$
- Overall effectiveness: $p=0.029$

pre (N=51) vs. post (N=69)
First Spring Semester

(statistical difference if p<0.05)

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National / International GTAs

• Approx. 30-40% of GTAs (mostly non-native English speakers)
• Post groups (both national and international) have higher TAOS scores
• Better improvement in first Spring semester for both national and international GTAs
Conclusions

• Students tend to not give very low ratings (1 or 2, out of 5) in TAOS
• TAOS scores for first-time GTAs across the board are higher after GTA preparation program went into effect
  o Statistically significant improvement in most categories for first Fall semester, and in all categories for first Spring semester
  o GTA preparation most likely cause of improvement in first Fall semester
  o Improvement in first Spring semester is more complicated (GTA preparation + one semester of teaching experience + ...?)
• International GTAs receive lower TAOS scores than US-native GTAs
  o But also show more improvement after GTA preparation
• More in-depth data exploration needs to be done!