

What elements of GTA development do GTAs find most useful?

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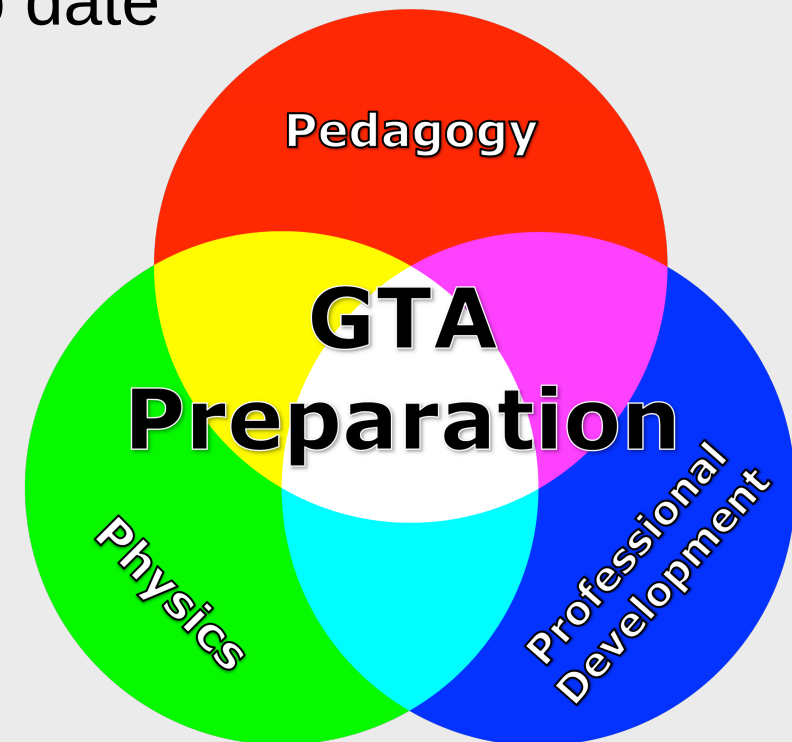
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AAPT Summer 2017 Meeting (24 July 2017)

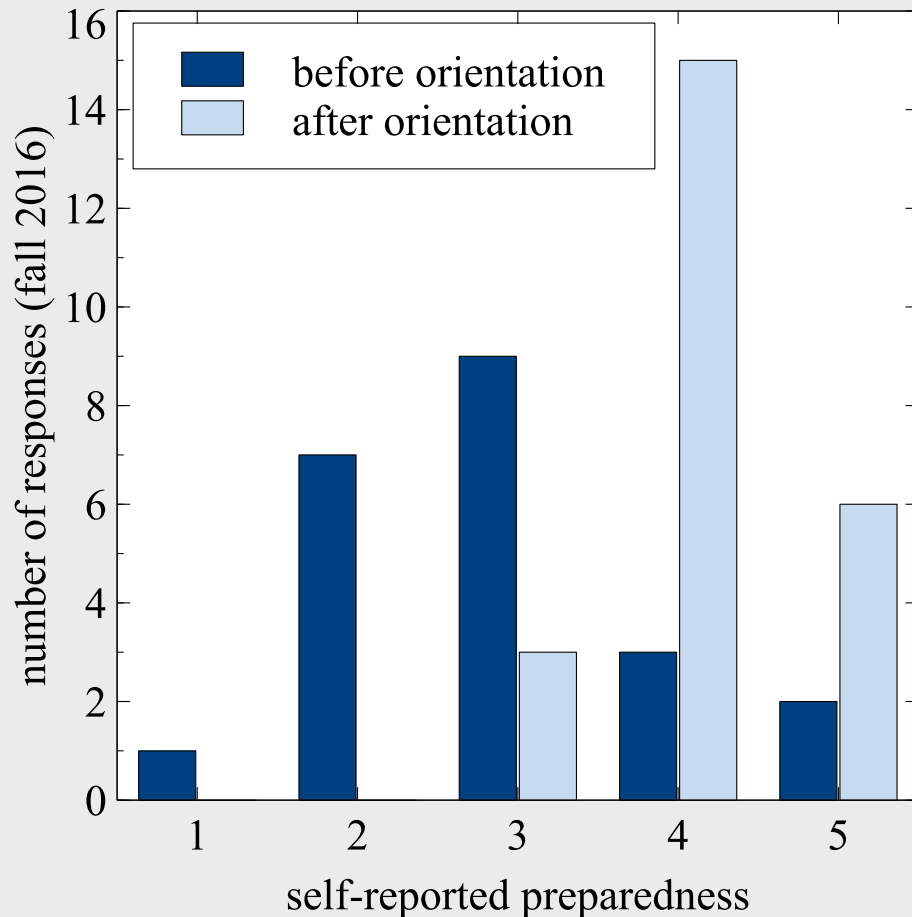


Physics GTA Preparation

- Integration of **pedagogy**, **physics**, and **professional development**
- Established in 2013; prepared 92 grad students to date
- **Major goals:**
 - Help GTAs develop and apply learner-centered teaching practices
 - Give/receive feedback
 - Manage classroom dynamics
 - Identify transferable skills useful for future career

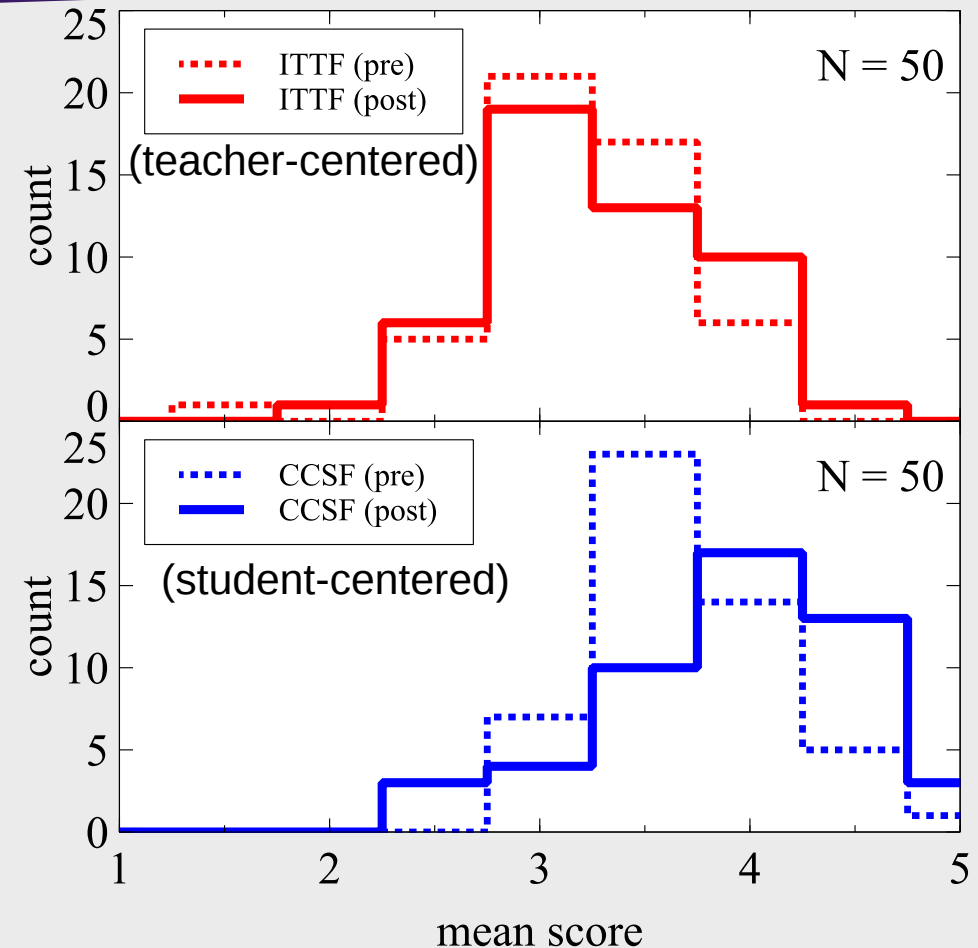


Increases GTA Self-Confidence and Learner-Centered Teaching



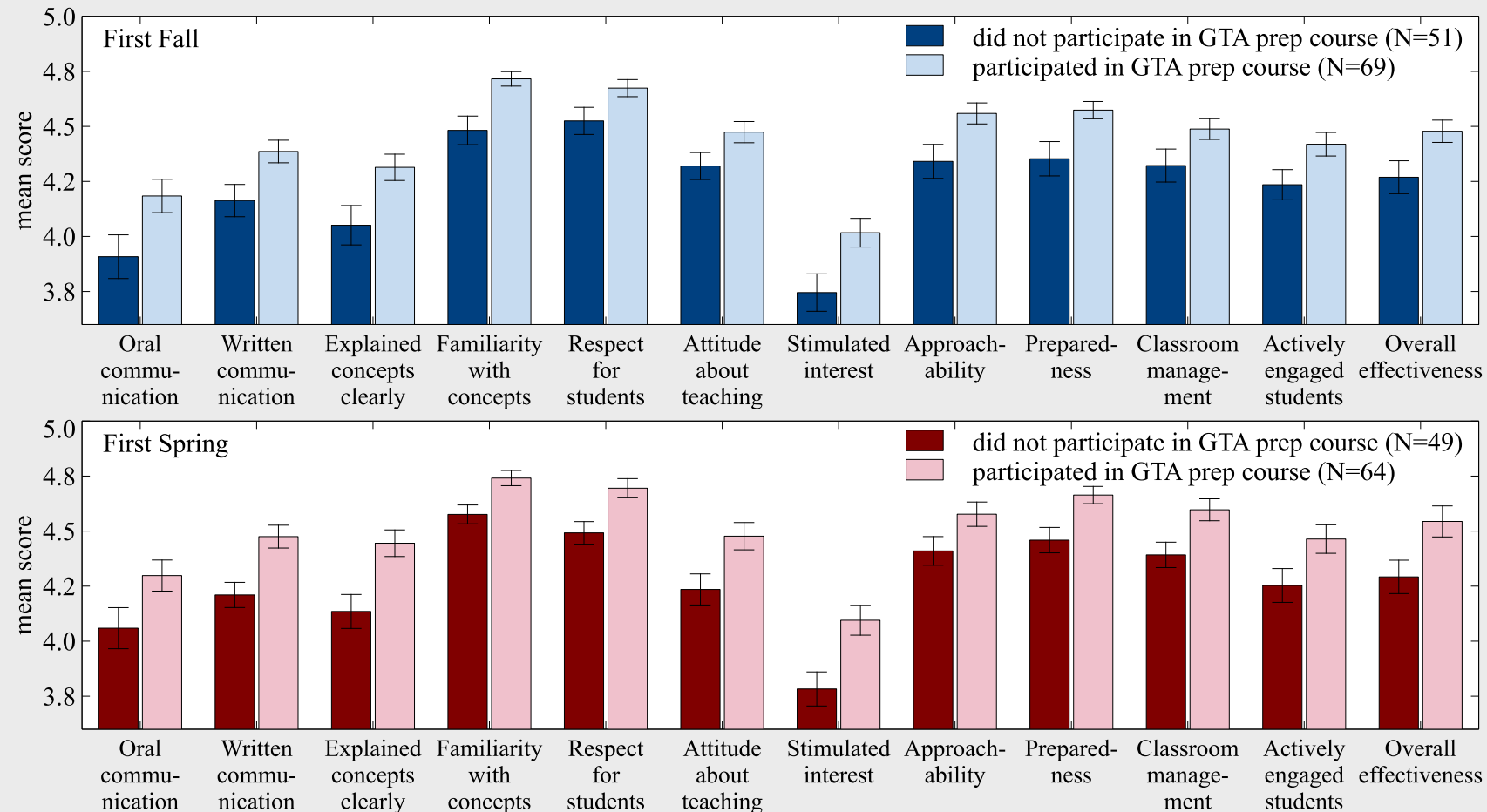
← “How prepared do you feel for your first GTA assignment at Georgia Tech?”

→ Approaches to Teaching Inventory (ATI) pre/post



Improves Teaching Effectiveness of First-Time GTAs

- End-of-semester student evaluations
 - 2011-2012: No GTA Prep
 - 2013-2015: GTA Prep



What elements do GTAs consider the most useful?

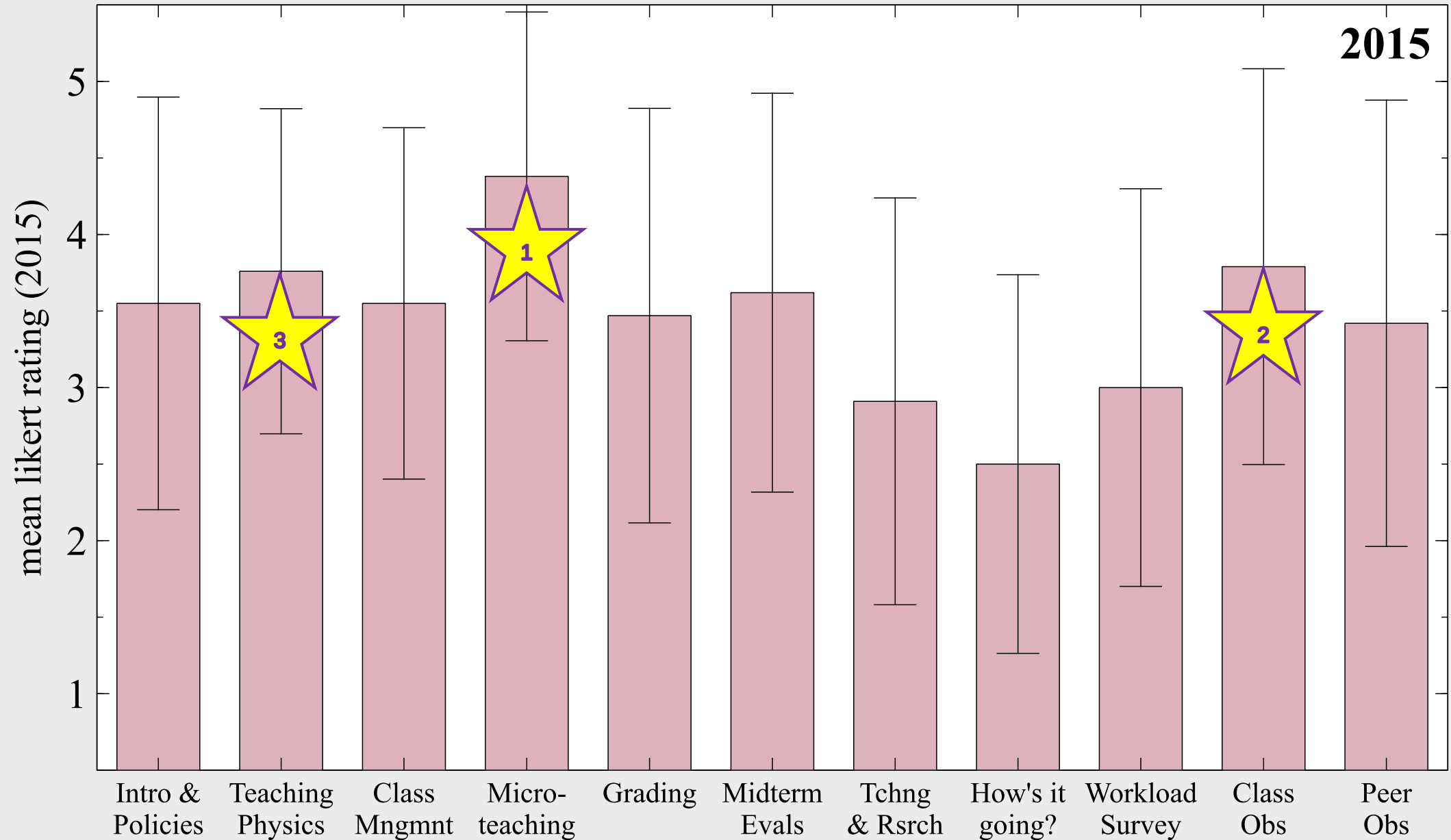
- **2013 and 2014:** GTAs asked to identify top 3 most useful course topics

Rank	2013	2014
1	Microteaching	Microteaching / Midterm Evaluations
2	Grading	Classroom Management
3	Midterm Evaluations	Teaching Videos

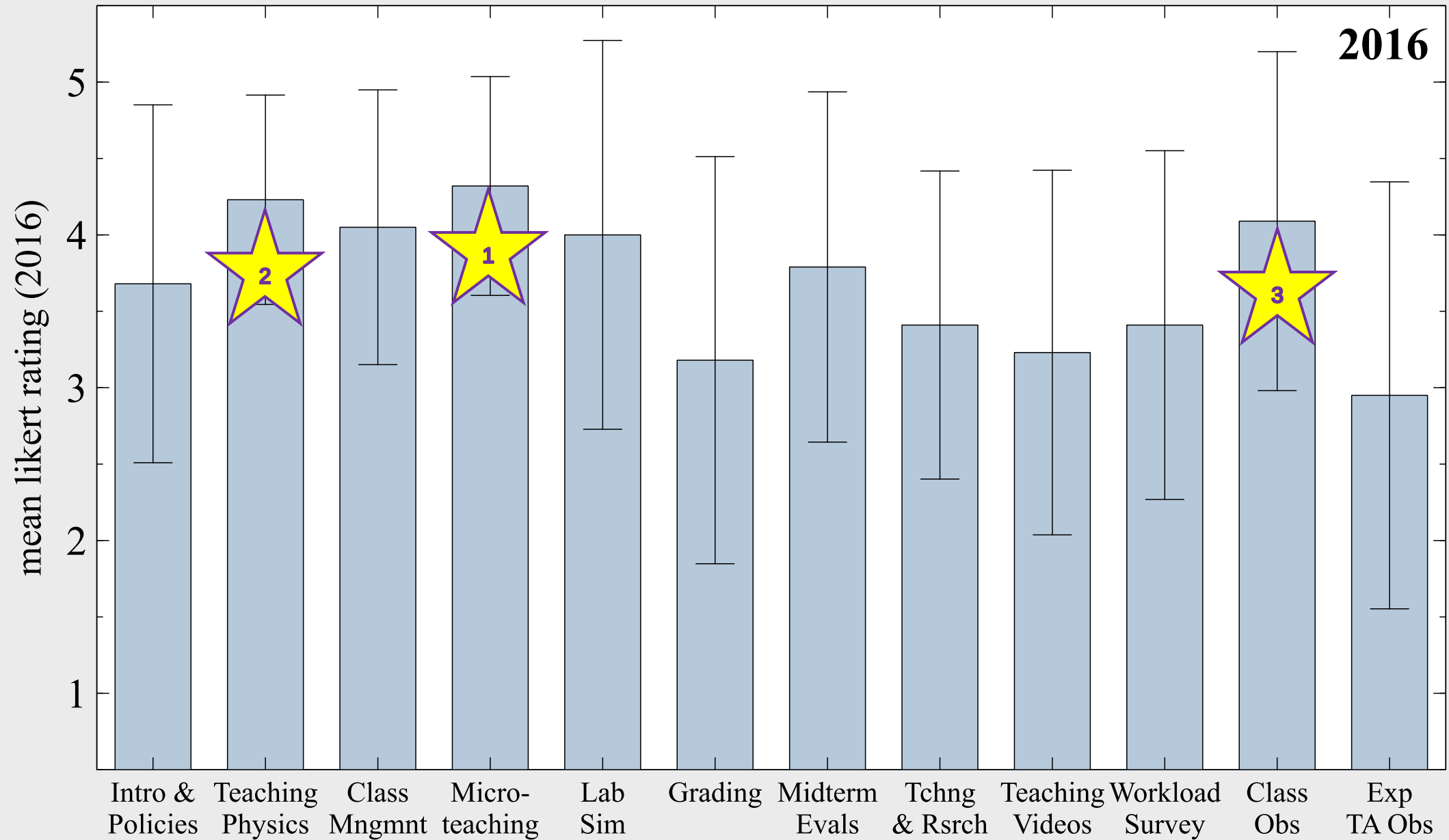
What elements do GTAs consider the most useful?

- **2015 and 2016:** five-point Likert survey to evaluate usefulness of topics

What elements do GTAs consider the most useful?

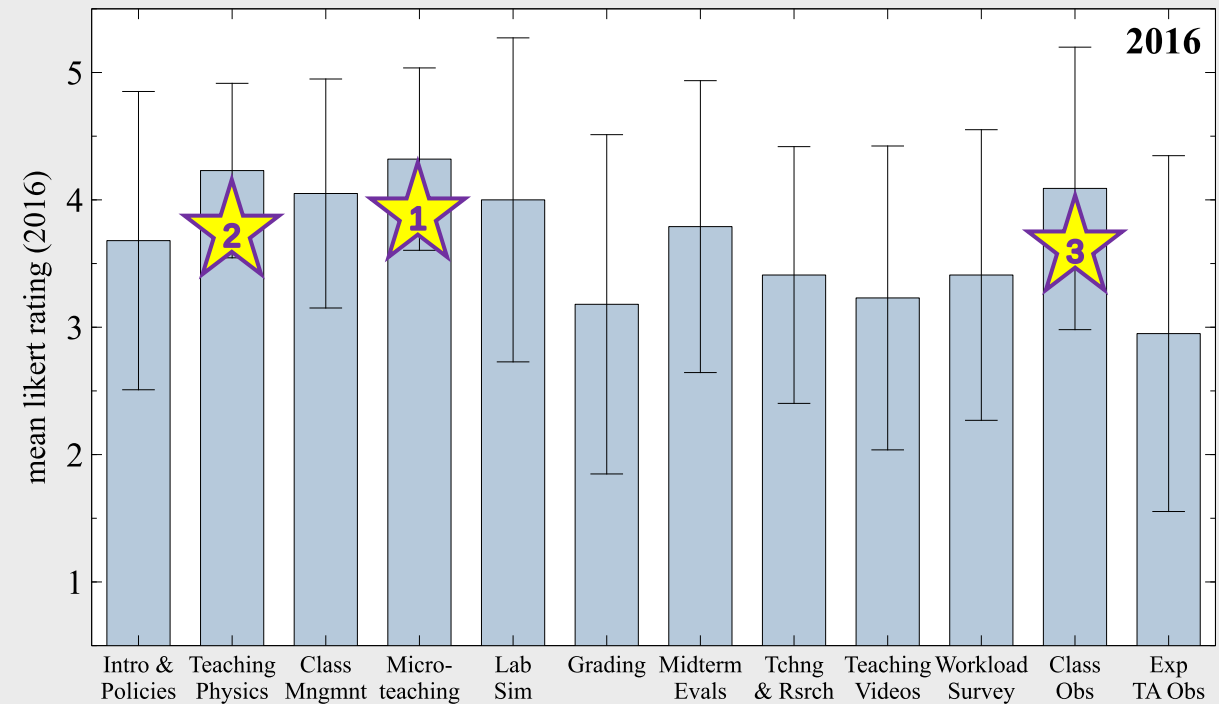
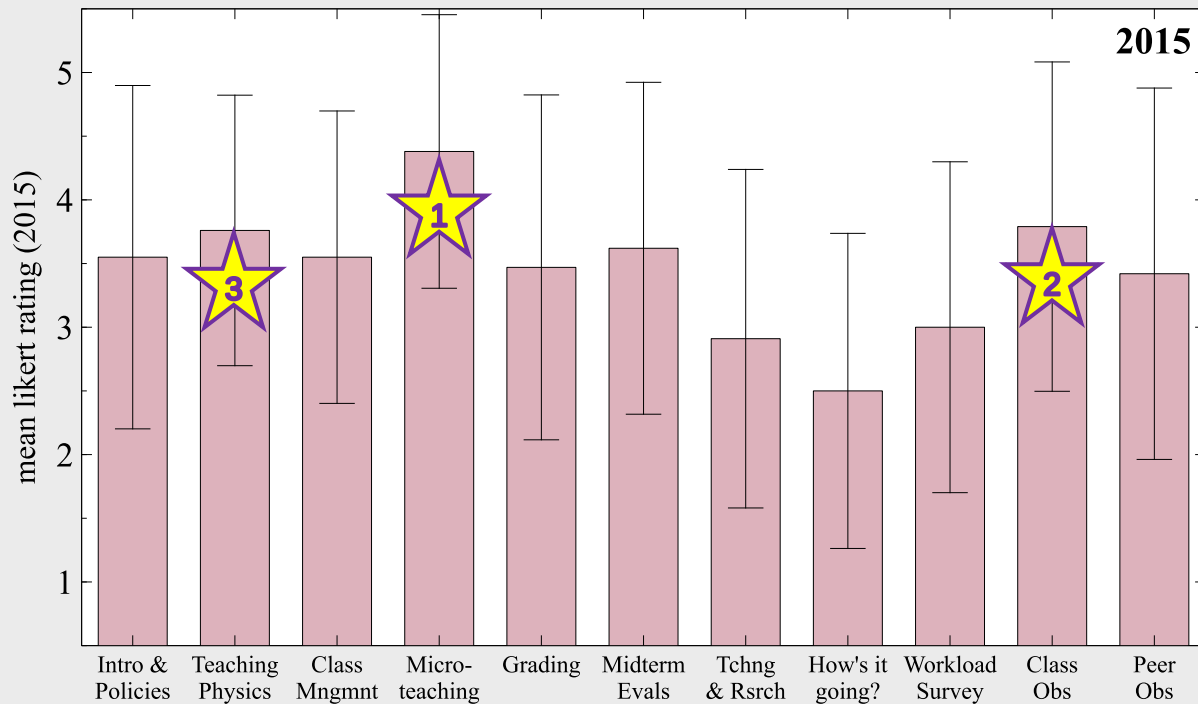


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- **2015 and 2016:** five-point Likert survey to evaluate usefulness of topics



GTAs Prefer Practical Activities

- Microteaching consistently rated most useful course topic
 - Also Midterm Evaluations, Classroom Observations
- More information: **PERC Poster**
 - Assessing a GTA Professional Development Program

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

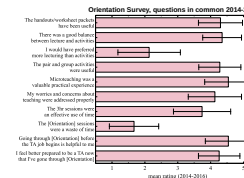
Major goals:

- GTAs develop and apply learner-centered teaching
- Give/receive feedback
- Manage classroom dynamics
- Identify transferable 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 attitudes 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

Orientation Surveys



• 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, $p=0.001$)

Final Surveys

• (2013-2014) GTAs asked to identify their top 3 most useful course topics

Final survey top 3 (2013-2014)				
Rank	2013		2014	
1	Microteaching	Microteaching	Midterm Eval	
2	Grading	Classroom Management		
3	Midterm Evaluations	Teaching Video		

• (2015-2016) GTAs given five-point Likert survey to evaluate usefulness of every course topic/activity

Final survey top 3 (2015-2016)				
Rank	2015	Mean ± St.Dev.	2016	Mean ± St.Dev.
1	Microteaching	4.35 ± 1.07	Microteaching	4.32 ± 0.72
2	Classroom Management	3.79 ± 1.29	Grading/Prep	4.23 ± 0.66
3	Teaching Physics	3.76 ± 1.06	Classroom Observation	4.08 ± 1.13

• Microteaching is considered the most useful topic consistently across all four years of GTA prep course

ATI Pre/Post

• 16 five-point Likert-scale items

• 2 categories, 8 items each:

- teacher-centered
- student-centered

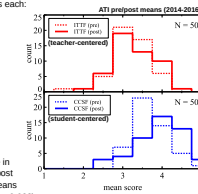
• Calculate means in each category for every GTA, pre/post

• 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, $p=0.032$)

• Statistically significant improvement in student-centered grand mean, from 3.52 to 3.72 (Wilcoxon signed-ranks test, $p=0.023$)

• GTAs' approaches to teaching are more student-centered after one semester of GTA preparation and teaching experience



Student Evaluations

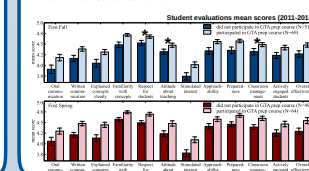
• 12 five-point Likert-scale items

• Available data for first-time GTAs: before GTA prep started (2011-2012), participated in GTA prep (2013-2015)

• 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



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 participate 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

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- (3) J.S. Spence, Canadian Journal of Higher Education 43(3), 100 (2013)
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- (6) K. Triggall and M. Prosser, Educational Psychology Review 14(4), 409 (2004)
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- (9) P.J. Van der Stoep and J.A. Van der Stoep, Journal of Education for Business, 78(5), 313 (2003)
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