



Benefits of the Undergraduate Teaching Assistant Experience in an Introductory Biology Laboratory Course and other STEM courses

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The Course

- Investigative Biology Laboratory (BioG1500)
- 2 credits
- Required for Biological Sciences Major
- One 50-min lecture and one 3-hour lab per week
- ~380 students/semester
- 24 sections of up to 18 students
- 12 Graduate Teaching Assistants (GTAs)
- 12 Undergraduate Teaching Assistants (UTAs) (S19, N=13)
- Each GTA instructs and UTA assists with 2 lab sections/week
- Each section has 1 GTA and 1 UTA

UTA Roles

- Attend 2 lab sections/week
- Provide logistical assistance to the GTA
- Facilitate student discussions
- Encourage student participation
- Circulate and answer questions during lab
- Proctor practical exams
- Hold 3 office hours/week in our study center
- Some provide paper feedback without grading
- Some communicate with students electronically
- Some lead lab activities

UTA Pedagogy Training

- Attend 5 of 7 bi-weekly discussion sections led by postdocs
- Read & discuss journal articles about teaching & learning
- Discuss classroom experiences, challenges, and solutions
- Microteaching practice with peer and postdoc feedback
- Topics included:
 - How to use Active Learning Techniques
 - How to assess student learning
 - Understanding diversity and student learning
 - How to recognize when students are struggling

GTA-UTA Interactions

- Variable
- Some provide informal mentorship
- Some communicate in person before lab
- Some communicate via email before lab
- Some GTAs provide feedback after lab

Other Guidance

- Weekly prep notes are provided that outline lab activities and how UTAs can assist
- Mid- and end-of-semester student evaluations

Benefits for UTAs

(Self-reported in anonymous and named surveys)

Overall Value

"My UTA experience this semester was overall valuable."
10=strongly agree, 1=agree, 1=somewhat agree, 1=neutral

Improved teaching skills

"I learned that being a UTA is not a passive position. It requires a lot of student interaction and public speaking which was something I really enjoyed. I also enjoyed learning about different active learning techniques and applying that to my position as a UTA."

Improved Communication

"At first, I felt very uncomfortable speaking in front of the whole class. Now, I feel much more comfortable doing so."
"I learned how to...explain challenging concepts to students."

New appreciation for course curriculum

"...as a student, there were some labs and assignments that I thought were not useful, but now I see the value in."

New appreciation for teachers' efforts

"I initially underestimated the amount of effort and preparation that it takes to run this course..."

Deeper understanding of course content

"I gained a new understanding of the class material, because I was now responsible for teaching it to other people. This required a new appreciation and level of understanding of the concepts."

A feeling of being valued

"One of my favorite parts is when I get an Instagram request from a student of mine at the end, makes me feel like I was successful"

Expanded social network

"I built strong relationships with my students and grad TA."

Improved metacognition as a student

"Learning about how people learn helped me a lot with my own studying and with teaching material to students"

Career and Academic Advice

"I obtained valuable guidance from my graduate TA in terms of summer plans and future career paths."

Informed career goals

"It taught me that I do enjoy teaching, and made me consider even more teaching as a career choice."
"I have begun considering the possibility of a future in teaching."
"I am definitely more inclined to pursue teaching as a career."
"It inspired me to consider more teaching opportunities in the future as a doctor."
"I think it has positively influenced my career goals. I thoroughly enjoyed working with my graduate TA's and all of the students this semester, which reinforced that I do love working with people. My love for people is what fuels my desire to be a doctor, so this definitely reinforced that for me."
"...it has eliminated teaching as a possible career goal."



Benefits for GTAs

- Another person to answer students' questions
- Another set of hands for logistics
- Another person for one-on-one student assistance
- Students can be more comfortable approaching a UTA
- Provides another perspective, one closer to the student
- Reminds GTA if something is missed
- Can improve students classroom attitudes

Student Corroboration

(Student Evaluation of Teaching) From your perspective, please indicate any aspects of your Undergraduate TA's teaching performance that improved over the course of the semester.

UTAs improve confidence and public speaking

"I think that [UTA] got a lot more confident in her teaching throughout the semester. [UTA] had more of a presence at the end of the semester, indicating she was more confident in her role as a TA. I think that [UTA] also got better at presenting in front of the class."
"[UTA] could explain knowledge more clearly with more confidence."
"[UTA] got better at teaching in front of the class and getting information across to us."

UTAs become more engaged and attuned to students

"[UTA] became more engaging and open to helping students who struggle even before they admitted they were struggling"
"[UTA] was increasingly more active in lab throughout the semester."
"[UTA] was a more helpful resource in the lab and walked around more, being more engaging."

Challenges

UTAs may not realize the time commitment
"The only negative aspect of being [a UTA] was that it was so time consuming."

No student audience during teaching practice
"it's super awkward and not realistic cause we aren't actually teaching students."

GTAs may hesitate to provide UTAs feedback
"I found that my own [GTAs] were very kind-hearted people and seldom provided me with constructive feedback."

GTAs may not provide many opportunities
"sometimes there wasn't much for me to do."

GTA-UTA communication may be weak
"we never talked about the evaluations or really prepped for class besides just talking about it for 5 min before it started"

UTAs may become bored and distract students
"class can be boring because I already know everything being taught."

Inexperienced GTAs may find mentoring difficult
"I don't think I would be able to [mentor] in my first semester, I was just trying to stay above water." (GTA)

Expectations need to be communicated
"sometimes I wasn't sure if I was communicating [the GTA's] expectations".

Timely integration of training with lab activities
"sometimes what we learned in the pedagogy wasn't really applicable to what we would be [teaching] in the lab."



Benefits for UTAs - Discipline Comparison

Preliminary analysis of non-anonymous survey given to UTAs online early and late in Spring 2019

| | How much do you agree or disagree with the following? I am confident in my ability to... | | | | | | | | | | | |
|----------------------------|--|-----|---------------|-----|-------------|-----|--|-----|---------------|-----|-------------|-----|
| | Speak in front of an audience | | | | | | Explain concepts or demonstrate the use of equipment to students | | | | | |
| | Biology N=50 | | Chemistry N=7 | | Physics N=9 | | Biology N=50 | | Chemistry N=7 | | Physics N=9 | |
| Strongly agree | 22% | 30% | 43% | 29% | 22% | 22% | 16% | 32% | 43% | 43% | 11% | 33% |
| Agree | 30% | 40% | 14% | 43% | 33% | 44% | 46% | 34% | 14% | 14% | 22% | 11% |
| Slightly agree | 28% | 18% | 29% | 29% | 33% | 11% | 20% | 26% | 14% | 14% | 0% | 11% |
| Neither agree nor disagree | 2% | 2% | 14% | 0% | 0% | 0% | 6% | 6% | 0% | 14% | 22% | 11% |
| Slightly disagree | 12% | 8% | 0% | 0% | 11% | 22% | 8% | 0% | 14% | 0% | 33% | 33% |
| Disagree | 4% | 2% | 0% | 0% | 0% | 0% | 2% | 2% | 14% | 14% | 11% | 0% |
| Strongly disagree | 2% | 0% | 0% | 0% | 0% | 0% | 2% | 0% | 0% | 0% | 0% | 0% |

How likely are you to pursue a career in teaching?

| | Biology N=51 | | Chemistry N=7 | | Physics N=9 | |
|-----------------------------|--------------|------|---------------|------|-------------|------|
| | Pre | Post | Pre | Post | Pre | Post |
| Extremely likely | 0% | 2% | 14% | 0% | 0% | 0% |
| Moderately likely | 22% | 22% | 43% | 43% | 56% | 67% |
| Slightly likely | 33% | 22% | 14% | 29% | 33% | 11% |
| Neither likely nor unlikely | 12% | 10% | 0% | 0% | 0% | 0% |
| Slightly unlikely | 8% | 10% | 14% | 0% | 11% | 22% |
| Moderately unlikely | 20% | 25% | 14% | 14% | 0% | 0% |
| Extremely unlikely | 6% | 10% | 0% | 14% | 0% | 0% |



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Acknowledgements:
We are grateful for the hard work of our UTAs, GTAs, and staff. FRC is funded through Cornell University's Active Learning Initiative.