

2023-2024 Bok Center Pedagogy Fellow in STEM Capstone Project

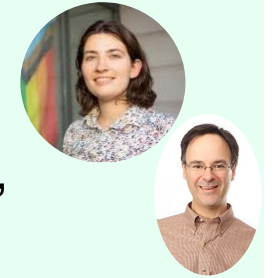
Tommy George

Highlights:

- Training and community-building for TFs in SEAS
- Peer observation of other STEM pedagogy courses (CCB & MCB)
- Video consultations with current TFs
- Planning a new graduate course in *electrochemical engineering*

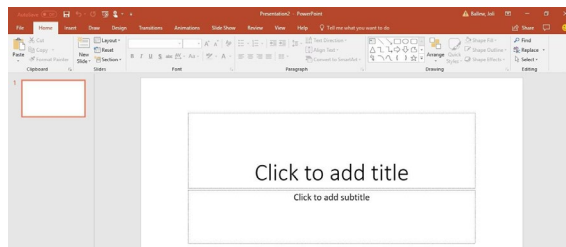
Training for new TFs in SEAS

- Half-day mandatory training for new TFs (non-CS SEAS) – led by Ashley Cavanagh
- ~ 2 sessions in the fall and the spring each
- *Outline:* Overview of TF role, undergraduate demographics and common challenges, microteaching, Title IX and TF comportment, scenarios and discussion



Microteaching:

- Different approaches:
boardwork and pre-made slides



- TFs practiced giving and receiving feedback

Scenarios:

1. A TF makes a mistake on the board, causing confusion
 - ✓ Follow up after class with the correct solution
 - ✓ Use as a teachable moment about fixing common mistakes
2. A TF encounters students at a party...
 - ✓ Importance of professional boundaries with students
3. Lots of out of class messages from some students, but challenges with reaching other quieter students who need help
 - ✓ Provide multiple avenues, incl. anonymous, for students to ask questions

Training for new TFs in SEAS: *Example Scenario*

Milo is the TF of an engineering course that involves difficult weekly problem sets. At the first section of the course, Milo encouraged their students to make use of office hours, as well as to reach out over Slack and email, to ask questions about course content and get help with assignments. As the semester progressed, Milo noticed that some students had never attended office hours, whereas others were coming every week. Milo was also feeling overwhelmed by a steady stream of emails and messages about assignments, but was noticing that the students who were actually struggling the most on these assignments were not the ones asking for help. One student, Maggie, was really motivated to pursue a career related to the course content, excelled on all graded assignments, and also sent Milo questions about lecture, section, and problem sets almost every day. Milo is having a hard time keeping up with all these questions, but they don't want to discourage their most motivated student. Meanwhile, they are also worried that some students are getting left behind, and these students aren't making use of all the resources for help available to them.

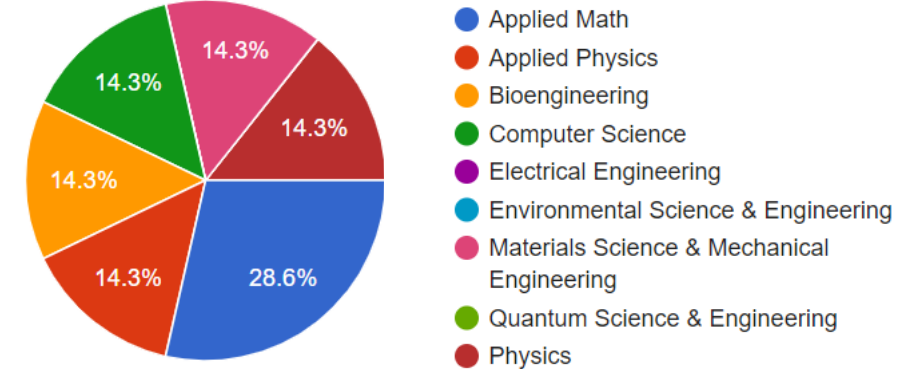
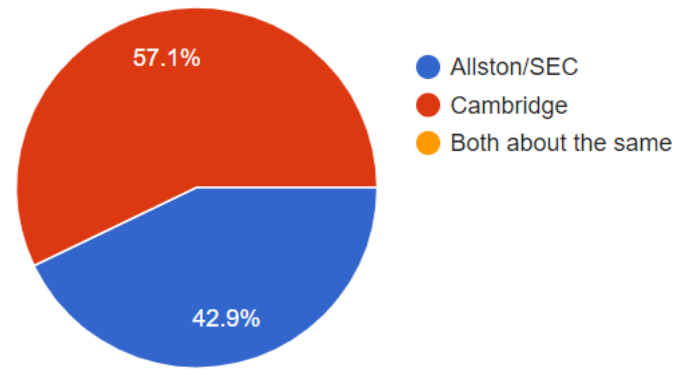
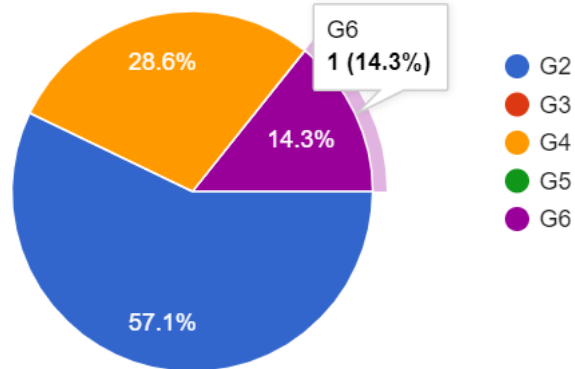
Discussion Questions:

What could explain this class dynamic, where the students most comfortable asking for help are excelling, while other students are struggling but reaching out for help less frequently?

How could Milo work with Maggie to keep her excited about the course, while rebalancing their time and attention to reach more of the students in the class without getting overwhelmed with work?

How could Milo help the students who are struggling in the class?

Survey results from new SEAS TFs



7 respondents - a small fraction of SEAS TFs, getting input from everyone still a challenge

But we decided to implement this suggestion:

Feel free to tell us other ideas on how we can support you, or anything about you you'd like us to know, in the space below!

1 response

I think the office hours are a great opportunity to ask any questions that are more specific to each TF's experiences/troubles, rather than having more general workshops that might not be as efficient or effective.

SEAS TF “coffee hour chats”



Informal gatherings of current TFs: me, Ashley, John Girash, with snacks and drinks, in grad student lounges in both Cambridge and the SEC. A few (1-3) came each time but would stay and chat the whole time.

Here's what we chatted about!

HW grading:
How to be time-efficient but thorough w/ feedback

Same dept. different TF roles:
How TF experiences can be quite different across courses in SEAS

TFs per course:
Challenge of being the sole TF

To record or not to record:
Will they come to class?

Brand new courses:
Challenge of starting from scratch

Observing other pedagogy courses



Chemistry & Chemical Biology

PF Sam Veroneau

What I did:

- Observed one session of the class, which was focused on active learning strategies

Takeaways:

- ✓ Mandatory course for G1s is an opportunity for teaching as a base for community building
- ✓ Teaching active learning strategies by demonstrating them in the lesson is an effective approach



Molecular & Cellular Biology

PF Cait Moffatt

What I did:

- Facilitated 8-min microteaching and peer feedback for a group of TFs

Takeaways:

- ✓ 8 min was a good amount of time for TFs to practice a variety of teaching moves
- ✓ TFs already comfortable with each other gave really thoughtful and constructive feedback

Video consultations with TFs

Climate change-based GENEDs: Facilitating student discussion

- Courses often assigned to EPS TFs who do not have a department pedagogy fellow
- Massive breadth of content from different disciplines to cover: economics, literature, physics, earth science
- Climate crisis presents strong motivation for students and pedagogical opportunity
- ✓ Focused on active learning moves to draw students into discussion – this was a central concern of TFs
- ✓ Also discussed strategies to transition between seemingly disconnected content areas, especially when TFs don't have total control over section content

Undergraduate mechanics: Effective boardwork

- TF used section to work through example problems on a whiteboard
- ✓ Worked on engaging the class with questions or asking their input with problem solving
- ✓ Discussed the challenge of helping with homework problems without giving everything away

Upper-level undergrad experimental biology: Drawing on student motivation

- TF was a seminar participant – Taking Your Teaching to the Next Level
- ✓ TF really effectively used scientific reproducibility crisis to motivate learning (potentially dry) stats methods

New course: AP2XX Electrochemical Engineering



Prof. Zack Schiffer
new Applied Physics faculty



A net zero world will be powered by renewable electricity...

Storing electricity and using it to power new, carbon-free chemical industry means driving chemical reactions with renewable electricity -

*that's where
electrochemistry
comes in!*

Can we incorporate active learning in electrochemistry, to give students hands-on problem-solving experience?