

## On the BPC Importance of Centralizing TA Training, Recruiting, and Evaluation<sup>1</sup>

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As computing departments have experienced significant growth in enrollment in recent years, teaching assistants (TAs) play an increasingly important role in program delivery and student experience. Depending on the institution, the role of the TA may include teaching/leading labs or recitations, holding office hours, grading assignments/exams, and helping with course administration. Many departments employ both graduate (PhD/MS) and undergraduate students as TAs. For universities that deploy TAs in student-facing roles, close attention should be given to their training, recruitment, and evaluation to ensure the teaching ecosystem as a whole is an inclusive learning environment for all students.

To date, the Center for Inclusive Computing (CIC) has performed all-day site visits at more than 45 universities across the U.S. and discovered that only a handful have implemented centralized TA training, recruitment, and evaluation. At most universities we visited, professors are expected to find their own TAs, train them as necessary, and neither they nor the department perform any systematic evaluation of TA performance. Note that while some schools do have university-wide training programs, these programs are most often focused on ensuring that TAs understand laws like FERPA and Title IX and do not explicitly prepare them to be inclusive teachers, mentors, and tutors in computing.

TA training is important because we have observed that *both students and TAs* are more likely to have negative experiences if the TAs are not trained. During a typical CIC site visit at a school without TA training, the women students we interview share that the TAs often indicate their questions are “too basic” and make them feel like they don’t belong. For their part, the TAs confess to being faced with interpersonal student situations for which they have no training (e.g., a student raising a concern that a student in their group is not pulling their weight). *From a BPC perspective, the TAs, particularly undergraduate TAs, are perceived as “near peers” to the students and can serve as role models for students discovering computer science at university.* Indeed, research has demonstrated that TAs can develop social capital that could improve retention of historically marginalized students.<sup>2</sup>

In this paper we discuss the benefits of centralized training, recruiting, and evaluation, outline and address the main concerns we have heard from faculty about centralizing these tasks, and provide concrete steps toward implementation.

### Centralized TA Training

Providing high-quality centralized pedagogical and interpersonal training to all TAs benefits students, TAs, and professors:

1. Students are rewarded with an environment in which TAs are more prepared to address student questions, treat students as multi-dimensional human beings, and understand that students’ backgrounds are unique and varied.

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<sup>2</sup> Shaundra Daily, Wanda Eugene, and Anderson D. Prewitt. "The development of social capital in engineering education to improve student retention." *American Society for Engineering Education Southeast Section Conference*, Louisville, KY, 2007.

2. TAs benefit from increased preparation, confidence in their own skillset, and obtaining more connections to their network of fellow TAs.
3. Professors benefit from being able to both count on the TAs they work with having had training and from reduced time pressure that centralized training provides for their already busy schedules.

However, while these benefits are attractive, it's important to acknowledge any barriers to centralized training. In the CIC's site visits, faculty cited one or more of the following concerns:

1. Budgetary: TAs must be paid for all the time they spend in the role and faculty can be reluctant to cede time or budget to TA training;
2. ROI: The return on investment can be hard to measure, especially in contrast to training on the grading tools and other systems that the TAs must learn;
3. The Trainer: No one in the department feels qualified to train the TAs, particularly when it comes to non-technical material such as how to create an inclusive learning environment; and
4. Training Curriculum: Departments feel pressure to develop their own materials, which can feel overwhelming, or they are unclear on where to turn for materials.

With regard to budget and ROI, centralized training is a more economical approach than having each professor invent their own methodology. The CIC encourages departments to allot at least two hours of every TA's time in the first week to attend centralized training, a period when course-related duties are typically low and the time-pressure on weekly TA hours is lighter. Indeed, when these concerns are paramount, one solution is to only require new TAs to attend training, and because TAs often work for multiple semesters, this amortizes the cost. Return on investment typically manifests with TAs expressing gratitude for their training and saying that they feel more prepared to work with the students in their classrooms. The CIC finds that faculty report better working relations and overall experience with their TAs and that students report fewer negative incidents and more excitement about working with TAs. To address concerns 3 and 4, there are resources available that reduce the initial burden of establishing a centralized TA training program. For example, Muzny and Shah provide a complete and publicly accessible curriculum that is adjustable to time constraints that individual institutions may be facing.<sup>3</sup> Pon-Berry et al. have contributed important work in developing peer mentoring and training programs (MaGE project)<sup>4</sup> in the context of small liberal arts schools. Mia Minnes has a quarter-long course for which the materials are publicly available.<sup>5</sup> The AiiCE program exposes computing TAs to topics that will help them contribute to a more inclusive and supportive learning environment.<sup>6</sup> Note that, if possible, we recommend in-person training including active discussions with experienced educators and fellow TAs. This is because we believe that we should rely on the same evidence-backed teaching techniques with our TAs that we rely on with our students; both populations are learning new skills.

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<sup>3</sup> Felix Muzny and Michael D. Shah. 2023. Teaching assistant training: An adjustable curriculum for computing disciplines. In Proceedings of the 54th ACM Technical Symposium on Computing Science Education V. 1 (SIGCSE 2023), March 15–18, 2023, Toronto, ON, Canada. ACM, New York, NY, USA

<sup>4</sup> Heather Pon-Barry, Audrey St. John, Becky Wai-Ling Packard, and Barbara Rotundo. "Megs and Gigas Educate (MaGE) A Curricular Peer Mentoring Program." *Proceedings of the 47th ACM Technical Symposium on Computing Science Education*. 2016.

<sup>5</sup> <https://cseweb.ucsd.edu/~minnes/cse599/>

<sup>6</sup> <https://sites.google.com/mtholyoke.edu/aiice-ta-pd-info-site>

## Centralized TA Recruitment

Only about half of the 45 universities we visited have centralized recruitment of TAs. When left to their own devices to select TAs, professors will most often look for students who received a top grade in their class, focusing only on a prospective TA's ability to understand the material. There are notable exceptions of course but, in general, professors do not have the bandwidth or resources to thoughtfully recruit a cohort of TAs. A centralized system provides the following benefits:

1. It positions the department to recruit a cohort that is diverse in demographics (gender, race/ethnicity) and in "thought," by which we mean students who have taken different *pathways* to the class, for example transferring from a community college, taking the AP exam, "discovering" CS as a major in a different discipline, etc.).
2. It sets a department up to collect historic data about which students have performed well in the TA role and who should not be asked back.
3. It increases the transparency of the process for those looking to become TAs, ensuring that applying for these coveted positions is open to all (coveted not just because of the pay but because of the "subject mastery" signal it sends to prospective employers). Indeed, centralized recruiting moves the department away from any favoritism that can benefit self-promoters, providing a more equal playing field for all students.
4. Centralized recruiting benefits new faculty because these faculty don't yet know the students. Indeed, the department can proactively match experienced TAs with the courses being taught by new faculty.

Although some faculty may resist the idea of a centralized recruiting system because they want to have agency over who they work with, a centralized system can still provide this option. For example, a standard workflow is for an email to go out to all students asking for TA applicants. At the same time, faculty are asked to personally encourage students to apply. The application typically asks the students for their top preferences or invites them to apply to the TA pool at large. Other information can be requested, or auto populated from departmental records, such as prior TA experience and a student's grade(s). At a few institutions, applicants are interviewed, but most just have a form for students to complete. For all students accepted to be TAs they are then assigned to classes (in most of the CIC schools with centralized recruiting, professors are allowed to input preferences before the assignments are done). Assignments are typically done by either a professor in charge of the TA program or by a staff person.

## Centralized TA Evaluation

At only two of the 45+ site visits did we find a comprehensive TA evaluation system. Comprehensive evaluation includes the TA's own experience, students' experiences interacting with the TA, and faculty experience working with their TA. Of these three, the one most likely to already be in place is a system for professors to give feedback about TAs, which can then be used in a centralized recruiting and assignment system to weed out "bad" TAs. However, faculty experience is most often based on whether the TA completed their duties in a timely fashion and is rarely based on a comprehensive evaluation of their performance with respect to TA-student interaction. At some universities, the official Student Evaluation of Teaching (SET) form has a question or two related to TAs such as "Were the TAs

helpful?”, but even in these cases, there are rarely systems in place to use this feedback to close the loop and improve TA performance. A few universities have TAs reflect on what they have learned during TA training and what types of training they wish they had more of. Finally, to our knowledge only a few universities are performing in-depth wide-scale evaluation of the students’ perspective on TAs.<sup>7</sup>

In our view a comprehensive centralized evaluation would include:

- 1) Student surveys: Because of the known sources of bias and flaws with standard SETs,<sup>8</sup> student evaluations of TAs should focus on their interactive experiences working with TAs. Thus, rather than having students rate the overall effectiveness of TAs as teachers, for example, we recommend asking students questions about their sense of belonging and whether working with the TA piqued their interest in the subject at hand.
- 2) TA surveys to evaluate their experiences and the preparation/training they received: TA evaluation of the training and preparation they received should be used to continuously update and improve the centralized TA training curriculum and identify gaps in what TAs need/expect and what they are receiving. Although perhaps controversial, TA evaluation should include TA’s evaluation of working with the professors with whom they were paired. This evaluation should be used to determine which faculty need more support in managing and working with larger teaching teams. The reality of our ecosystem is that faculty in computing departments are increasingly asked to work with and manage large teams of TAs, which is not a skillset that is provided by the typical PhD program.
- 3) Feedback from professors: At the same time, professors should be asked to complete feedback forms to ensure that TAs who do not meet their responsibilities are not asked back.

In terms of implementation, short in-class surveys produce a higher completion rate than those out of class,<sup>9</sup> TAs should receive a survey toward the end of the semester, and professors should be prompted to provide confidential feedback on their TAs at the end of the semester. Finally, evaluation should be considered when determining which TAs should be “asked back” and to provide confidential feedback to TAs and professors on how to improve.

### **Centralized TA training, recruiting, and evaluation is one of several best practices for retention in CS**

As discussed, centralized TA training, recruitment, and evaluation are a necessary component for the retention of students in computing and to handle the large surges in enrollment currently being experienced in computing across the U.S. This approach is even more beneficial when combined with other best practices that have been proven to increase retention of students from populations historically marginalized in tech. We point the reader to other articles that can be found at <https://cic.northeastern.edu/resources/> which describe other best practices.

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<sup>7</sup> If you would like to be part of a research study to determine how to evaluate teaching assistants during class in your university, please email Felix Muzny at [f.muzny@northeastern.edu](mailto:f.muzny@northeastern.edu)

<sup>8</sup> Rebecca J. Kreitzer and Jennie Sweet-Cushman. "Evaluating student evaluations of teaching: A review of measurement and equity bias in SETs and recommendations for ethical reform." *Journal of Academic Ethics* (2021): 1-12.

<sup>9</sup> The CIC together with CRA’s CERP developed an in-class survey for students’ evaluation of TAs. Please email Felix Muzny at [f.muzny@northeastern.edu](mailto:f.muzny@northeastern.edu) if you are interested in this survey instrument.