

# THE TEACHING EXCHANGE

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## *Peer Mentoring for Graduate Teaching Assistants in Physics*

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*Physics*

The training of new teaching assistants (TAs) has recently been given more attention at the University level. Brown has decided to push for an improvement in the preparation of new graduate students as they take on teaching responsibilities. However, each discipline still deals with the individual situation. In the Department of Physics, the graduate students have taken the initiative to develop and instate their own program for their incoming peers. Our efforts were supported by Department Chair Chung-I Tan and Professors Ian Dell'Antonio and Robert Pelcovits. This past August was its second year of existence, and this article details the different stages and developments through which it has progressed.

Three years ago, incoming physics TAs were provided with no formal training in teaching. There was (and still is) a three hour crash course outlining the teaching responsibilities. This session consisted of safety training, covering the specific responsibilities with respect to laboratory assignments, important legal concerns –do not date your students—and a general introduction to the staff with which the TAs would be working. It did not touch upon how to grade, how to prepare a lecture, or formulating a teaching philosophy. This situation is not a flaw limited to physics; there seems to be an unspoken agreement that if you understand a subject, you should be able to intuitively teach it. We know that this is incorrect and that teaching actually requires training and mentoring. At the lower levels of education, teachers are well-informed on how to teach and are always assigned an

experienced teacher as a mentor. This preparation has been lost at the university level among the concerns of research and job hunting. This lack of support tends to result in a trial by fire for inexperienced TAs. Small mistakes seem to escalate to large ones out of fear of failure and miscommunications cause arguments and frustration for undergraduates, TAs, and the professors. Experienced graduate students often listened to the first years complain about the situation and then related their own tales of horror and stress from being TAs. No single individual is at fault, it is just part of the TA experience that is repeated year after year.

Now my own experience as a TA was very different from most because I was not an inexperienced TA. I had been a Peer Learning Assistant (an undergraduate TA) for three years previously at Worcester Polytechnic Institute (WPI) in the Department of Mathematics. At WPI, I had received formal education on teaching. I had been trained to be a tutor and educated to lead recitation sessions. I had completed three sequences on methodologies for grading, preparing and presenting lectures, and working with my fellow undergraduates to promote learning. I felt that, while my first year of teaching laboratory experiments was different from recitation sessions, the experiences were still fairly similar. However, many of my colleagues had a difficult time. We would actually discuss this issue fairly often in the first year graduate student office as we held our TA hours and criticized the situation. The problem with rants is that they consist only of hot air and not action. However, it was a special year in the department; in particular, the graduate student liaison to the Sheridan Center was graduating and a replacement needed to be chosen. I was contacted and asked if I was interested in the position. I accepted and the focus of the very first meeting I attended at the Sheridan Center was Brown's push for departments to improve their training of the TAs. This was fate. People need motivation to take action and this meeting motivated me to begin to change the situation. I went straight from the meeting to ask my department chair for permission to develop our own program. The Physics Department runs a new student orientation in the week before classes start at Brown and our TAs consist almost entirely of first-year graduate students. I recalled that there had been downtime during the orientation (particular in the morning), and decided that it would be a perfect opportunity for incorporating a training session. I received permission to utilize two of the mornings as a supplemental TA orientation. I contacted the Sheridan Center to see if it would be able to assist me in anyway and a second special coincidence occurred. The Sheridan Center had just changed its structure and hired an Associate Director for the Life and Physical Sciences, Dr. Kathy Takayama. It was decided

that my request was perfect for Dr. Takayama's new role's responsibilities and I met with her when she arrived in August 2007. Together we planned the first teaching focused orientation for the department.

We adapted the sequence that I had completed at WPI, pulling out two important components (one for each day of the session). Our first focus was an introduction to self-reflection on teaching and developing a teaching philosophy. We wanted the first years to start asking questions about what it meant to teach, what their own learning experiences had been, and how could they build upon these experiences for their own students. Our first day was structured as an hour of open discussion facilitated by Kathy to promote this thought process. The second focus was on grading. Grading is an interesting responsibility. On the surface it appears to be a black and white concept but in practice, impressive shades of gray develop. The first time a TA grades a test or even a lab report, it is a slow and even painful process. Developing consistent grading procedures between different TAs has always been an issue in the department that has been dealt with mathematically. My year, the solution was to normalize all the different TAs' grades to a bell curve and then shift all the bell curves to the same mean. While this answer creates equality for the final result, the production of the grades has large variation. Depending on the TA, an undergraduate could end up working for an hour or two days on his or her lab report and getting the same grade at the end. This fact does not create happy undergraduates and is the cause of many complaints and headaches for the TAs and professors teaching the course. With the assistance of Shawna Hollen, a physics graduate student, and Prof. Ian Dell'Antonio, we guided the participants through sample student exams. I am a believer in the hands-off teaching approach so we started by allowing the students to grade the problems according to their own beliefs and justifications. Then we came together as a group and discussed the large spread in point values for one problem. The first time you see the difference between graders over a simple problem—be it on calculus or Newton's Laws—it leaves an impression. Afterward, we discussed the grading guidelines provided for the course for the exams and the rubrics for grading laboratory reports. This discussion with the first-years, many of whom had never graded anything before, developed awareness of how perspective shapes grading outcomes without a cost to real students.

This orientation was a departmental first and done on a trial basis so we surveyed the participants to see if we should continue it and for any recommendations. However, in order to actually evaluate the impact in the new TAs' teaching experiences, we waited until

the middle of first semester to collect feedback. The responses were entirely in favor of the continuation of the orientation and the main suggestion was to setup a mentor program for new TAs with experienced ones. With such positive encouragement, we decided to gather additional input from Physics professors and other graduate students. The idea of a mentor program was echoed by the experienced graduate students. After meeting with Chair Chung-I Tan and Prof. Robert Pelcovits, we added a teaching mentor to the current department community mentor program. Working with Barbara Dailey, the Student Affairs Coordinator, we contacted the Physics graduate students to ask for volunteers to participate in the mentor program. The response was overwhelmingly positive. In general, the higher year graduate students were very interested in working with the first-years to help them adjust and deal with possible issues. The professors also provided us with feedback on what they felt would improve the TA situation. Their main concern was that poor communication and the TAs' fear of repercussions had caused many unnecessary problems in the past. It seemed that the mentor program could provide a solution to this issue as well. By assigning mentors to the new TAs, they would have someone less intimidating to approach for assistance and the mentors would be able to approach the course staff if they felt it was necessary. To introduce the new mentors to their future mentees, we extended the first day's session. The initial hour remained an open discussion with Dr. Kathy Takayama on teaching, but a second hour was added where the first years were divided into small groups and met with the different mentors for each of the TA positions. There are roughly five different TA assignments available in the department with varying responsibilities. The TA mentors were chosen according to their experiences with the courses. The second day remained the same with a focus on grading an exam and a discussion on grading laboratory reports. As a supplemental program, Dr. Kathy Takayama organized a Sheridan Center workshop on grading reports early in September 2008 that the participants were encouraged to attend.

Currently, the program is being reviewed and adjusted for next year. In retrospect, the first assignment of mentors to the new graduate students was not as successful as we had hoped. Mentor-mentee bonds are difficult to develop, especially when everyone involved is inexperienced with the process. This situation will hopefully improve next year since we have been through the procedure once. Additionally, we have learned more about the grading needs of the first-years and are going to increase the focus of the second day on the different grading philosophies used by the Physics Department. A final adjustment is that a new graduate student liaison will be taking over the position so there will be a new

coordinator and a fresh perspective to the program. This idea was initially developed by graduate students for graduate students and graduate students do eventually graduate. In order for a real impact to take place, a structure must be developed in the department to continue the sessions. The longevity of the orientation depends on finding new graduate students to carry on for the next generation.

If you have any specific questions on the session or have suggestions for its improvement/survival please contact the author at [Helen\\_Hanson@brown.edu](mailto:Helen_Hanson@brown.edu). Thank you.