

# THE TEACHING EXCHANGE

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## Factoring TAs, TFs and Gadflies into the Teaching Equation

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[see also: 1998 TA/TF Training Program - Math 9](#)

### **The Problem: Revising the Preparation of Graduate Students for Teaching in Mathematics**

#### **Introduction**

For several years now the Math department has held a brief training program every May for those grad students who are about to be TAs for the first time, followed by another for those who have been TAs and are about to be TFs. This year we did something different and more substantial. It was a combined program for both TAs and TFs. It took place during one week in May 1998 and was the result of a group planning effort that began the previous September.

I want to describe what we did in May, in case any of the ideas we came up with might be useful to other departments (and I would be very interested in hearing about anything that other departments are doing along these lines). At the same time I want to describe the process that led up to it, because, to me, that process has been in some ways as important as the end product and may be the part of the story that is most likely to be relevant to other departments.

I am not thinking of this as a "how-to" article. Different departments have different needs. Different people or groups have different styles. I am sure that if you were to initiate something like this in your department it would unfold very differently from the process that I'll describe. What I have in mind is to tell our story in the hope that it will resonate somewhere for others.

Before beginning I want to mention some ways in which this has been personally rewarding to me. One thing that has been especially satisfying about the whole enterprise is its home-grown quality. The Sheridan Center was a great help to us in developing our ideas, as you will see, but it was the Math people who led the way. I think that the resulting sense of ownership is a powerful force. We did something, it worked out pretty well, and, whatever it is, it's ours. (It's not finished yet, either; next year we can build on this foundation and do something better.)

It was not my idea for us to do this - in fact, I was more or less goaded into it by a gadfly - but I am very glad we did. I found myself taking a leading role in spite of the fact that I did not see myself as either a natural leader or someone with a lot to say about how to teach calculus. A year ago in September, I was saying to myself "Oh, I know we ought to do this, and I will help with it, but it's really not my kind of thing." By May I was looking around at a room full of Math people having an animated discussion about teaching, and saying, "Hey, we should do this more often!"

As a result of all this I have learned a little about leadership. I know I have learned a lot about asking for help. I have also learned something about teaching. This learning has taken place on at least three levels, and the total effect has certainly been greater than the sum of the parts. First, in order to prepare other people to start teaching, we obviously had to think together about what we know about teaching. Second, in the course of preparing some video materials for this, I spent a certain amount of time carefully observing other people teaching. Third, as a member of a group working together to design this four-day "course," I acquired some skills and confidence that will undoubtedly help me out when I am designing math courses in the future. I also learned something about the proper use of gadflies.

### **Teaching by Graduate Students in Mathematics**

Grad students in the Math department normally begin teaching in their second year. At first they work as Teaching Assistants; later they become Teaching Fellows. The distinction is that a TA leads recitation sections to complement the lectures in a calculus course while a TF teaches his/her own class. For example, this fall I will be course head of Math 9 (beginning calculus). Each student in the course will have an instructor (either me or a TF) and a TA. The instructor will lecture three times per week to the class, and the TA will conduct one recitation section per week for a smaller subset of the class.

Until 1996-97, our required training program for the new TAs went like this: Over the course of several mornings in May, each trainee in turn did a prepared 15-minute "micro-teaching" on an assigned topic for an audience consisting of all the other trainees and some faculty members, more advanced grad students, and a couple of people from the Sheridan Center. Each such presentation was immediately critiqued and discussed at some length by any or all of the audience. (We got through about three presentations a morning.) At the beginning of the first morning there were remarks by the department chair and by one of the experienced TFs, and we distributed handouts about classroom technique and about

the responsibilities of a TA. There was a similar program for new TFs, either in June or late August.

### **The Gadfly**

This year's change was set in motion by one of our graduate students, Kathryn Leonard. I almost want to say that she shamed the department into doing better, but in my experience shame is more likely to paralyze people than to move them in a good direction. Let's say that she challenged us to do better and we took up the challenge.

Kathryn, who was then beginning her second year at Brown, had attended the required training for new TAs and had found it quite disappointing. She had also had occasion to compare it with a much more substantial training course offered at another university. In September she approached both me (as Graduate Adviser) and Walter Craig (as Department Chair) saying something like "Hey, we could be doing a whole lot better, and we should, too." We both agreed and I said that I would take the lead. Kathryn said that she had been talking with some of her fellow students about ideas for a new improved TA/TF training. I proposed that some day soon a few interested faculty members and grad students should sit down to talk about those ideas and then see where we wanted to go from there. One day in October we did. There were three faculty (Tom Banchoff, Walter Craig, and I) and three grad students (Kathryn, Danielle Jamison, and Rob Benedetto). Danielle and Rob were in their fourth and fifth years at Brown, both of them excellent teachers. In the meantime I let Nancy Dunbar at the Sheridan Center know that something was in the works and that we would be turning to them for some help. She replied with words of encouragement, some pithy advice about how to approach our task, and an open-ended promise of support.

### **Problem Solving: The Planning Process**

Before the meeting, Kathryn drafted an outline of a possible four-session training course. I would say that the main ideas behind her proposal were:

1. Let's do some serious teaching about teaching rather than having most of the time taken up by practice presentations.
2. Let's make the critiques of the presentations better focused so as not to waste time.

At the meeting we talked about our goals and how to achieve them, taking Kathryn's outline as a starting point. Afterwards she said she would revise her outline, and we agreed to meet again and talk some more. We seemed to have some good momentum going.

I then got rather busy with other things and started to let that momentum falter. Eventually, after a gentle nudge from Kathryn, I started paying attention again. In January we got the same group of six together again. This time Nancy Dunbar and Becky More from the Sheridan Center joined us. It was a very productive meeting. Nancy and Becky were at that time making the rounds of a number of science departments in an effort to get some

dialogue going about how the Sheridan Center might better serve these departments. In our case it was easy to begin such a dialogue because we were working on something that we specifically wanted some help with. Of course, we did not know exactly what kind of help we would want until we got the dialogue going.

Another interesting bit of timing was that by January I had learned that I was slated to teach Math 9 in the fall. This put the whole matter of TA/TF training in a different and more personal light for me. I find that, especially in that course, it is very easy for me to get stuck in a painful feedback loop, with my feelings of inadequacy and my resentment feeding off each other. (My perception of both resentment and inadequacy in the students also looms rather large.) I think you will agree that this is not a good frame of mind for teaching, or for mentoring TAs, either!

In the January meeting I was suddenly struck by a thought attached to some deep feelings. That moment was a turning point for me. The gist was this: 'I am determined to do a better job with Math 9 this time around, and in particular to work hard on good communication between me, the TFs, and the TAs. There is bound to be some synergy between my work on the TA/TF training and my work on Math 9. And I would very much like some help from the Sheridan Center, both in getting ready to teach this course and in making "course corrections" next fall. In particular I want to arrange for an Individual Teaching Consultation (ITC).' (That's when you request the Sheridan Center to send two trained observers and a video camera to watch what's happening in your classroom and help you think about how it could be better. I emphasize that the "better" is on your own terms: before they even come to your class, they start by asking you about your goals.)

One idea that emerged at the January meeting was the use of videotape as food for discussion. We decided to go around collecting (with permission) video footage of some of our fellow faculty and grad students teaching calculus, so as to be able to choose some interesting excerpts to show on the first morning of the training course. We thought it would be a good exercise to watch someone teaching, think about what they're doing and why, look for good techniques, missed opportunities, and so on, and then share our observations. It sounded like a lot of trouble to prepare, but it also sounded like a good investment for the future: we will add a bit to our library of raw footage each year, but the bulk of the work was done in this first round.

We ended up taping parts of about nine classes or recitation sections. I was pleased that so many people allowed us to invade their classrooms with a camcorder, and also that a number of grad students volunteered to do some of the camera work. (If you're thinking of doing this, Media Services can lend you the equipment. Call ahead to reserve. One piece of advice: Don't set up your camera too near the classroom door if there's a lot of noise in the hallway.) I took on the task of viewing all the tapes and deciding what parts to use. I also did the actual editing. (The folks at Media Services patiently showed me how.)

### **Developing and Implementing the 1998 Training Program**

A couple of weeks before the training course was to take place, we showed Becky and Nancy the latest version of our plan and invited them to come and talk about it with whoever wanted to be in on the planning at that stage. Our conception for the first half of the first morning was to hand out lists of "teaching tips," have someone give a brief talk about them, and then have someone illustrate them by giving a sample mini-lecture. Becky and Nancy quite rightly challenged this rather stiff beginning, and before we knew it we were substituting something much livelier and more pointed.

We decided to begin by having all the trainees take a few minutes to respond in writing to some questions about their goals and expectations of the teaching job ahead. (Questions like "What might be the hardest part of the job?" and "What might be your favorite part of the job?") The point was, first, to engage their attention immediately by leading them to imagine themselves in the teacher's role, and, second, to give the group a basis for some discussion right away by sharing the responses anonymously. (We still used our teaching tips handouts, but we saved them for the end of the first session so that people could take them away and ponder them while preparing their practice presentations.) The "questions" device worked very well. In a way it worked too well: people had so much to say about what the future TAs had written that we had to cut off that discussion, forego any discussion of what the future TFs had written, and skimp a bit on our video viewing later in the morning. (This goes on the list of things that need some fine-tuning next year.)

Another idea that came up at that meeting was to incorporate a bit of improvisational drama in the third morning's program, as a way of stimulating discussion of "difficult situations." Two scenes were played out: one on the theme "What do you do if they come to your office hours and act like this?," and the other on the theme "What do you do if they sit in your class and act like that?" Rob Benedetto played the role of a beleaguered TA or TF. For the classroom scene, the Sheridan Center sent us a grad student from another department to play the role of one trouble-making student, and we all gave Rob a hard time. It was a lot of fun.

The other topic for discussion on the third day was a list we had drawn up of further kinds of difficult or tricky situations. The trainees and others present all looked at the list and shared ideas about some of the things on it. Here is a sample of issues that came up: "Dealing with late homework," "How can I encourage people to come to office hours?," "What if a student bursts into tears in my office?," "What if the same people are always speaking up in class?," "How can I get college students to see me as any kind of authority figure?" Each of these last two topics led to some discussion of gender issues. By the way, all the sessions were attended by some faculty members and some more experienced grad students, and they had a lot to contribute to the discussions.

The "final" plan that we made is reproduced in the side-bar. Of course, it was not really final; the plan kept evolving even after the training week began. Here are some last-minute changes we made: In making up assignments for the TA group's second round of micro-teaching (on the fourth day), instead of assigning a topic, we had the bright idea of giving them a taped lecture from Math 10 to take home and watch. The assignment was: "Pretend

that you are the TA for this class; your job is to plan a recitation section for the day after this specific lecture." My comments to the group at the end of the third morning became an oral expression of some of the personal sentiments I am voicing here. We also made some time on the last day for the Sheridan Center people to talk to the group about the various resources that they offer throughout the year.

### **Assessment: Looking Back (and Ahead)**

So now that it's over, what do I think? Was it perfect? No, I'd say it was kind of ragged around the edges, to say the least. Was it worth doing? Yes, absolutely. Will next year's new TAs and TFs be better prepared than they otherwise would have been? I don't know. My guess is that it helped some of them a lot, and most of them a little. What do I wish we had done differently? Or to put it another way, what am I thinking of doing differently next year? Here is a partial list:

1. I wish there had been more faculty involvement during the planning stage. I think that keeping the working group small was the easy way, but I'm not sure it was the best way. One thing I certainly want to do next year is to invite more people's input.
2. The special challenges faced by TAs whose first language is not English received little or no attention. It was one of the issues raised by the TA group in the first session, and it was also on our long list of possible topics for the third session, but for lack of time we never really talked about it. Next year I would like to give it higher priority and greater forethought.
3. I want to pay more attention to the needs of the TF group. Looking back, I see that we put more thought into TA than TF training this year. It seemed to work pretty well to combine the TA course with the TF course (we combined them on the discussion days and separated them on the presentation days to save time), but I do want to rethink this aspect.
4. With the TF group in particular it would be good to look at how one goes about planning a course. (This suggestion was made by one or two of the trainees after this year's session.)
5. I have an uncomfortable sense that to some degree our discussion about "anticipating difficult situations" turned into a kind of student-bashing free-for-all bonding experience. Sometimes anticipating trouble is not so different from asking for trouble. You don't want to be filling up a new teacher with negative attitudes. On the other hand, you don't want to be filling up a new teacher with rosy ideals and then turning him or her loose on a bunch of unwilling students with negative attitudes of their own. It's a dilemma. There must be a middle ground, and I'm not sure that we attained it this year. I must say, though, that there is something false about that dilemma. The fallacy lies in the notion that teaching consists of "filling people up" with something. It's a lot more complicated than that. That's why we began the week by looking at what the trainees were bringing with them, rather than by trying to fill their heads with teaching tips. The fact is that, whether you're learning mathematics or learning how to be a TA or learning how to teach Math 9

better, you won't get anywhere unless you start from where you are. That can mean having to deal with some negative attitudes.

## **Conclusions**

What about my Math 9 course? Will it be "all better" now? Of course not. But I know that it will be different in some ways. Mainly, when I get discouraged, I'm going to ask for help. If I look out at my class and see a sea of bored, sullen faces, I might try a little harder than usual to get some response out of them, if only for my own information. I may seek advice from a colleague. If I feel like I gave a bad lecture, I might even dare to solicit some constructive criticism from the TAs who will be sitting in the back row. (Ah, but will they dare to give it?) I will certainly ask the Sheridan Center for an ITC and urge my TFs and TAs to do the same. And I want the TFs and me to be putting our heads together regularly, thinking about the best way to teach the material.

By the way, in getting ready for the TA/TF training course there were several moments when I felt discouraged, and in most cases all it took to get me out of the hole that I had dug myself into was a little contact with another member of the planning team. Good lesson to learn, hard lesson to remember.

Oh, and about the proper use of gadflies: Put them to work. (Thanks again, Kathryn!)