

Teaching Assistants and Mid-Term Feedback from Students

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The emerging consensus at all levels of teacher preparation, including college instruction, is that it is clinical work where instructors must evaluate, diagnose, and prescribe, while also developing their practice. Personal experience as students in lecture-based mathematics courses is the foundation on which many mathematicians build their instruction (Sofronas & DeFranco, 2009) and early experiences are likely to influence a graduate student Teaching Assistant (TA)'s later work as a college faculty member (Kung, 2009; Speer & Hald, 2008). One way to gain a kind of knowledge for teaching that is useful for improving instruction is to check in with undergraduates themselves about how a class is going about halfway through the term through a mid-term feedback form.

Here we report on two sets of information: responses to a nationally distributed College Mathematics Instruction survey by 203 graduate student TAs and interviews with two TAs. The interviewees were PhD students in the same medium-sized mathematics department (about 20 full time mathematics faculty, 15 doctoral students, 30 master's degree students; offering about 100 classes each semester to student body of about 15,000). The interviews with TAs were about their anticipations of student struggles, especially those that might be elicited through mid-term feedback or "evaluation" completed by undergraduates in a course. The question of interest was: *What is the nature of novice TA anticipations about their undergraduate students' experiences of a course, and how do TAs navigate through, make meaning of, and respond to student mid-term evaluation feedback?*

The interviewer observed at least 3 hours of each person's instruction before the first interview and at least 3 hours of teaching between the second and third interviews. The first interview was early in the semester, the second was conducted as the TA went over mid-term feedback from students, and the final interview was conducted as TAs went over end-of-term evaluation feedback from students. Here we focus on the second interview. In what follows, all names are pseudonyms and all quotes are from either the interviews or from responses to open-ended items by the TAs who completed the survey. We used a technique called constant-comparative coding to analyze the interviews.

One TA interviewee was Lisa, a senior graduate student in the doctoral program with multiple years of mathematics teaching experience at both universities and at two-year colleges. In the semester of the interviews, Lisa was teaching a geometry class for future elementary school teachers. She taught two of the six coordinated sections of the course. Lisa planned lessons based on a notebook of course coordinator-provided materials and a textbook chosen by the coordinator. She met monthly with the three other instructors of the course (2 were TAs) and wrote exams in consultation with the two other TAs teaching sections of the course. While the coordinator approved each exam, Lisa was responsible for its construction. As with the classwork and homework assignments, Lisa relied on the course notebook in developing her lesson plans and quizzes. Lisa was responsible for grading all assignments. Though it was not the first time she had been instructor-of-record, nor her first experience working with future elementary school teachers, it was the first time she had taught an activity-based geometry course for prospective elementary teachers.

The other TA, Pat, was in his second year of the doctoral program with two semesters of teaching experience. In the semester of the interviews, Pat was teaching college algebra for the second time. This, too, was a coordinated course with 11 sections taught by 7 different

instructors (5 TAs and 2 part-time instructors). Unlike Lisa's teaching assignment, Pat's responsibilities included participation in weekly coordination seminars where discussion centered on teaching strategies, quiz ideas, test construction, pedagogical trouble-shooting, and occasional textual and video case activities about college mathematics instruction. His teaching experience included tutoring and being instructor-of-record for college algebra the previous year. The textbook for college algebra had been selected by a committee and was used in all sections and Pat was responsible for all lesson planning, homework and classwork assignments, quizzes, tests, and grading. As was the cases for Lisa, Pat's syllabus and exams were reviewed and approved by the course coordinator before they were administered.

Evaluation Forms

Several types of evaluation forms are in use in U.S. universities. The two most common methods for eliciting student feedback are (1) limited response statements where an assertion is made and students are asked to rank their agreement on scale (e.g., from 1-strongly disagree to 5-strongly agree) on a machine scanned form and (2) open-ended items where students are prompted to offer their own statements about their perceptions and experiences (see Appendix for examples).

Survey of TAs

The College Mathematics Instructor survey included an open-ended prompt: "How do you use student evaluation feedback?" Among the 203 TA responses to the survey, 126 (60%) replied to the prompt. About half of these responses fell into the category of *learn*, and about half fell into the category of *plan to act*. About 10% of responses fell into both categories. That is, the majority of responses only involved one of the two categories. TAs either intended to learn or to plan to act but did not often explicitly mention both. This dichotomy may be, in part, a result of the kinds of feedback TAs have the opportunity to see. From the content of TA written responses and interview comments, it may be that the *learn* category is associated with only having limited response ("score") type feedback while the *plan to act* response may be more likely when the detailed feedback undergraduates can give in open-ended items is available for TAs. The two TAs interviewed were at an institution that gathered both numeric and written feedback (the mid-term and end-of-term evaluation forms they used are in the Appendix).

Interviews

At their initial interviews early in the term, Pat and Lisa both reported that they were nervous about teaching and being prepared to teach this term. Lisa was anxious because she was teaching a new course and Pat because he was planning to make changes to his lecture-only teaching style.

From observing Lisa teach it was clear that she encouraged her students to explore mathematical ideas, fail, and try again. Lisa seldom lectured and usually spent fewer than 20 minutes per class at the board demonstrating a solution or collecting student ideas. The voices in the room during her classes were those of the students, often many talking at once as they worked at their tables (4 to 6 students per table). The class was activity-driven, based on the materials in the course notebook. While students were regularly uncomfortable with the challenges in the class they also consistently worked together in pairs and groups to attempt in-class assignments. At the beginning of the term Lisa communicated confidently to students about what they knew and could learn. Lisa's assertions about what students were expected to complete during class or at home was more hesitant during later observations.

For most of Pat's observations, he was the main voice in the room. His lectures were organized and his writing on the board legible. Late in many class meetings, Pat identified a problem on the board (giving textbook page and item number) and asked students to complete the problem right then in class, consulting with neighbors. The items were related to work done recently in the class or to that day's lecture. Though most worked individually, students occasionally worked together in pairs to complete these in-class problems. Throughout the term Pat worked from prepared notes. In the later half of the term, Pat began to experiment with in-class group work using worksheets he handed out and collected.

Both TAs distributed the mid-term feedback form (see Appendix) about 9 weeks into the 15-week semester. As we had seen in survey answers, both Lisa and Pat indicated two main categories of response to student evaluation feedback. They saw feedback from students as either an opportunity to *learn* or as a foundation for *planning to act*. The category we are calling *learn* includes the three subcategories *falsify*, *validate*, and *additional venue*. In reading over evaluations, Pat attempted to falsify his pedagogical choices, to determine what to jettison, by seeing if students reported problems that he had not anticipated, such as a "weak spot" in presentation technique (e.g., "you don't talk loud enough," "sometimes I can't read your writing, it's so small"). While Lisa attended to such falsifying aspects, she also attempted to validate her teaching, seeking to learn what was working, to find out what to keep. Pat and Lisa both felt they could learn information from students on a mid-term evaluation they would not otherwise learn from a conversation or other interaction with the student; that is, the mid-term evaluation was an additional venue for feedback. They both noted that mid-term evaluations also provided a place for students to "vent" even if the comments were not especially illuminating for the instructor.

Like survey respondents, the interviewed graduate student instructors also saw evaluations as an opportunity to create a plan to act. Two subcategories of plan to act emerged: *improving/changing* and *keeping*. Pat discussed his goals in the subcategory "improving/changing," which included finding out ideas from student reports about what potentially productive changes might be and for getting feedback on the efficacy of changes he had already made (like the "work in pairs" problem solving he began to implement each class). Alternatively, for Lisa, "keeping" meant making plans that paid attention to continuing to do what student feedback suggested was working. During the end-of-term evaluation interviews, the same categories occurred. While Lisa's reflections were more about the *learn* category, Pat's touched more on the *plan to act* aspect of responding to evaluations.

Improving the Quality of Undergraduates' Midterm Feedback

Among the things that came up in the interviews were how to get undergraduates to be better participants in evaluation writing by asking them to consider the audience for the evaluation. A mid-term evaluation (at least in the case of Lisa and Pat) is a private professional communication from students to instructor. However, the final course evaluation forms had a different audience – the first person to get copies of student responses was the department chair, to help in making staffing decisions for the next term.

Interviewees liked the phrasing of the questions on the mid-term evaluation form because they were a reminder to undergraduates of the distribution of responsibilities for learning. The framing of the questions on the end-of-term evaluation also came up. Lisa mentioned that on previous evaluation forms (though not on the one used by the university in this study – see Appendix) there were questions not specifically about the instructor, including open-ended items like: "What advice would you give a student taking this course next semester?" and scaled items

like “I would recommend this course to another student” or “I came to class regularly” where students marked on a 5-point scale from strongly disagree to strongly agree. What frustrated Lisa (in her previous teaching position) was that students’ answers to these were included in the averaged score across all questions that was the summative “evaluation score” for the instructor.

A primary topic of conversation during the interviews was the challenge of being respectful of, and honestly responsive to students and their opinions, no matter how positively or maliciously offered by the student. Lisa and Pat sometimes found it hard to believe there was a real experience for students behind what the students said. Sometimes this was very hard – largely because of negatively worded or accusatory expressions of frustration from undergraduates. Among the many challenges for college instructors is understanding the powerful emotions (and sometimes unguarded expression of them) that undergraduates associate with learning mathematics (see, e.g., the *Mathematical Autobiography* essay, this volume).

We saw equally powerful expressions from TAs in their initial responses to some student comments: from smiling pleasure when a student mentioned how helpful a particular assignment or project was in coming to understand a concept; to head-shaking, groaning, or desk-slapping frustration when a student commented in ways the instructor found surprising or insulting.

How do we help instructors deal with the “mean” comments? Why do undergraduates do that? How can we frame evaluation questions better so that instructors get better and more constructive comments? There is a relationship between a learner’s emotions and their desire/motivation to learn – this is as true of learning about teaching as it is of learning about mathematics. A key here for instructors is that while we are just as fallibly human as undergraduates, we have the additional responsibility of being the adult in the room – of looking past the surface of how a student communicates their anger, despair, frustration, joy, or confidence and seeking the meaning that lies beneath that surface. It means learning to look for what someone means through the imprecision of what they say. Though not a perfect instrument, for Lisa and Pat in the context of the public university at which they taught, the mid-term evaluation form they used resulted in feedback that was seen by them as more useful than not. One lesson from this exploratory study is that we must also consider the question, how can we help undergraduates write feedback that is honest, respectful, and useful? One suggestion that seems to have worked well locally for the authors is a short statement by the instructor before handing out the form (see Appendix for statement and form).

Responding to Feedback

For both mid- and end-of-term evaluations it is valuable for instructors to learn to filter the things students say. Unique to mid-term evaluation is that one must acknowledge to students the feedback and in some way communicate a respectful, considered response. Two main questions arise here: How does one determine which lessons learned or plans to act are appropriate for immediate (in the current term) trials and which should be saved for starting a new course? How and when does the instructor share with the class a response to reading the evaluations? While both Pat and Lisa thought they had to answer these on their own, both found that the interview process, discussing the feedback with a trusted other person, facilitated decision-making about what to say and do. This suggests that going through evaluations with a more-experienced peer/partner can help in creating and maintaining an inquisitive professional distance from the feedback. Instructors with whom we have worked, including TAs like Pat and Lisa, have benefited from seeing the feedback comments as information – they are data. A suggestion that Pat found worthwhile was creating a data analysis: he tallied common statements

(and noticed how they were related to other contextual variables – like the student self-reports of preparation included on the form Pat and Lisa used) and clustered student comments into categories of feedback, noting how frequently the reported experience came up. This tallying of data made it clear that 1 of the 4 “mean, personal attack” kind of comments was not related to a common theme, but 3 of the 4 were all connected to the idea that the student was uncomfortable with paired work because they did not feel it was safe to be ignorant in class. That is, it allowed him to see the assertions of students as likely true *for the student* in some way and to plan to act. Pat’s plan, carried out in the last 6 weeks of the term, was to build a sense of community and trust in the class through weekly team worksheets. The same group of 2 or 3 people worked together during time set aside in class as well as outside of class to complete a worksheet.

Both Lisa and Pat were unsure of what to say, if anything, directly to their students in response to the feedback. When it comes to responding to student feedback, one might consider the difference between two scenarios. Scenario 1: 16 of 40 students say the pace of the class is “too fast” with 5 commenting on going to tutors and office hours in order to keep up and with 2 students who complain, “I am lost because you go too quick.” Scenario 2: Five of 40 students make the same assertions about fast pace and also note that they spend 15 to 30 minutes a day on the class while another 9 students express concern that the last three quizzes still have not been graded and returned.

In Scenario 1, an appropriate response by the instructor to the class (in the next meeting after the mid-term evaluation) might be a version of the generic one offered in the Appendix, “Thank you for taking the time to give me feedback, I noticed that several people find the class pace challenging. I also saw that many had comments on how they were dealing with that challenge, including using the tutoring center and coming by my office. I encourage you to utilize these resources that others are finding helpful and also offer the suggestion that starting and sticking with a study group is another good idea.”

In Scenario 2, the class response might include a statement like “Thank you for the feedback. It was good to get insight on how people are studying, including amount of time studying. I noticed that several people who said they were feeling lost also said they worked on class for less than 2 hours a week outside of our meetings. It is always a challenge to make the time for studying. Some ways for dealing with that challenge include using the tutoring center, working with a study group on homework or practice problems, and coming by my office to work with me. Also, some commented on the challenge that I am facing in getting quizzes graded and back to you. I have set aside time to complete that grading and you will have your quizzes back this week. As we continue, I commit right now to returning graded quizzes before we have a new quiz.”

While a response to the class will depend on what students say, the key factors in confirming for students that their comments have been read are (1) a thank you, (2) identification of a shared challenge, and (3) a statement about how to positively deal with the challenge. This last point includes, when appropriate, letting students know if a change in response to the feedback will be happening during the term. Of course, caution in making promises is essential; practice at knowing our own strengths and challenges is part of the reflective process in thinking about and responding to students.

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APPENDIX
Mid-Term Feedback: Introduction and Form

Introduction instructions

1. Mention a week ahead of time that you will be asking for students to complete a written feedback form.
2. Photocopy the form onto pale yellow or salmon colored paper (or some color not usually used for class assessments – this makes for a visual reminder that this is a separate kind of activity).
3. Before passing out the form (with at least 10 minutes left in class), say:

As I mentioned last week, today I set aside some time for everyone to reflect on how the class is going. In a minute I'll hand out a Mid-Term feedback form. Please understand that this form is a communication from you to me. While the end of term evaluation is sent to my supervisors so they can make decisions about my work, this form is to help you reflect on the class so far and to give me constructive feedback. There's no need to write your name on the form unless you feel it is important that I know who wrote the comments. I appreciate you taking the time to carefully consider each of the four questions and respond thoughtfully and honestly to each. When you are done with your form you can leave class. As you leave, please put your completed form in the folder (envelope) next to the door.
4. Hand out the form and make sure there is a place near the door to deposit the forms in an opaque receptacle (folder, large envelope).
5. Read the evaluations before the next class meeting. At the next class meeting provide at least a brief statement acknowledging that you have read them. For example, you might use some version of:

Thank you for taking the time to give me feedback, I noticed that several people mentioned [*identify something mentioned by at least 10% of students, good or bad, e.g., "they found the class pace challenging"*]. I also saw that many had comments on how they were dealing with the challenge of [*identify something at least 10% of students commented on as ways to meet challenges, e.g., "the challenging pace, such as using the tutoring center, study groups, and coming by my office"*]. I encourage you to utilize these resources that others are finding helpful. Also, please know I am happy to talk with you about any concerns during office hours.

Mid-Term Feedback Form

1. About how often have you done each of the following for this class? Mark your answers in the boxes.

	Very Often	Often	Some- Times	Never
a. Asked questions in class or contributed to class discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Worked with classmates outside of class to study or prepare for class assignments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Came to class without completing reading or assignments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.a. How do you prepare for class (e.g., reading the book, reviewing, working on homework)?

b. How much time do you spend preparing for class each week?

3. How is class going for you (what is working well, challenges you are facing)?

4.) What do you need (from yourself, me, classmates, others) in order to meet any challenges?

Appendix B: Example End of Course Evaluation Form

**University-Wide End-of-Term
COURSE/INSTRUCTOR EVALUATION FORM**

Instructions: We are asking for your input on this course and your instructor in an effort to improve the quality of instruction in the College. Please read each question carefully before responding and decide on only one answer. Not all of the questions have the same response options. For questions 2-14, answer using the following five-point scale (1=Strongly Disagree ... 3=Neither Agree nor Disagree ... 5=Strongly Agree). Once you have decided on your response, blacken the corresponding number on the Course Evaluation Response Form.

1. The frequency of my attendance in this class is:				
① Attended almost every class meeting				
② Missed 3-6 class meetings				
③ Missed 7 or more class meetings				
Questions 2-14 should be answered using the following five-point scale:				
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
①	②	③	④	⑤
2. I took responsibility for learning the material in this course.				
3. The instructor promoted an atmosphere in class that was conducive to my learning.				
4. The instructor communicated concepts so that I could understand them.				
5. The instructor demonstrated knowledge and/or expertise in the subject matter.				
6. The instructor was helpful when I had questions about the course.				
7. The instructor provided clear information about expectations for the class (I knew what I needed to do and when work was due).				
8. The instructor provided constructive feedback on my work.				
9. I was challenged to think in this course.				
10. My work was graded fairly (e.g., exams, quizzes, other assignments).				
11. The instructor returned my work in a reasonable time frame.				
12. The instructor treated all students with respect.				
13. I learned a lot in this class.				
14. Overall, I would rate this instructor as effective.				

For questions 15 & 16, use the reverse side of the bubble sheet for your comments.

15. The instructor did the following things well ...

16. The instructor might improve the effectiveness of her/his instruction by ...