Preliminary Report: Teaching Assistants and Mid-Term Feedback from Students

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Abstract: This preliminary report explores how mathematics graduate student teaching assistants (TAs) anticipate and adjust to mid-semester feedback from their students. We interviewed two TAs just before they administered a mid-course evaluation in their classes and did follow-up interviews as they went through the completed forms and thought aloud about their immediate and considered responses to student comments. We situate the interview results in the context of 120 TA responses to an open-ended survey item about evaluation feedback. The eventual goal of the work is to develop a guide, including a selection of evaluation forms, for novice college mathematics teachers to use to get the most out of soliciting and reviewing student feedback.

Key words: teaching assistants (TAs), evaluation, professional development, pedagogical content knowledge (PCK).

Background

There is an acknowledged need for tools to help college mathematics instructors, from teaching assistants (TAs) to full professors, to understand and facilitate the richly diverse approaches to learning they will encounter in their classrooms (Adams, 2002; Linse, Turns, Yellin, & VanDeGrift, 2004). The American Mathematical Society and Mathematical Association of America have supported efforts to create such materials (DeLong & Winter, 2002; Friedberg et al., 2001; Fulton, 2003). 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 (Hinds, 2002). Given that personal experience as students in lecture-based mathematics courses is the foundation on which many mathematicians build their instruction (Sofronas & DeFranco, 2009) and given that early experiences are likely to influence a TAs later work as a college faculty member (Kung, 2009; Speer & Hald, 2008), a key to improving college mathematics teaching is supporting TAs to develop as classroom professionals.

Across all fields, research has suggested that graduate student TAs must work to build competence in the habit of communicating with expertise in a research discipline while simultaneously building capacity in communicating with non-experts, their students (see, e.g., Austin, 2002; Golde & Walker, 2006). While this can be particularly challenging for TAs who are English language learners (Chiang & Mi, 2008; Madden & Myers, 1994), native English speakers struggle in balancing how to communicate as expert graduate students and teachers of non-experts. Both groups may benefit from considering their teaching as an opportunity for building competence in intercultural communication (Ross & Dunphy, 2007). In particular, one means to gaining a particular kind of pedagogical content knowledge – context-specific anticipatory knowledge about how to communicate with undergraduates about engagement with (and struggles with) mathematics – is to ask undergraduates themselves.

Methods

In the Fall of 2009 we conducted interviews with two TAs who are PhD students in a mathematics department around their anticipations about student struggles, especially those that might be elicited through a mid-term evaluation completed by undergraduates in a TA's course. Our research question was: *What is the nature of novice TA anticipations about their undergraduate students' experiences of the course, and how do novice TAs navigate through, make meaning of, and respond to student mid-term evaluation feedback?* Later work will attempt to discern approaches that might be efficacious, keeping in mind that different TA views of teaching will likely need different forms and support structures. This study was conducted in the setting of results from a national survey, the *College Mathematics Instructor Survey.* There were 203 TA responses to this survey.

For this pilot study, the interviewer observed at least 3 hours of a TA's instruction before the first interview and at least 3 hours of teaching after the second interview (before the third). This small study involved three interviews with each of two TAs. One TA, who we call Lisa, was a senior graduate student who had multiple years teaching experience at both two- and four-year colleges. In Fall 2009, the semester of this study, Lisa was teaching a geometry class for pre-service elementary teachers; it was the first time she had taught this particular course. The other TA, Pat, was in his second year of the doctoral program with two semesters of teaching experience; Pat was teaching Business Calculus for the first time.

The first interview preceded a mid-term evaluation and was based on the constructs of a "math-talk learning community" offered for teachers by Hufferd-Ackles, Fuson, and Sherin (2004). That is, the semi-structured interview protocol asked TAs about (a) types of *questions* they think they need to ask in class (and why), (b) what *explaining* mathematical thinking means for the TA in and outside of the classroom context, (c) what the *sources* of mathematical ideas in the course are, and (d) where the *responsibility* for learning lies. In each case, the TA was asked about their perceptions (1) as a graduate student enrolled in courses, (2) as teacher of undergraduate mathematics, and (3) in attempting to imagine (anticipate) the perceptions of their own students. The second interview followed after TAs had administered a one-page short-answer form of mid-term evaluation. The follow-up interview explored (a) through (d) with a focus on the context of (3). Topics for the third interview came from the outcomes of the first two and occurred early the following semester. Though the final interviews included discussion of end-of-semester evaluation feedback as part of the conversation, we focus here on the mid-term evaluation feedback. We performed data analysis through comparative coding of the interviews with at least two researchers coming to consensus on each code.

Results

We found two categories for TA use of student evaluation feedback. TAs appeared to use feedback to (a) learn or (b) form plans to act. These categories, and the associated subcategories described below, appeared in interviews with observed TAs and in the responses from TAs to the open-ended survey prompt: How do you use student evaluation feedback?

The category we called *learn* included the three subcategories: *falsify*, *validate*, and *additional venue* for feedback. In the first of these subcategories, TAs referred to student comments as a way to falsify their pedagogical choices and determine if their anticipations about students and class were "wrong" and "there were problems" or if there were "weak spots" in their "presentation techniques." TAs who attempted to validate their anticipations sought to "learn what was working" so they "could find out what to keep." Written evaluations were also a way of getting feedback in addition to other methods identified by TAs (such as office hour conversations). TAs felt they could learn information from students they would not otherwise learn from a conversation or other interaction with the student. Evaluations also were a place for students to vent frustrations (either directly or indirectly through personal attack), and TAs sometimes took these up as opportunities to learn and sometimes not.

TAs also saw the midterm evaluation as a spur to action. More than gathering information, sometimes TAs wanted to act on what they gleaned from evaluations. We identified two subcategories of intention: *changing* and *keeping*. "Changing" included harvesting ideas from student comments for how to improve as well as getting feedback on changes already made. Alternatively, "keeping" was continuing to do what students reported to be effective instructor actions or classroom processes. Both categories had an affective component – choices to act noted by interviewees included emotional components, from frustration to joy.

Of the 203 TAs who completed the *College Mathematics Instructor Survey*, 120 (60%) replied to the open-ended prompt. About half of these responses fell into the category of *learn*, and about half fell into the category of *plan to act*. Interestingly, about 10% of responses fell into both categories. That is, TAs either wanted to learn or plan to act but did not often explicitly mention both. Interviewee comments support the notion (to be explored in future work) that TAs may need help in making the connection between how to use evaluation feedback to both learn from their students and then plan and act on that newly acquired knowledge.

As touched on above, we learned about the emotional and cognitive load of reading through evaluations (and that these varied greatly). Pat talked about "not taking things personally" and appeared to prioritize student comments into the bins we identified (falsification, validation, etc.) and readily identified some *alternate venue for feedback* responses as not directly related to teaching (e.g., one student wrote "he's ugly" as part of a response and Pat immediately brushed it aside as not pertinent). On the other hand, Lisa noted many emotionally loaded responses in her interview:

> It's really hard. In fact, sometimes, I – there's been semesters I just haven't even read them. I just knew they were mad at me. Even if I got 29 great ones and 1 bad one, I would focus on the 1 bad one. It would just put me in tears.
>
> I try to remember when I'm reading them that it's not personal. But – (pause) – It *is* personal! So, um I try to look at them. I try to be objective. But, it always for me, it feels like a personal attack when they're bad. If they're good, it feels like praise and I'm wonderful.

Discussion

We presented our results and suggestions for soliciting and reflecting on mid-term evaluations and gathered feedback from the RUME 2010 session audience. Among the things that came up in the session was how to get undergraduates to be better participants in evaluation writing by asking them to consider the audience(s) for their comments. That is, TAs might get

more useful mid-course information from students if protocols for collecting evaluations explicitly described the audiences for the information and the primary uses for the evaluation data. It was also suggested that mid-term (and end-of-term) evaluation administration and/or forms include specific information for students about what things the instructor has control over: it could be helpful for a student to know the instructor is not in charge of everything. We also discussed framing of the questions: on the evaluation, there could be a question that was not specifically about the instructor – in part to provide a less personal context for feedback, such as, "Tell me at least one thing that makes this course useful for you?" or "What advice would you give a student taking this course next semester?" Another topic of conversation was how to support novice college mathematics instructors in discerning the messages for teaching that may be contained in an undergraduate's writing about their experiences in that TA's class.

One connection between the national survey and our interviewees was TAs' learning about themselves as TAs. It became apparent to us that TAs needed to believe what the students said in order for them to act upon it. Since reading evaluations can be emotionally challenging, TAs can use help in being honest with themselves and their students while also being respectful of students. This leads us to a desire to help TAs explore the timeline for change and generates questions for our future research and development: How does one decide if and when to act on what students say? How and when does one announce to the class the actions one will take in response to mid-term evaluations (if at all)? Along with this goes helping TAs learn from the things the students say and to be cautious with their interpretations of student responses: How do we help graduate students deal with mean, spiteful, or personal attack comments? Why do undergraduates do that? How can we frame the questions better so that TAs get better and more constructive comments? For some TAs there appears to be a strong relationship between self-

esteem as a teacher, handling the emotions that may arise in immediate reading of evaluations (which appear to be different than those that come up in the considered re-examination of evaluations) and a desire to learn about their teaching and improve it. To answer our question, "How can the TAs navigate and make meaning of feedback from student evaluation?" we are learning we must also consider the question, "How can we help undergraduates write feedback that is useful?"

Future work will include expanding examination of TA feedback-eliciting practices and responses to include office-hour interactions. Future research directions will be guided by the following key questions:

1. What adjustments to mid-term evaluation forms and TA preparation might be needed for master's level TAs or undergraduates who are TAs or tutors? Why those changes?
2. How might we frame mid-term feedback and analysis guides for TAs and facilitation guides to make materials more useful to course coordinators (e.g., those who are research mathematicians supervising mathematics graduate student TAs)?
3. How might identity development as an instructor and as a researcher be dissonant and how do we facilitate TA professional development that supports being effective in both roles?

Reflecting on these questions and beginning pilot studies in these areas will help us to shape future interviews, mid-term evaluation forms, and guidelines for reflecting and acting on what one learns from such evaluations.

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