Novice Teacher Reflections:
A Case Study of Novice Teachers' Self-Analyses of Videos of Their Own Teaching

Rachael Kenney
Purdue University
rhkenney@purdue.edu

Abstract

The purpose of this study is to look at undergraduate mathematics education majors engaged in their first teaching experience and to examine what they attend to most when watching videos of their own teaching. The pre-service teachers in this study taught a College Algebra course and met in a seminar after each lesson to discuss pedagogical and mathematical concerns. Teachers videotaped one lesson and watched the video with the researcher. An examination of the data from this study can identify issues that are most important to novice teachers and can inform efforts to teach teachers how to reflect on their practice.

Introduction

Reflection is a necessary component in a teacher's professional development (Dewey, 1991). In fact, Clarke (2000) posits, "to teach *is* to reflect" (p. 201). Thus, it is crucial to investigate the ways in which teachers, especially novice teachers, begin to attend to and reflect on their own teaching practices. Observing mathematics teachers' reflections on specific teaching situations can provide teacher educators with a better understanding of novice teachers' professional knowledge (Garcia, Sanchez, & Escudero, 2006).

The purpose of this preliminary study is to look at pre-service teachers engaged in a novel teaching situation. I was teaching a unique seminar course where undergraduate mathematics education majors were assigned to teach a section of college algebra and to meet to discuss their teaching. As seminar instructor, I also observed each teacher twice during the semester. When

Kenney, R. (2010). Novice teacher reflections: A case study of novice teachers' self-analyses of videos of their own teaching. *Proceedings of the 13th SIGMAA conference on Research in Undergraduate Mathematics Education*, Raleigh, NC.

sharing my observations and reflections on their teaching, I realized that there was often difference between what I noticed and the things on which the teachers reflected. For example, where I might have noticed that students in the class seemed to be confused or struggling with the material, the teacher might reflect that they felt that the students had really grasped what they were trying to explain that day. Similarly, while my focus was often on types of questions and tasks teachers used and their effect on student learning, the teachers' focus was more often on pacing and organization of the class and effective coverage of material. These differences were not necessarily surprising because it has been suggested in the literature that teachers need to learn ways to effectively reflect on their practice (e.g., Dewey, 1991; Jaworski, 1998). However, they did lead me to wonder what might change in teachers' reflections if they were in my position. I therefore chose to make use of videos of the teachers' classrooms to work with the teachers and investigate the questions:

1. What do novice teachers attend to when reflecting on their own teaching?
2. What are some initial ideas about teaching that come out of a novice teacher's unprompted reflections?

Background

The term *reflection* in this study refers to the practice of exploring behavior, focusing on lack of understanding, and probing discrepancies in one's actions (Boud, 1999). Reflection is a necessary component in teachers' professional development (Dewey, 1991; Mewborn, 1999); it is, however, qualitatively different from recollection or rationalization (Mewborn, 1999).

Just as students come to a mathematics classroom with existing experiences and notions about the mathematics that they are going to teach, novice teachers have preconceived notions about what it means to teach mathematics (e.g. Ball, 1988; Clarke, 2000). For example, Ball

(1988) suggests that,

> Long before they enroll in their first education course or a math methods course, [preservice teachers] have developed a web of interconnected ideas about mathematics, about teaching and learning mathematics, and about schools. They have already spent years in math classes as students themselves. The experiences they have had with mathematics shape their feelings about the subject and about themselves in relation to it (p. 1).

Thus, before we can adequately teach teachers effective ways of reflecting, we might look at what they do on their own. Researchers have looked at teacher reflection through journals and portfolios (e.g., Francis, 1995; Riemann, 1999), video editing (e.g., Calandra, Brantley-Dias, Lee & Fox, 2009) and the use of video clubs (e.g., Berg & Smith, 1996; Maclean & White, 2007). However, a first hurdle to reflection on practice is often one of becoming aware of what one's own practice and beliefs really are (Abell, Bryan, & Anderson, 1998). In this study, I used teachers' self-analyses when watching videos to help build their awareness of their own teaching practices and to provide a detailed investigation of their reflections on their own teaching.

Methods

The Participants

The teachers participating in this study were undergraduate mathematics education majors involved in a unique mathematics course where they were assigned to teach College Algebra at a university. The teachers had all of the responsibilities as any instructor would have for the class, but they had the added task of meeting each day in a seminar that gave them a chance to discuss pedagogical issues from the day and to practice teaching and thinking about the mathematics that they would teach next.

One benefit that mathematics education majors recognize in this experience is that they get

their first full teaching experience in a relatively safe environment with a great deal of support. Teachers do not have to devote their time to typical issues that often accompany teaching in a middle or high school setting (e.g., meetings with parents, major discipline issues, interruptions in daily schedules, etc.). This made for an ideal setting for teachers to observe their own teaching and perhaps attend to issues other than classroom management. Teachers are able to focus primarily on teaching and learning mathematics.

To accomplish the goals for this study, I worked with three volunteers from the seminar: Stan, Daniel, and James. Stan and Daniel were also enrolled in their first mathematics methods course on secondary math teaching. In the seminar, these two demonstrated a strong understanding of college algebra concepts, and often discussed ways of incorporating ideas from the methods course into their teaching. James' mathematical knowledge was a little weaker than the others, and he struggled with teaching because he wanted to delve into theory a great deal, but was not successful at clearly explaining ideas and often ended up creating confusion for his students.

Data Collection

Teachers were asked to videotape one teaching lesson. For consistency across cases, the teachers all videotaped a lesson toward the end of the semester related to exponential and logarithmic functions. Two unstructured reflections were collected, one verbal and one written (although only the verbal reflections are discussed here). For the first reflection, teachers watched and responded verbally to their video. The verbal reflection took place within two days of the video recording in my office. During the viewing, teachers talked aloud about their thoughts on the video. I occasionally asked questions prompting the teachers to share their thoughts, but did not try to direct the focus of their attention in any way. Following the viewing,

the teachers were asked to take the video home, watch it a second time, and provide a second, written reflection on their teaching. The structure of this written reflection was left open to allow teachers the freedom to focus on whatever they chose in their writing.

Data Analysis

Transcripts of the teachers' conversations while watching themselves teach served as the data for analysis (analysis of the written reflections has yet to be completed). In this initial investigation, I chose not to categorize remarks based on an existing framework, but to generate codes from the data. Common and uncommon themes for the three teachers were identified in the verbal reflections for the preliminary report. Additional analysis will follow by looking at each individual teacher's unstructured written reflections to see if these themes persist or if additional or different ideas about teaching emerge.

Findings

I identified six common themes in the initial analysis of the teachers' verbal reflections.

1. Relationship with Students
2. Mannerisms/Habits
3. Goals for their students
4. Questioning
5. Preparation for Class

Each is described in detail below.

Relationships with Students

The first thing that all three teachers discussed while watching their video related to their presence in the classroom and their relationships with their students. All three recognized that they had a casual demeanor in front of the class. While James felt that this was a positive

attribute of his teaching because it allowed students to be open about their problems, Stan and Daniel both felt that they wanted to look more like the teacher of the class. Stan, for example, shared, "I like having a casual demeanor with the class, but now that I see it in front of me, I'm sort of slouching and leaning a lot. I need to keep that line clearer, that I'm not a friend teaching the class, I'm a teacher." Daniel also noted, "I think I have kind of a laid back presence in front of this classroom. It doesn't seem like I really have a teacher presence." These two students seemed to be reflecting on their position in the classroom and the role of physical appearance.

Mannerisms/Habits

Not surprisingly, all three teachers identified some mannerism or behavior repeatedly in their teaching that they found troublesome. The nature of these observations, however, differed among the three. Daniel was very concerned to hear his voice tone, commenting several times that it was very monotonous, but Daniel added to these observations by also reflecting on the effect that his voice might have on student learning. James, on the other hand, focused a great deal on a blinking tick that he exhibited on a regular basis, but of which he did not seem to have previous awareness. At least four times in the video he asked, "Do I always blink that much?" Stan's focus was less on his personal mannerisms and more on habits that he identified in his teaching that he saw as time wasters. For example, he commented several times on his habit of leaving his notes on the desk and having to walk back to them to find his place in the lesson. He felt there were better ways that he could organize his teaching to save time, sharing, "I could either plan it better so I continue to use the book or notes all the time, or at least I can be talking while I'm finding what I need, or ask them a question so it's not just dead time."

Goals for Students

The three teachers did not often attend to what their students were actually doing in the

class, but they did explain several of their pedagogical decisions in the class in terms of what they wanted from or for their students. All three teachers shared that they wanted students to be able to think about problems and try to solve them on their own. Stan said that he, "sort of let them remind themselves of [the ideas]…they need to decide what is best?" Similarly, Daniel shared at one point, "I thought instead of just showing them, this is how you do it, having them do it. Because they won't have me on the test," and James explained, "I've been trying every time I give them an example to give them time to work through it. Grind through it, see what they can do." Interestingly, in their teaching, this notion of giving students time to grapple with mathematical concepts instead of just telling them was not evident. These shared ideas, however, indicate some of the teachers' ideal beliefs about student learning.

Each teacher shared some additional goals for his students or classroom. Stan, for example, made it clear through his discussions that he did not wish for students to leave the class for the day with any misconceptions: "I didn't want anybody to take away from this activity that that was the right thing to do, so I had to stop it right away." Daniel, on the other hand, repeatedly shared his desire for students to volunteer and to ask questions in the class, while James indicated that he wished students would be more willing to take risks when working on problems and answering questions in mathematics.

Questioning

The notion of questioning was a strong theme throughout much of the teachers' reflections. There were differences, however, in how they focused on this theme. Stan attended to instances where he saw students bringing up good questions that addressed concepts he may have missed in his teaching. He shared his happiness each time this happened because he was worried that an important idea could have been missed had students not asked certain questions.

Daniel, on the other hand, focused more on the types and variety of questions that he asked the students. He observed, "I use the phrase 'Does that make sense?' a lot, which is probably not very good. I could probably use something else other than just 'Does that make sense?'" This observation indicated that Daniel was concerned about how his questioning. Later in his observation, he reflected something he heard himself say in the video: "Right there I was about to ask 'How did you do that?' but then I corrected myself and asked, 'How did Zach do that?' because then someone other than Zach can answer." Daniel reflected on his question choices in terms of how they contributed to student involvement and to his ability to assess understanding.

James' focus on questioning was more often on they ways in which students answered questions that he asked. He shared during one point in the video that, "After I asked the question [about the logarithms], it was immediately said that the negative value was not going to work. I was very happy to hear that." James was pleased when he identified clips in the video where students could correctly answer questions. When students were unable to answer questions, however, James often indicated that he thought they should have been able to. For example, when teaching formulas for the laws of logarithms, James observed himself in the video writing $log_a x^c$ and asking the students "So what do you think this becomes?" He then commented to me, "Everyone just took so long to even think about this, but I sort of pressed them because I think they should be able to see this, or at least intuitively make the connection to the *c* power." James expected students to make a connection and to attempt to answer his question.

Preparation for Class

The last common theme in the teachers' reflections related to preparation for class, though these reflections once again took different paths for each person. Stan focused on things that he should have done to be better prepared mathematically. There were several places where Stan

felt that he had not thought ahead of time about some of the examples he was using. For example, he shared, "One of the things I wish I would have prepared for on this one is...you can see me hesitate right as I get to that $y = x$ graph, and I couldn't remember if *log* crosses $x = y$, and I like to be very accurate, even if they never notice it, and I couldn't remember it." Stan was concerned when he was not mathematical precise in his teaching.

Daniel's focus was more targeted toward things that he should have done organizationally. Daniel had struggled early in the semester with his board writing and organization of presentation, and it was clear in his reflections that he was attentive to improvements he had made and things that he still wanted to improve. He shared, "I wish I had prepared this better…if I had drawn each graph and wrote some notes on it about what I wanted to do I think it could have been better executed." James comments were also focused on planning, but they were less reflective and more observations pointing out places where he had tried to fix pacing and planning problems. For example, he observed, "I'm thumbing through [the book] to section 5.6 right now going, all right, what can I do so I don't let them out before noon. Panic, panic, panic!" James shared the distress he had felt during class to stretch his lesson, but he also later shared that he had been pleased with the pacing for the class because he felt it gave students time to grasp the concepts.

Summary

From this initial look at the data, it is possible to determine some of the aspects of teaching that are most important to the novice teachers. The section above describes six common themes in the three teachers' reflections, but even within the common themes, the three students provided insight into their different ideas about teaching mathematics. Additional investigation of the uncommon themes and a comparison of their verbal and written reflections can provide

further insight into these particular teachers' professional knowledge, and outline the next steps for this preliminary project.

One conclusion from this initial analysis is that the teachers in the study were doing more noticing, recollecting, and rationalizing than reflecting on their practice. Many of their comments were merely observational rather than introspective. This is not surprising because this was their first time seeing themselves teach on video, and it seems reasonable that they must first have time to notice before they can reflect. An initial reading of their written reflections from their second viewing of the video, however, shows that the teachers continued this noticing pattern. This supports the ideas from the research literature that teachers may need to learn ways to effectively reflect on their practice (e.g., Dewey, 1991; Jaworski, 1998).

The seminar and accompanying teaching experience investigated in this study could be an ideal setting for helping novice teachers to learn to reflect on practice. They meet each day to share their experiences with each other. A question of interest to this research is to see how video might be further incorporated to provide teachers with opportunities to learn to reflect on their practice and to learn from their reflections.

References

Ball, D.L. (1988). Unlearning to teach mathematics. *For the Learning of Mathematics, 8*, 40-48.

Berg, M. H., & Smith, J. P. (1996). Using videotapes to improve teaching. *Music Educators Journal, 82*(4), 31-37.

Calandra, B., Brantley-Dias, L., Lee, J.K., Fox, D.L. (2009). Using video editing to cultivate novice teachers' practice. *Journal of Research on Technology in Education, 42*(1), 73-94.

Clarke, D. (2000). Time to reflect. *Journal of Mathematics Teacher Education, 3* (3), 201-203.

Dewey, J. (1991). *How we think*. Amherst, NY: Promethus.

Francis, D. (1995). The reflective journal: A window to preservice teachers' practical

knowledge. *Teaching and Teacher Education, 11*(3), 229-241.

Garcia, M., Sanchez, V., & Escudero, I. (2006). (Learning through reflection in mathematics teacher education. *Educational Studies in Mathematics, 64,* 1-17.

Jaworski, B. (1998). Mathematics teacher research: Process, practice and development of teaching. *Journal of Mathematics Teacher Education*, *1*(1), 3–31.

Maclean, R., & White, S. (2007). Video reflection and the formation of teacher identity in a team of pre-service and experienced teachers. *Reflective Practice, 8*(1), 47-60.

Mewborn, D. (1999). Reflective thinking among preservice elementary mathematics teachers. *Journal for Research of Mathematics Education, 30*(3), 316-341.

Reimann, A. J. (1999). The evolution of the social roletaking and guided reflection framework in teacher education: Recent theory and quantitative synthesis of research. *Teaching and Teacher Education, 15*, 597-612.