

STUDENT TEACHER AND COOPERATING TEACHER TENSIONS IN A HIGH SCHOOL MATHEMATICS TEACHER INTERNSHIP: THE CASE OF LUIS AND SHERI

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In this paper, we investigate interpersonal difficulties that student teachers and cooperating teachers experience during the teaching internship by exploring the tension between one high school mathematics student teacher and his cooperating teacher. We identified seven causes of this tension, which included different ideas about what mathematics should be taught and how it should be taught and a strained personal relationship. We compare these findings to results from interviews with 6 other student teachers and 8 of their mentors. These results suggest that (a) cooperating teachers may offer less freedom than they realize, (b) mathematics educators and cooperating teachers may have very different goals for student teaching, (c) cooperating teachers may hold unrealistic expectations about the student teachers prior to their student-teaching experience, and (d) personal relationships can greatly impact the overall student-teaching experience.

Key words: Student teaching, cooperating teacher, mathematics teacher education, teaching internship, cooperating teacher relationship

Introduction

When asked to name the most valuable part of their teacher education, both beginning and experienced teachers commonly cite field experiences, including student teaching (e.g., Beck & Kosnik, 2002; Byrd & McIntyre, 1996; Wilson, Floden, & Ferrini-Mundy, 2002). The teaching internship offers student teachers important opportunities to develop general pedagogy as well as content-specific knowledge (Feiman-Nemser & Buchmann, 1987; Wang, 2001). Although there has been notable progress in understanding effective components of mathematics field experiences (e.g., Davis & Brown, 2009; Jaworski & Gellert, 2003), much of this research focuses on elementary or middle school teachers. Many of the details of the internship⁷ experiences of secondary mathematics teachers remain under-researched (Mtetwa & Thompson, 2000; Rhoads, Radu, & Weber, 2011).

More research in this area is sorely needed. Researchers in teacher education stress that teachers of mathematics need a robust pedagogical knowledge of the mathematics that they are teaching (e.g., Graeber & Tirosh, 2008; Hill, Rowan, & Ball, 2005; Ma, 1999). Some researchers have hypothesized that this pedagogical content knowledge can *only* be obtained by working with students in the context of the classroom (e.g., Fennema et al., 1996; Noddings, 1992). Teacher educators have also emphasized the importance of prospective teachers' mathematical

⁷ In this paper, we use the terms *teacher internship* and *student teaching* interchangeably. These terms refer to an extended field placement during initial teacher training where student teachers assume teaching responsibilities in a cooperating teacher's classroom.

beliefs (e.g., Davis & Brown, 2009; Grant, Hiebert, & Wearne, 1998; Phillip, 2007; Thompson, 1984). Mathematics educators call for teachers to teach in reform-oriented ways that focus on student learning (e.g., Fennema et al., 1996; National Council of Teachers of Mathematics, 2000), and the student-teaching experience can be a place where teachers have opportunities to experiment with novel methods of instruction in a classroom setting.

Although the teaching internship sometimes provides prospective teachers with the opportunity to develop the content knowledge and beliefs they will need to become effective teachers, these gains are not always realized. Some student teachers report having negative internship experiences in which they learned little (e.g., Rhoads et al., 2011). The cooperating teacher with whom the student teacher is placed may have considerable influence on the prospective teacher's development. Mathematics cooperating teachers do not always challenge student teachers to develop their pedagogical content knowledge (e.g., Borko & Mayfield, 1995; Peterson & Williams, 2008), and mathematics teacher interns may emulate the mathematical beliefs and practices of their cooperating teachers, even in cases when these practices may hinder student learning (Eisenhart et al., 1993; Peterson & Williams, 2008).

More in-depth research is needed in order to explore some of the issues behind mathematics student teacher and mentor interactions. In this paper, we present a case study that describes and interprets one secondary mathematics mentoring relationship. The following exploratory questions guided our research: What causes a strained relationship between a student teacher and cooperating teacher? How do the student teacher's and cooperating teacher's beliefs about the internship experience influence their behavior?

The case study in this paper focuses on one student teacher of secondary mathematics, Luis⁸, and his cooperating teacher, Sheri. This study is of interest because Luis was an especially bright student who showed promise as a preservice teacher, and Sheri was regarded as a good teacher who had had positive experiences working with two student teachers in the past. However, Luis and Sheri each reported having a difficult experience working with one another. In section 0, we discuss what issues caused tensions in their working relationship from the perspectives of Luis and Sheri. Although Sheri and Luis largely agreed about the events that transpired when working with one another (i.e., we did not observe instances where Luis claimed he did something and Sheri claimed he did not or vice versa), their interpretations of these events were, at times, dramatically different. In section 0, we describe how Luis and Sheri's case related to other secondary mathematics teacher internships we investigated and discuss what can be learned from our data.

The Current Study

Overarching Design and Goals of the Study

This study took place at a large public university in the northeastern United States. This university had a five-year program for undergraduate students to obtain certification to teach secondary mathematics. In the first four years of the program, the students completed the coursework for an undergraduate degree in mathematics while taking electives in education courses. These electives included two content courses to deepen students' understanding of high school mathematics, two methods courses that taught teaching techniques, and four general education courses (e.g., classroom management, individual and cultural diversity). These

⁸ Pseudonyms are used for all participants.

students graduated after their fourth year with an undergraduate degree in mathematics and began their teacher internship in the first semester of their fifth year. These teacher internships are semester-long experiences where student teachers (STs) teach a limited number of classes in a cooperating teacher's (CT's) classroom. Once a school district is selected for these students (based on negotiation of where these students would like to teach and the district's propensity to take on STs from the university where this study took place), the district assigns a CT for the student. The CTs receive little to no training on how to work with a ST, which is common in the United States (Giebelhaus & Bowman, 2002). In the year when this study occurred, there were seven STs who had teacher internships.

Near the end of the teacher internships, the STs, their CTs, and their university supervisors (USs), who observed and critiqued the STs eight times during their internship, were invited to meet individually with the first author of the paper for an interview. All seven STs agreed to participate, although some of the CTs and USs did not. The goal of these interviews was to investigate issues that we found important from previous studies, including the flexibility and freedom that STs were allowed in their student teaching, the feedback they received, and the relationships that they had with their mentors.

The Case Study

The case discussed in this paper occurred in a suburban school district, where Luis taught three classes. He taught two precalculus courses with Sheri, one of his CTs, and one algebra course with Anya, a second CT. His US was Rhonda, a retired teacher with over 30 years of experience.

Luis. *Luis was regarded as an excellent student by most who had contact with him. He was the only ST in mathematics from his university to be nominated for a prestigious statewide award for outstanding student teaching. His undergraduate GPA was 3.9 out of 4.0, which was unusually high for a prospective mathematics teacher. In her interview, Rhonda emphasized that Luis would become "a great teacher," and in her evaluations of Luis, she claimed he had the skills to develop into "a master teacher."*⁹ *Anya declined to be interviewed for this study, but her written evaluations of Luis were overwhelmingly positive. Although Sheri had a difficult relationship with Luis, she acknowledged that he was extremely smart and worked well with individual students. She was also impressed with the way he made himself available to students outside of class.*

Sheri. *Sheri was a mathematics teacher with 11 years of experience. She used the "alternate route" to obtain her certification, meaning that she received on-the-job training and did not complete an education program from a university. Sheri was asked to work with Luis, in part, because her supervisor regarded her as a good teacher. She worked with two STs in the past and reported that she had very positive experiences with them. Although Luis expressed frustration*

⁹ Sheri was aware of, and somewhat frustrated, by the positive opinion that Rhonda held of Luis. She felt Luis taught very well on the days in which he was observed by Rhonda, but this was not representative of the way he usually taught.

with Sheri, he claimed she was a “good teacher” and was impressed with her classroom management skills. Rhonda found Sheri to be an ideal CT with whom to work¹⁰.

The Data

The data came from multiple sources. The primary data came from individual interviews with Luis and Sheri about their experiences in Luis’ teacher internship. These interviews were semi-structured, in the sense that they were organized around particular questions, but the interviewer explored other issues as they arose in the interviews. In making sense of the experience, we also considered Rhonda’s interview, the evaluations of Luis’ teaching that were provided separately by Sheri, Rhonda, and Anya, and 20 pages of hand-written notes that Sheri provided for Luis during the beginning part of his student-teaching experience.

Interviews were fully transcribed for analysis. An initial pass through the transcripts indicated tension between Luis and Sheri, which was reported from both interviews¹¹. We used the participants’ reports to hypothesize potential causes of this tension. The first author then met with Luis for a follow-up interview, in which she shared these hypotheses with Luis to see if he felt they were accurate. She also asked Luis to expand on issues that he discussed during his previous interview that we thought were unclear. This follow-up interview was used to confirm, reject, or refine our previous hypotheses. In the following section, we present the case of Luis and Sheri organized around the causes of tension in their experience.

Causes of Tension

We located seven causes of tension between Luis and Sheri. Although Luis and Sheri generally agreed on the facts of the events that transpired, their interpretations of these facts were sometimes very different. We discuss each issue below. In section 0, we discuss the extent that these issues arose in the interviews that we had with other STs and CTs.

Freedom of Teaching Methods

One cause of tension between Luis and Sheri was Luis’s perceived lack of freedom to teach in the ways that he desired. Sheri claimed to allow Luis the freedom to try out new ideas, but Luis felt he was coerced into using Sheri’s teaching methods and was constrained by her demands.

Sheri gives a glimpse of some of her teaching methods in the comments below, in which she discusses the freedom that she allowed Luis and her past STs¹²:

Sheri: I said [to Luis], “You have lots of options. . . . We have computers and television sets hooked up to all the computers in every classroom, so you can use PowerPoints in every classroom. You can use the overhead. I have an overhead graphing calculator, I have all this stuff. You can use whatever you want.”

¹⁰ We should note that Rhonda was discriminating in her comments; she was critical of the other ST she supervised and CTs that she worked with in the past.

¹¹ Interestingly, Rhonda did not discuss the tensions between Luis and Sheri in her interview, which may indicate that she was unaware of the situation.

¹² Quotations were lightly edited to increase their readability. Stutters, interjections (e.g., um, er), and repeated words were deleted. Ellipses are used to indicate the removal of short passages. We do not believe our edits changed the meaning of the text.

Later in the interview, Sheri reinforced the freedom that her STs had:

Sheri: Some of [the past STs] did PowerPoint, some of them did stuff on overheads. I don't have a preference. I say to them all the time, "Whatever your preference is, you do. I'm not going to force you to do one thing or another. Do what you're comfortable with."

These excerpts, along with other comments made by both Luis and Sheri, suggested that Sheri's instruction relied heavily on the display of PowerPoint slides prepared prior to class. She felt that PowerPoint presentations or overhead slides were valuable aids for time management, as she did not have to spend time writing out the solutions to the problems that she covered. Luis had a different philosophy on using prepared solutions to teach, as he discussed in the following passage:

Luis: [Sheri] definitely loved to use PowerPoint to teach, and she taught everything from PowerPoint, which is good and bad. But I always felt like, in math, PowerPoint's good for organizing, but if you're trying to show a problem, you have to, like, show it.

The fact that Luis and Sheri's philosophies differed in this way was not necessarily a cause of tension. Rhoads et al. (2011) discussed how STs did not mind working with CTs whose teaching philosophies and methods differed from theirs, so long as the STs had sufficient freedom to try out their own ideas in the classroom. Consider the following excerpt, where Sheri discussed the types of freedom that she allowed Luis:

Interviewer: In what specific areas do you think you allowed Luis to have flexibility?

Sheri: Pretty much everything. I pretty much let him do what he wanted to do, and only when I saw this is definitely not working would I say, "You have to change that." I gave him lots of options, lots of suggestions, as far as using the overhead or writing on the board or using the computer or PowerPoint.

Sheri believed that she was allowing Luis flexibility in his teaching because he did not use PowerPoint like she did. However, Luis felt that Sheri was not flexible about the fact that he was required to prepare written documents before a lesson, such as homework solutions that could be displayed to students (e.g., by transparency or power point). As the following excerpt illustrates, Luis felt constrained by this method of teaching:

Luis: I started using the PowerPoint, but just for solutions for homework, which I think is good. But again, it's not that much freedom. Because if it were up to me, I feel like I waste class time going over answers. I'd rather assign the odds, which [the answers] are in the back [of the book]. And just . . . do like maybe two problems [in class].

Luis remarked that he did not mind a lack of freedom in student teaching per se; he claimed his other CT was equally strict with how he taught and he had a good relationship with her. Rather, he felt the cause of tension was that Sheri claimed to allow him the freedom to teach his own way, but was then upset if he taught using a different style than she did. This is illustrated in the excerpt below:

Luis: Sheri was like, "You can have freedom," but later on when she's like trying to take away the freedom, that's what caused the problem.

Interviewer: I see, OK . . . With Sheri it was kind of confusing, it was like, "I thought I could do this, but I guess I won't"?

Luis: Yeah.

Luis and Sheri seemed to have very different ideas about what constituted “freedom.” In addition, Sheri admitted that she took away some of Luis’s freedom because of his issues with time management and the topics that he chose to emphasize, as we describe in the following sections.

What Mathematical Topics should receive Emphasis

Sheri described how she guided Luis on which mathematical topics to emphasize before he taught a lesson:

Sheri: We would go through briefly in the book and I would say, “Ok this topic they need to know. This topic you can touch on, but it's not extremely important. This topic, you have to go really into depth.”

However, Luis and Sheri did not agree on what mathematics should be emphasized during a lesson. Sheri felt that Luis would sometimes spend too much time on higher-level ideas that would be useful in calculus, even though students in the class were struggling to understand the basics of precalculus.

Sheri: And he said, “Well they really need this for calculus.” And I said, “Ok but we need to make sure they understand precalculus before they get to calculus because most of them are never going to take calculus. We're focusing on this year and these topics.” . . . He was always thinking higher. Which is great. I must have said a million times, he would be a great college-level teacher.

Luis also acknowledged that he and Sheri disagreed on the topics that he should emphasize. He described his philosophy of focusing on ideas that would be useful in students’ subsequent mathematics courses:

Interviewer: So, how did you personally decide what to emphasize in a lesson or in a unit?

Luis: I just kind of felt like what was more important, what was more applicable to things that students were going to use again in the future.

Interviewer: What do you mean? In math class, or in the real world?

Luis: Yeah, in math class. Like, if they're going to continue studying math, what's more important to concentrate on? For example, I always tried to give them more open-ended questions on quizzes and stuff, especially for extra credit. But then, Sheri would be like, “No, that's a waste of time.” And some of the kids liked the questions and they answered them fairly well.

The last excerpt also illustrated Luis’s philosophy on the presentation of the mathematics that he was teaching. Not only did Luis want to emphasize different topics than Sheri, but he wanted to provide students with more opportunities for critical thinking about those topics through open-ended questioning. He reinforced both of these ideas with an example of when he taught the addition of functions:

Luis: I remember I spent like maybe like five to ten minutes the first time I taught about the domain of when you add two different functions, the intersection, why it's not the domain of the one with the function with the bigger domain. And all of a sudden she just looks at me, and she's just like, “You're spending way too much time on this.” She's like, “You don't need to focus on domain of the composition of functions.” And I was like “I should” [laughing].

Interviewer: So why did you think it was important?

Luis: Just because like conceptually what students get from it.

Interviewer: You mean just thinking about, like you just said, why it's the intersection as opposed to just the bigger one?

Luis: Yeah, exactly. For example, they have to add like f of x is x and g of x is $\sqrt{x}$ and they have to add it together. Why the domain is just the positive reals and zero.

Interviewer: Why do you think she thought it wasn't as important?

Luis: I have no idea. I mean maybe she thought that it wasn't appropriate for the level.

As illustrated in the previous excerpts, Sheri felt that some ideas that Luis presented were not appropriate for precalculus students. However, there were other topics that Sheri felt were important and Luis did not, as Luis described in an example of synthetic division with complex numbers:

Luis: I remember one time she wanted to show synthetic division with complex numbers, and I didn't because I thought it was too long. And I just thought it was extra time and unnecessary to all the stuff I had to do.

Luis discussed the constraints of time in the previous excerpt. Time management was another cause of tension, as we describe in the following section.

Time Management

Both Luis and Sheri indicated that Luis had difficulty with time management when teaching. Sheri indicated that she was continually frustrated by Luis' poor time management.

Sheri: There was never time. He had a very difficult time with time management as well. It was always the bell's ringing and they're running out the door, and he's still talking. And I tried to tell him, "Luis, you've got to keep track of the time, you've got to look at the clock, you've got to kind of wind down."

To a large extent, Sheri believed that Luis' time management difficulties stemmed from Luis's failure to prepare written material for class and his decisions of which topics to emphasize, as we discussed in sections 0 and 0. She noted that if Luis prepared his solutions to the homework problems ahead of time, he would not waste time figuring out how to do the problem in front of the class. In her words, covering the homework problems "would take you two minutes instead of ten." She also complained that Luis would spend too long covering things that the students should be able to do on their own (e.g., simple arithmetic) or on higher level skills that the students did not need, but Luis did not spend enough time on important ideas that were new to students.

Luis candidly admitted that he had difficulties with time management. In fact, when asked if his time management skills differed from Sheri's, Luis replied, "I would say probably not because I didn't have any time management skills." Although Luis recognized that he was not managing time appropriately, he wanted his students to have a deep understanding of the material he was teaching, and he sometimes felt like these two goals were in conflict with each other. In section 0, we described how Luis recognized the need to go over homework quickly, but he also wanted to explain homework solutions in more depth for the students. In the following excerpt, Luis described a similar conflict:

Luis: Maybe that's because I'm too strict in the way I think of a teacher.

Interviewer: You mean like you kind of have this idea of what you want to do?

Luis: Yeah, an idea of what I want to do, what I want to explain, what I want them to understand, and I kind of feel like if I spent too much time putting together calculators and I don't get it through to them, basically. But, I have to. Classroom management is more important. . . . So, I kind of felt like, alright, I might sacrifice student understanding, but that's enough for them.

Towards the end of his experience, Luis believed he had made progress with this conflict and learned strategies for balancing time management and student understanding. His other CT complimented Luis on his progress in her evaluations. From our interviews, it seemed that Sheri did not recognize Luis's internal struggle with time management. Rather she was frustrated that Luis did not take her advice, as we discuss in section 0.

Understanding Students' Mathematical Knowledge and Difficulties

Sheri commented that Luis did not have a good grasp of students' mathematical knowledge. This manifested itself in three ways. First, Luis did not have an accurate expectation of what these students' background knowledge was. Luis acknowledged that he sometimes had difficulty "understanding where the kids were coming from" and sometimes assumed they knew more than they did. Second, Luis sometimes could not understand what students were asking. Third, he was unable to present the material in a way that students would understand it. As the excerpt below illustrates, Sheri felt that Luis' intelligence worked against him in this aspect of teaching, as the gap between what he understood and what the students understood was too wide.

Sheri: Luis was very smart. And I think that kind of took away from him being able to present material to the kids in a way that they would be able to understand it.

Jumping In

With her previous STs, Sheri would stop attending STs' lessons halfway through the semester, providing them with more autonomy in the classroom. However, Sheri claimed that early in the semester when working with Luis, she received complaints from the parents of the students that Luis was teaching. This did not happen with the previous STs, and Sheri felt that she needed to exert more control in her classroom. Sheri noted that after Luis finished his student teaching, she would have to teach the students for the rest of the semester, and she was accountable for their mathematical learning.

Sheri: My thought was, you know, they're my students, they're the ones that need to be learning. He needs to understand what's going on, and I'm the one who's getting them back, so we have to make sure that everything's in place.

Sheri and her supervisor discussed a modified pace of curriculum in order to remedy the situation. In addition, she felt obligated to attend Luis' lectures and "jump in" to provide Luis guidance when she felt he was teaching poorly. Sheri struggled with interrupting Luis's classes, as she discussed here:

Sheri: So, [my supervisor and I] said, you know what, let's try [the modified pace] first, and if it doesn't work, or if it doesn't help, then we're going to have to have me kind of jump in. But I didn't want to undermine anything that [Luis's] saying or have the students kind of look at him like, "Well, you don't know what you're doing and you're not really our teacher anyway." I wanted them to really say, "This is our teacher, we have to pay attention to him, we have to listen to him, we have to ask him questions." That's why I shouldn't have been in

the room, and I haven't been in the past. But there were just too many issues, too many, sometimes mistakes. But he tended to focus on things that they don't really need and not so much things that they did need.

In this excerpt, we see that Sheri was reluctant to “jump in” because it defeated the purpose of Luis’ student teaching. However, she felt she had to, in part because Luis was not emphasizing what Sheri believed to be the appropriate mathematical ideas (see section 0). Later in the interview, Sheri again described her struggle with “jumping in,” but felt she had to because Luis was not understanding the students’ questions (see section 0).

Sheri: He had a very difficult time understanding what the questions were that the kids were asking. They would say, “Can I do this?” or “Does this mean that?”, and he wasn't comprehending what their question was. So he would answer a question that they weren't asking and in turn just confuse them more. And, they would just say, “Ok,” and they would just drop it. And then I'm like, “Ok, do I jump in and say, ‘Ok this is what they're asking and here's the answer to their question’?”

Luis also acknowledged that Sheri would interject during his teaching, and he found it frustrating, as the following excerpt illustrates:

Luis: I mean there was like one day, I'm in the middle of something, and she's like, “Don't spend too much on that, they don't need to know that.” So it's kind of annoying when you're in the middle of a lesson and you have to change it.

Luis realized that Sheri tended to interrupt his lessons when he was not emphasizing the topics that she deemed appropriate. He found this particularly frustrating because he was confused by what Sheri thought should be emphasized and because Sheri did not understand his reasons for emphasizing the topics that he did (as discussed in section 0).

The Role of Feedback

Luis and Sheri had different ideas about the role of feedback in the student-teaching experience. First, Sheri expected Luis to implement her suggestions, but Luis thought that Sheri's suggestions were optional. He eventually implemented them only to avoid complaints from her. Second, Luis expected Sheri to give consistent feedback throughout the student-teaching experience, but Sheri felt that it was appropriate to give less feedback towards the end of the experience.

In the beginning of the semester, Sheri provided Luis with detailed verbal and written feedback. As the excerpt below illustrates, Sheri found that Luis always took feedback well; however, he often did not implement Sheri's suggestions.

Sheri: He was definitely harder on himself than I was on him. But I feel like he didn't do anything to correct it. Or, if he did, it took a really long time to get there.

When Luis reflected on his student-teaching experience, he acknowledged what he labeled as “being stubborn” and not looking for other resources to find new ways to teach.

Luis: I kind of felt like I could have tried different things. I was kind of stubborn in a way, let's put it that way.

Interviewer: What do you mean by stubborn?

Luis: I kind of wanted to do things my way. I didn't look for any outside resources to help me teach any specific things.

Over time, Sheri became frustrated with Luis's failure to implement the feedback she gave him. She described the feedback she was giving as "a lot of pushing." Sheri felt that Luis's difficulties with time management in particular could be solved with her suggestions about preparing PowerPoint slides prior to class, so she began to be more forceful with the feedback she provided, as she described here:

Sheri: STs have to learn on their own, they can't, you can't tell them, "Ok, do this, do that." It wasn't until it definitely wasn't working that I was like, "Ok you *have* to do this" [italics were Sheri's emphasis].

In the excerpt below, Sheri describes an instance when Luis followed her advice (about using PowerPoint to display homework solutions).

Sheri: He finally did it. He said, "This helps a lot. It's much easier." And I said, "See, I know what I'm talking about. I'm telling you for a reason, to help you." I kind of felt like he didn't want to go above and beyond to do the extra work for himself. Which, in the end, created more work for him without realizing, and it wasn't until the end where he did all of his own things and he finally took my advice and did what I suggested, that he said, "Yeah, you're right. This does make it easier." Where the [past STs], when I'd make a suggestion, they took it, and they said, "Yeah, this is great."

The excerpt above indicates that Sheri felt somewhat vindicated with Luis's decision to implement her feedback.

From Luis's perspective, he seemed to think that he found a solution that minimized Sheri's complaints. Specifically, he began to review his lesson plans with Sheri before he taught, as Luis described here:

Luis: We had really a lot of trouble in the beginning. It was more so we were going back and saying, "OK, you should have done this, you should have done this," after I taught it, as opposed to, "OK, why don't I just go to her first?". . . That way we don't have to fight about it afterwards.

As the semester progressed, Sheri offered less feedback to Luis. As the excerpt below illustrates, Luis seemed disappointed with Sheri's lack of feedback.

Luis: She [provided positive feedback] more so in the beginning, but now it's like barely anything. I feel like she wants me out of there quickly.

Later in the interview, Luis also said that he did not know what to interpret from Sheri's lack of feedback. Sheri's perception about her lack of feedback was different. She viewed her role as providing strong guidance to her STs in the beginning of the semester and then letting them teach on their own for the remainder of the semester.

Sheri: For the last month or so that [Luis] was here, even though I was in the room, I let him just do on his own. Every once in a while I would look over and say, "Ok this is what we need to fix." But my other STs were able to just go with it on their own.

Indeed, as discussed in section 0, the only reason she attended Luis' classes was because she felt he needed extra help.

A Difficult Personal Relationship

Both Luis and Sheri acknowledged that they had a difficult personal relationship, although each claimed not to dislike the other personally. In the excerpts below, we see that Sheri had closer relationships with her other two STs.

Sheri: When you have more of that personal relationship or that friendship, more vulnerability, and they don't have as much of a fear opening up and showing that. And I think it's almost easier to help them when they do open up like that. It might be more of that male/female relationship where he's afraid to show me that he had faults or that he was afraid of something or that he didn't understand something. I felt like he wanted to show that he was really smart and he knew what he was doing and he could do it. Where the [past STs], they kind of came in, in the beginning with, "I have no idea what I'm doing, I'm terrified, help me."

Sheri felt that the relationships she had with her other STs were due, in part, to their "vulnerability," which she believed that Luis lacked. However, Luis believed that the difficult relationship between him and Sheri was simply due to "clashing personalities." Several times during the interview, Luis mentioned that Sheri seemed tired of working with him. Luis may have gotten this idea by Sheri's lack of feedback towards the end of the experience, as discussed in section 0. By contrast, Luis reported having a great professional and personal relationship with his other CT.

General Discussion

In the previous section, we described seven sources of tension between Luis and Sheri. In this section, we discuss issues raised by Sheri and Luis that were present in other intern/mentor relationships and use these issues to identify general aspects of CT/ST interactions.

Freedom and Flexibility

To develop an independent style of teaching, STs need the freedom to try out their own pedagogical ideas in a classroom (Eisenhart et al., 1993). Researchers have noted that STs valued this freedom, and STs who lacked this freedom had negative internship experiences (Beck & Kosnik, 2002; Rhoads, et al., 2011). For Luis and other STs that we interviewed, a lack of freedom in the classroom sometimes led to tensions in their internship experience.

We believe two factors may contribute to STs' perceived lack of freedom in the classroom. First, CTs may allow STs considerably less freedom than they realize. Sheri believed that she allowed Luis freedom in "pretty much everything," yet she was particular about what mathematical topics that he emphasized (see 0) and insistent that he use slides prepared ahead of time to present his material (see 0). A second issue concerns accountability constraints that may limit the teaching flexibility that CTs can pragmatically allow. Several CTs in our study mentioned that they were ultimately responsible for students' learning and so could not allow their STs complete freedom in the classroom, and similar views are reported in the general teacher education literature (e.g., Rajuan, Beijjaard, & Verloop, 2007). Luis' supervisor, Rhonda, discussed why some CTs do not allow their STs freedom in their teaching:

Rhonda: They're looking for someone to clone their style. And don't forget they're going to get these students back again, and they want those students in the form that they want them to be, with the behaviors and the habits of the mind that they want.

Rhonda noted that CTs are ultimately responsible for the learning of their students, and CTs want their students to be conditioned to learning when they return as the classroom teacher. In section 0, we noted that Sheri was stricter with Luis after she received complaints from parents about his teaching, in part because she was responsible for these students' learning.

Time Management, Understanding Students' Mathematical Thinking, and Room to Fail

The abilities to manage time effectively and understand students' mathematical thinking are widely acknowledged to be critical for successful teaching. Luis had difficulty with both of these issues, as indicated in sections 0 and 0. However, in this sense, Luis was hardly unique. Indeed, all seven STs reported having difficulty with these things, with many citing learning how to manage time and better understand students' mathematical thinking as the most valuable benefits they obtained from their student-teaching experience. Other researchers have also documented that these are common problems for beginning teachers (e.g., Ponticell & Zepeda, 1996).

What appears different about the case study reported here was how Sheri interpreted Luis' deficiencies in these regards. Other CTs and supervisors recognized that their teacher interns had difficulty with time management and understanding students' mathematical thinking, but most did not think this was problematic. Instead they thought these types of issues were the norm and something that preservice teachers were expected to develop during their internship. Sheri viewed these as serious faults of Luis.

Discrepancy between Goals of Mathematics Educators and Cooperating Teachers

There were several points where Luis was engaging in pedagogical behaviors that we believe mathematics educators would characterize as good teaching practice, but Sheri found to be inappropriate and unnecessary. This was most prevalent in section 0. In teaching a precalculus course, Luis would emphasize ideas that would be useful in calculus. Researchers such as Ma (1999) have indicated that teaching with an eye toward how the mathematics being taught will connect to the future mathematics that students will learn may help students to be more successful in mathematics. Sheri, however, found this to be a waste of time, essentially arguing that students can learn calculus if and when they take calculus. Luis also mentioned that he would like to engage students in problem-solving activities, but lamented that he did not feel like he was able to do so.

We should note, however, that other ST/CT pairs did not seem to have conflicts over which mathematical topics to emphasize. All STs that we interviewed mentioned that their CTs would help them decide which mathematical topics to emphasize when planning a lesson or a unit. Most STs appreciated this guidance because they felt inexperienced in this regard. Luis seemed to be a special case. Perhaps this was because he was, in his words, "stubborn" and had "strict ideas about what a teacher should be." Other STs seemed to respect and go along with their CT's wishes, but Luis tried to stick to his convictions.

As described in section 0, Luis felt an internal struggle with balancing the elements of a high school classroom with his ideas about teaching and learning. Although it is important that Luis learn how to both manage a classroom and facilitate students' learning, CTs may see learning how to run a classroom as a primary goal, but mathematics educators see facilitating students' learning as more important (Leatham & Peterson, 2010).

Personal Relationship

One of the most robust findings that we found in our interviews with STs was how important their personal relationships with their CTs were to the overall quality of their internship experience. Luis and Sheri's case study is consistent with our findings. Sheri believed having a friendly personal relationship was important and, indeed, she had such relationships with her other STs in the past. Similarly Luis had a closer relationship with his other CT.

It is difficult to say whether the strained relationship between Luis and Sheri was a *cause* of the other tensions that they experienced or merely a *consequence* of these tensions. We suspect it was both, but we do not have the data to make a judgment.

Although we cannot be sure exactly what caused the difficulties in Luis and Sheri's relationship, we can offer a hypothesis. In our (non-research) based experience in working with STs and CTs, we have noticed that when CTs have problems with STs, they usually complain that the STs do not follow their advice and often attribute this to arrogance on the part of the ST. They feel insulted that the ST was not respectful of their experience and expertise. We do not have the data to conclude that this occurred in Luis' interactions with Sheri. However, when discussing the role of feedback in section 4.6, Luis commented that he could be stubborn and not seek outside counsel for his lessons, and Sheri expressed frustration that Luis would not take her advice, telling him, "See. I know what I'm talking about. I'm telling you for a reason." One implication of this hypothesis is that for some CTs, a failure to heed their advice might not be interpreted as a difference of teaching styles, personalities, or opinions, but rather as a lack of respect. This interpretation could sour the relationship between the two, and STs should be aware that some CTs are apt to make this interpretation.

Implications

Many researchers have indicated the need for quality preparation and training for STs, CTs, and USs (e.g., Feiman-Nemser, 2001; Giebelhaus & Bowman, 2002). Luis and Sheri's case and supporting evidence from the other interviews we have conducted point to some suggestions for this training. First, preparation could include discussions about the goals and purposes of student teaching according to the STs, CTs, and USs. Such conversations may not lead to consensus, but could lead to a mutual understanding and help to avoid some of the tension that we saw with Luis and Sheri. (For example, Luis seemed to expect consistent feedback throughout the semester, but Sheri believed it was her role to taper feedback.) STs and their mentors should be encouraged to continue critical dialogue about their intentions and goals throughout the student-teaching experience so that each has the opportunity to learn from the other (Graham, 1999; Feiman-Nemser, 2001). Second, common issues and sources of difficulty for STs (e.g., time management and understanding students' mathematical thinking) could be discussed during training. This would provide mentors with an idea of what to expect of their STs and make STs aware of some of the challenges that they may face. Third, the US can be encouraged to serve as a mediator between the ST and CT if necessary. USs can help to create an open and communicative atmosphere at the beginning of the student-teaching experience and encourage STs and CTs to approach them with issues. In the case of Luis and Sheri, although both respected and appreciated the US Rhonda, neither seemed to consider the option of discussing their relationship tensions with her.

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