Problem-Based Conversations:
Using Preservice Teachers' Problems as a Mechanism for Their Professional Development

By Matthew Miller

Introduction: A Personal Account of Learning to Teach

Learning to teach is a challenge. When people make the decision to become teachers, they enter their undergraduate, postbaccalaureate, graduate, or alternative teacher education programs with a goal of learning how to teach so their future students learn. Many teacher candidates, understandably, do not foresee the complexity of the journey that lies before them, nor the *problems* that will likely emerge as they venture into their initial teaching experiences and ongoing work with students.

In the early 1990s, I studied to become a teacher in a graduate-level elementary teacher preparation program. The journey toward becoming a teacher was, to say the least, a challenge for me. I experienced many difficulties as I shifted back-and-forth between classes at the university and field placements in public schools, where I was being asked to implement teaching strategies across a broad range of subject areas with students I did not know well. I saw teaching practices in schools that were very different than those advocated by my professors at the university.

Upon returning to the university after an initial placement in schools, my preservice colleagues and I would have conversations at the coffee shop, on the

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way to campus, or in the hall before classes about all of the problems we were facing out in the "real world." These rather urgent conversations about teaching subject matter, connecting our course requirements to our field experiences, classroom management, and pedagogy were helpful because they allowed us to empathize with each others' predicaments, offer advice, and support each other. These peer-to-peer conversations were somehow *different* from those I would have with my supervisors and professors, because we all encountered similar problems and could readily empathize with each other's predicaments. At the same time, these conversations were, by their very nature, sporadic, and generally not incorporated into the "official" context of my preservice teacher education program. As a consequence, there were missed opportunities to explore these problems more systematically.

Preservice Teacher Education: A Problematic Context

My personal account depicts a challenge in the field of teacher education. New teachers need to (1) gain an understanding of instructional strategies related to specific subject matter, (2) develop an understanding of how to address individual differences, (3) increase their knowledge of formative and summative assessment practices, and (4) learn how ongoing collaborations with teaching colleagues, school administrators, and parents can provide the necessary support for students, particularly those who are not succeeding (Darling-Hammond & Youngs, 2002; Hill, 2000; McDiarmid, 1990; Walsh, 2001). They are expected to develop this nuanced understanding of teaching in an environment where there are inescapable tensions between teacher education institutions and schools. This complex arena for teacher learning is one that is likely to surface problems for prospective teachers.

Research studies show that preservice teachers face similar types of problems. Problems related to classroom management, developing a conception of subject matter and how to teach it, understanding the ways students learn, assessment practices, working with colleagues connecting the required work in courses and in schools, as well as a host of other predicaments can confront beginning teachers (Bullough, 1989; Fullan, 1998; Hill, 2000; Mueller & Skamp, 2003; Richardson & Placier, 2001). Given that such problems are likely, it is sensible to examine learning contexts that encourage preservice teachers to approach, reframe, and make sense of these problems. Rather than viewing preservice teachers' problems as obstructive to learning and professional growth, a question that reframes preservice teachers' inevitable challenges asks, "What happens to preservice teachers' conceptions of teaching practice and student learning if their problems are used as a mechanism for their professional development?"

Given the substantive problems I faced during my own teacher education experience and my witness to my students' problems as they learn to teach as a professor in a College of Education, I designed a research study to better understand how preservice teachers navigate their problems through conversations with each

other. I was particularly interested in examining conversations that were supported through the use of *evidence* of teaching and learning such as lesson plans, samples of student work, and teaching videotapes. I was curious whether such specific attention to these artifacts in the service of preservice teachers' problems would support the process of learning to teach. Two research questions frame the study: (1) What kinds of knowledge about teaching and learning emerge from problem-based conversations among preservice teachers? and (2) What factors support the participants' engagement in problem-based conversations?

Though teacher education researchers have documented the positive benefits of the use of already-prepared written and multimedia cases as a way to facilitate novice teachers' problem-solving and learning (Hammerness, Darling-Hammond, & Shulman, 2001; Hewitt, Erminia, Bencze, Vaillancourt, & Yoon, 2003; Moje & Wade, 1997; Rowley & Hart, 1996; Silverman, Welty, & Lyon, 1994), an under-researched area of inquiry is the examination of problem-based cases when they are generated by the participants themselves and explored with their novice peers. It was unknown whether an exploration of self-identified problems and supporting evidence would help these beginning professionals to develop more nuanced understandings of teaching and learning.

Review of the Research and Theoretical Literature

Two fundamental assumptions upon which this study is framed are: (1) teacher learning is socially constructed and supported through conversation (Bakhtin, 1981; Vygotsky, 1978) and (2) Conversations can serve as a mechanism for teachers' problem-solving, sense-making, professional development, and engagement in professional learning communities (Dunne & Honts, 1998; Little, 2003; McLaughlin & Talbert, 2001). These assumptions provide a means to analyze the problems of preservice teachers as a mechanism for their professional development.

Frame #1:
The Role of Conversation in Teacher Learning

Research supports a theory that knowledge and learning are social enterprises and are situated in particular physical and social contexts. Vygotsky (1978) placed a high value on the role of language and social interaction in learning. He highlighted the importance of talk in social situations as a prerequisite to an understanding of new concepts. Social interactions support key aspects of learning: the ongoing processes of comparing and checking understanding with capable others. Through social discourse, people learn how to justify their claims with evidence and how to ask informed questions of each other in order to refine their work. Similarly, Bakhtin claims that as individuals we see only the narrow view of that which lies before us, and we require the "sight of others" (Bakhtin, 1981, p. 58) to look beyond

our relatively myopic understandings of ourselves, others, and the communities in which we participate. This may be particularly true of preservice teachers, who have not developed the insights of experienced teachers. One's peers, as a matter of fact, may serve as a "testing ground" (Rogers & Babinski, 2002, p. 5) for his or her understanding of the problems that surface when learning to teach.

A social constructivist orientation toward teaching emphasizes how teachers can work together to co-construct knowledge (Lave, Wenger, & Hanks, 1999; Vygotsky, 1978). Smagorinsky et al (2003) use the term "nexus of practice" (p. 10), to describe these purposeful environments where teachers participate in focused engagement with each other about evidence from their teaching and students' learning. When focused on problems, such conversational spaces provide opportunities to explore the "overlapping zones of proximal development" (Hammerness, Darling-Hammond, & Shulman, 2001, p. 241) that exist in any peer group.

Through conversation with each other, teachers have opportunities to make their theories and practices public as a means to increase their effectiveness. Such social opportunities allow those who are new to the profession of teaching to practice asserting their authority over their own emerging experience. Though the process of sense-making can lead to multiple and even conflicting interpretations among a group of teachers, conversation with peers provides a means for teachers to get these understandings out into the open, in a social space with colleagues, where they can be supported, challenged, and/or critiqued.

Theoretical Frame #2: Professional Learning Communities and Teacher Learning

Professional learning communities are contexts where teachers endeavor "to generate new knowledge of practice and their mutual support of each other's professional growth" (McLaughlin & Talbert, 2001). The use of local knowledge and evidence from teaching and learning in these learning communities sharply contrasts with the norms of privacy and individualism that are generally characteristic of teaching and professional development in many traditional contexts (Lortie, 1975). In professional learning communities, conversation provides a means for teachers to modify their practice over time by reflecting on the exchanges they have with their colleagues. This reflective and social work produces local knowledge of student learning and teaching practice, and it offers teachers mutual support of each other's professional growth (McLaughlin, 1994). Such problem-based conversations between teachers are integral to their learning and sense-making, particularly when these opportunities to share problems are focused and structured to account for complexity, include all voices, and are grounded in experience.

In the past 15 years, researchers have investigated how practicing teachers change

by examining their own and their students' work with each other in professional learning communities (Fullan, 1994; Gomez, Stone, & Kroeger, 2004; Lieberman & Miller, 2001; Little, 2003; McLaughlin & Talbert, 2001; Meyer, 1999; Nave, 2000; Richardson & Placier, 2001; Rosenholtz, 1991). Teachers in these learning communities gather together to participate in a "public airing" (Little, 2003) of their teaching issues, problems, and uncertainties. Conversation becomes the vehicle through which teachers produce this local knowledge about student learning and teaching practice. These communities are seen as ongoing and integrated with practice in comparison to one-day or "splash-and-dash" in-service workshops.

What distinguishes professional learning communities from traditional forms of professional development is the way that adult learning is framed; *prescription* is replaced by *joint work*, *problem posing* and *problem solving*. Participants pose real-world problems to each other, support the conversations that ensue by sharing evidence of student learning, and work concertedly to resolve their problems. Conversations in these contexts are centered on continuous inquiry that creates interdependence among the participants over time (Little, 1992).

Findings from empirical studies reveal that when teachers gather to talk about a peer's self-identified teaching problem, they can serve as mirrors for their colleague to view his or her practices. For example, studies of teachers involved in "video clubs" (Frederiksen, Sipusic, Sherin, & Wolfe, 1998; Rowley & Hart, 1996) revealed that viewing videotapes of peers' classroom teaching allowed teachers to share their observations of teaching moments, provided opportunities to connect what they saw to their own experience and research, and, because they were not intimately involved in the actual teaching on the tape, allowed opportunities to use a clearer observational lens than the individual likely would have if reflecting alone. Similarly, Thomas, Wineburg, Grossman, Myhre, and Woolworth (1998) examined problem-based conversations between experienced history and English teachers that participated in professional learning communities. In their analysis, the authors showed how a collective understanding student learning and teachers' decision-making was advanced through conversation. In particular, they note that a central feature of teacher-to-teacher learning through conversation is the concept of "distributed expertise," a means by which individual conversational contributions are "taken to levels that no group member could attain individually" (p. 23).

Findings from these, and other, studies of teachers' professional learning communities support a hypothesis that the creation of similar learning communities in a preservice context can benefit the learning and practices of beginning teachers. This research and the theories that support conversation-based models of professional development are useful when designing a study that examines conversations between preservice teachers about their self-selected problems.

Setting and Participants

The setting for this study of preservice teachers' problem-based conversations is an elementary teacher education program situated in a research university in the northwest United States. The five-quarter Teacher Education Program culminates in a master's degree and initial teaching certification. The first three quarters of the program combine daytime course work and several one-to-three-week field experiences. The fourth quarter is devoted to a full time student teaching experience of 11 weeks. Students return to campus for a fifth quarter during which they finish two end-of-program courses and construct a culminating portfolio emphasizing professional reflection, evidence of learning from the program, and professional development.

Twenty-six preservice candidates participated in this study. Data were collected in two phases. The first phase took place during three sessions during the participants' third quarter, after a three-week full-time field experience in schools. The second phase took place during four sessions throughout the participants' 11 weeks of full-time student teaching. Each of the seven total sessions lasted approximately 1.5 hours and focused on two of the preservice teachers' self-identified problems. Each session also ended with a focus group interview that lasted approximately 20-30 minutes.

The participants employed a consultancy protocol (Appendix 1) that is part of the Critical Friends Group professional development system (Dunne & Honts, 1998; NSRF, 2003) to engage in their conversations. The consultancy protocol was chosen because it was relatively efficient (30 minutes), focused participants on a colleague's self-identified problem, and provided a series of questions and discussion prompts. After a colleague presented his/her problem and supporting evidence, the participants asked clarifying and probing questions of the presenter to get a better understanding of the problem and its context, considered the evidence that was presented, and had an informal conversation about the problem while the presenting teacher sat to the side and took notes about his/her group's conversation. At the end of each session, the presenting teacher voiced his/her new understandings about the problem that were gained through the process.

The participants had several opportunities to practice the steps of the consultancy protocol in the quarters leading up to their participation in the study and to view videos of more-experienced teachers and analyze their teaching using the protocol. This familiarity with the protocol enabled the participants to focus more on their problems and accompanying conversations, versus getting caught up in learning the steps of the protocol.

Data Collection

A qualitative case study involving the ethnographic methods of observation, interview, and document collection was used to understand the nature of these participants' conversations. Collecting a range of data was appropriate given the desire to gain a more holistic overview of the context under study.

A primary source of data was videotapes of the participant-groups' problem-based conversations that were collected during the problem-based seminars that occurred throughout the participants' student teaching. The videotapes were later transcribed for further analysis. As I observed these sessions from behind the video camera, I also took notes to record my observations and compare them to the subsequent analysis of the videotapes.

Immediately following each problem-based session, I conducted a 20-minute focus group interview with each of the participant groups. The group interviews offered a way for participants to reflect on specific moments from their problem-based conversations and to describe their interpretation of how they experienced those moments and helped me make sense of each participant's experience. The interviews relied on an open-ended series of questions and prompts such as, "Tell me about your experience in this session" and "What was the most helpful/challenging part of this session for your professional development?" As the participants would share their experience of engaging in the problem-based conversations with their peers, I asked follow-up questions such as, "Can you think of a moment in your conversation that supports what you just said?" and "One of the things I heard during your conversation was _____. Could you explain what you meant by that?" to clarify and extend the participants' responses.

I also conducted more in-depth interviews with 5 individual participants from a single group. The interviews took place at the end of the data collection period and lasted approximately 20 minutes. The interviews allowed me to gain insights into the participants' overall perceptions of their problem-based conversations over time. As part of the interviews with these five participants, a stimulated recall strategy (Gass & Mackey, 2000) was used. The participants were shown a 5-to-10 minute videotaped segment from one of their sessions, with an accompanying transcript. After the viewing and reading, the participants discussed the content of the segment and their perceptions of the conversational moment. Participants were also asked to write notes on the video transcript about thoughts raised when viewing the videotapes and reading the transcript. As a way to assess different perceptions of the same moment, several seminar members who were present at a single particular session saw the same conversational examples.

A variety of documents were also collected and analyzed to provide a context for understanding the participants' problems and to further my understanding of how the problem-based conversations contributed to the participants' learning. These documents included lesson plans, samples of student work, graphic organizers made by the presenting teachers, and other artifacts that the participants brought to the seminars.

Analysis

The analysis of the data produced a conceptual framework that was grounded

both in the data and the literature, providing a "steady dialogue between theory and evidence" (Miles & Huberman, 1994, p. 144). This framework provided a means to better understand how the participants talked about teaching and learning over time and the patterns of conversation that emerged about these issues during their problem-based sessions.

Codes were created to summarize segments of the conversational and interview data in terms of the content and conversational processes at play in the participants' discourse. Gradually, initial codes were grouped into "code families" (Miles & Huberman, 1994, p.57) as an iterative analysis began to take shape. To better understand the patterns of discourse among preservice teachers and the links between their problem-based conversations and their learning, the analysis of the data included looking for patterns and themes in the participants' talk. What was sought were instances where there were, and were not, "converging lines of inquiry" (Yin, 2003); where multiple sources of evidence either corroborated or conflicted with particular findings or conclusions.

Throughout the analysis, I sought to describe the affordances that surfaced throughout the data. Little (2003) defines "affordances" as what is made available to the participants for consideration by way of the group members' accounts of classroom events and their context, the problems raised, and the artifacts (student and teacher work) used to shed light on those problems. These affordances influence how participants are able to represent their problems to each other and how they are able to approach these problems through conversation.

The analysis also identified moments of "take-up" by the participants (Lippincott, 1999, p.37). Lippincott defines take-up as the ways in which participants choose to act upon or talk about their problems. Analyzing the questions, suggestions, ideas, and general flow of the groups' problem-based conversations lent insight into what the participants prioritized and the frames of reference they used to approach their problems.

Depictions of the Professional Knowledge Landscape through Problem-based Conversations

The following examples come from a longitudinal study of problem-based conversations within several groups of preservice teachers. The participants' problems, related to depictions of subject matter, the pedagogical strategies used to facilitate learning, and the assessment of student learning, were consistent with those reported in the research literature on preservice teachers (Feiman-Nemser & Buchmann, 1985; Hill, 2000; Howey & Zimpher, 1996; Knowles & Holt-Reynolds, 1991). A central focus of the analysis shared here is to illustrate how the study participants extended and generalized from their problems to more in-depth discussions of this "professional knowledge landscape" (Clandinin & Connelly, 1995) for teaching.

Conversations about Subject Matter

The problem-based sessions provided many opportunities for the participants to navigate their conceptions of the subject matter they were teaching, in relation to their students' and their own understandings of the school contexts in which they were placed for field experiences.

The following exchange features Carol and Ann exploring the challenges in facilitating students' understanding of mathematics algorithms during student teaching. While looking at Anita's mathematics artifact, Carol takes-up the notion that multiplying fractions is a difficult concept for students to navigate due to the language involved:

> Carol: Well, the other insane thing about fractions and algorithms is that the language is backwards from what they know, like for example, to multiply something, you think you're going to have more, you don't think you're going to have less because you're multiplying.
>
> Ann: Yeah, it's the same with when you divide a fraction, I mean, it subverts what they know—dividing it makes it larger. You need to actually decode the language with students and move them past the idea that "when you multiply, you think you're having more, you don't think you're dividing it into more pieces." You know what I'm saying?

Carol notes that multiplying fractions together reduces, rather than increases, their value. The idea that the language employed in such problems is challenging and needs to be decoded with students speaks to an understanding of the conceptual challenges in such algorithms.

The following example features participants' exchanges about the difficulties in teaching elementary students punctuation because of the differences between spoken and written sentences:

> Maggie: One thing that's coming to mind for me is that we've been doing some (work with) adding proper punctuation to sentences with my third graders. A lot of the kids were providing answers that made sense, but weren't technically the correct answers that originally the worksheet had asked for.
>
> So when they read some sentence like, "I hope everyone has a super duper Wednesday," some of them read that as a question. Because when an answer is on paper, you lose the vocal intonation. Punctuation is really tricky in the written form because so much of how we hear punctuation is spoken. I've been thinking a lot about that; isn't their answer still valid?

With the door now open to talk about punctuation, Ellen spends a moment taking up the reasons for punctuation:

> Ellen: Mm-hmm….I think why we have, um, punctuation though, is because we can't get it across in written language as well, so we have these symbols to help ((V: Mm-hmm.)) identify the kind of intonation that should be there or the, you

know, because it doesn't come across as well so. Um, I think that's part of the purpose of the punctuation, you know.

Maggie: Right, but if you're filling in the punctuation, then you could read it any way you want.

Ellen: It's kind of subjective.

Maggie: Yeah.

These examples align with research that prioritizes dialogue between educators about their conceptions of subject matter (Ball & McDiarmid, 1989; Darling-Hammond, 1996; Floden, McDiarmid, & Wiemers, 1989; McDiarmid, 1990; McLaughlin & Talbert, 2001; Meyer, 1999; Wilson, Floden, & Ferrini-Mundy, 2001). These studies report that such discipline-based exchanges are essential for fostering student learning and the norms of professional community. The participants frequently used a presenter's problem as a vehicle to explore subject matter content and to contextualize it in light of their growing experience in the classroom.

Conversations about Pedagogy

The participants frequently explored ways to enhance the pedagogical approaches that would improve their colleagues' teaching and students' learning. The following example highlights how a group took up Erica's question about ways to make her think-aloud strategies more effective during a unit on descriptive writing. As the conversation commences, Sally suggests that questioning strategies may enhance Erica's think-aloud process:

Sally: I thought of something…What if you break-up your think-aloud and it over to them by stopping and saying something like, "Why might I want to do that? How is that helping my story?" That's really getting them to think out loud about it and to respond to you, and you're not just up there preaching. It allows them to tell you in their own words why a writer would want to do that and that might be something that could help you like involve the students and make it more interesting for them…

Jenny: Would you do that even though you're modeling a new skill?

Sally: I think it's important that the students understand why she's using the strategy she's trying to teach. But if you're doing a think aloud and you're just constantly up there talking…that's great if you have very motivated students, but I would definitely be worried about [the teacher talking so much] with some kids.

Sally raises the idea that while think-aloud strategies are useful, many students may check-out and disengage without the teacher's use of questions to involve them.

A common theme in discussions about pedagogy was the need to be transparent and intentional with students about the reasons why they are engaging in particular activities. Ellen's problems centers on her concerns about losing some of

her first-grade students' attention when she wasn't directly engaging their voices. During the group's conversation Nancy presents pedagogical transparency as a useful technique to prepare students for the sequence of their work:

> Nancy: I forgot that my teacher does this, but I wonder if you could talk about how the different types of instruction that are going to happen in the classroom, so they know better when you're going to talk and engage their ears and when they're going to talk and engage their voices. That way, they know better the different types of learning that will happen and why it will help their learning.
>
> Ellen: Mmm-hmmm. How would I introduce that?
>
> Nancy: You could say, "Okay, I know that this is a time for modeling, and this may not be easy for you, but there's going to be a time for *you* to respond, but I'm going to talk first so we can learn something new and *then*, we're going to try it together…I can't wait to hear about what you have to say!" That way, the students know that there's going to be a time to contribute with their voices, but it's just not right now while they're learning something new.

Nancy notes that a desirable instructionally-transparent "move" is to be explicit with students about why they may need to, at times, listen versus be involved with their voices and that more active student involvement will be invited shortly. This way, she reasons, the students will have a better awareness of when and why the teacher and/or students will either speak more or less as they engage in learning together. Also, it is noteworthy that Nancy opens her comments with, "I forgot that my teacher does this…." Ellen's problem encourages her to recall and reframe a helpful classroom practice used by her cooperating teacher at put it to work in service of her peers' problem.

The following is another example of advocacy for pedagogical transparency and intentionality as a way to facilitate students' learning:

> Ann: Something else I was also thinking of is besides just making it exciting and more fun…It can be very powerful for kids to be aware of how much they're learning and be aware of what they're learning…that there are activities set, that you're leading them through the activities for specific reasons, are things that they have to learn from. And so maybe being more intentional with, "These are the objectives for what we're doing." And then checking in after, "What did you learn from this activity? How do you know?"

This participant is arguing that successful teaching goes beyond making activities exciting and fun to helping students become more aware of their learning and reasons for engaging in particular activities.

In addition to transparency as a pedagogical "move", the participants frequently took up "transactional strategies" (M. Pressley et al., 1992, p.511) as important to a pedagogical tool kit. Pressley defines transactional strategies instruction as direct explanation with an emphasis on teacher-student and student-student discussions and interpretations of text during the practice of strategies (M Pressley, 2001; M.

Pressley et al., 1992). Research has reported that the explicit instruction of learning strategies on relatively simple tasks, accompanied by student practice of the new strategies, contributes to comprehension and to students' transfer of strategies to new learning problems. The study participants did not usually reference research or reading about transactional strategies; yet, the immediate context of the problem-based sessions enabled them to surface such strategies as necessary to promote students' understanding:

> Amber: The students need to be *taught* how to do those procedures. Like, thinking even if you're just briefly, you know, as they come up to you and they're ready to go onto a new step in the writing process…It seems like, even just five minutes of talking to the whole group, letting them hear you think aloud about how to move from drafting to revising to publishing and what they're supposed to do when they get done with one step and move to another… it seems like doing a quick mini-lesson on these procedures would really help.

In this example, Amber suggests that the students in her colleague's classroom may need to hear their teacher think-aloud procedural strategies that they used to move through the writing process. Abby's comment suggests that she believes using a think-aloud strategy will promote the students' metacognition, or their ability to monitor their current level of understanding and decide what the next steps for learning should be (Bransford, 2000).

Conversations about Assessment

The participants often took up the challenges in employing assessment-driven instruction. Here, Abby tries to support a peers' problem with choosing what to assess in students' writing when their writing has many areas of need:

> Abby: Okay… We did this writing unit and I noticed many things, but two things that I noticed prominently were that the students had difficulty creating endings in their papers and they didn't use capital letters. So, these are two really different things, but the next writing minilessons that I teach, I'm making sure I've got these two things in there – the first one will be about (creating) endings and the next one will be about punctuation. Assessment is so hard because you can't assess and teach it all at once; you just have to pick one or two things to focus on and know that usually you're 'gonna get to it more than once. But at the same time, *we* probably aren't going to get back to it, so that's really hard.

With her statement, "But at the same time, *we* aren't going to get back to it, so that's really hard," Abby acknowledges her limited role as a preservice teacher limits her ability to follow through on assessing student learning over a long period of time. Yet, she indicates that she is aware this practice is most desirable to facilitate student learning.

Assessment often worked into the participants' conversations even if a colleague's problem was initially articulated as one being more connected to instruction. For

example, Susan's problem focused on questions about her next steps for instruction within a summary-writing unit in her student teaching in third grade. Jill asks her about the assessments she's done of her students' work:

> Jill: You mentioned that you'd gone back to reread some of the writing your students created at the beginning of the year. Had you noticed any improvement in their writing or growth in their writing?
>
> Susan: Well, before this project started, I kind of looked to refresh my memory as to what they'd done in the fall, but it would probably be helpful for me to look back and see some of those examples in terms of this project. I look at those earlier examples recently enough to connect them to their learning in this project. That's a good point.
>
> Jill: Because that might show whether their writing has leveled off or plateaued.
>
> Susan: Good point. I need to do that.

This example demonstrates how the participants connected an instructional problem to assessment issue. Jill's question about previous student work helps Susan to acknowledge that while she looked at students' work before her unit on writing summaries, she had not gone back to this earlier work to compare it to the work they had done since beginning her unit. The act of assessing her students' current work against their work from earlier in the year might have given her a better understanding of the change (or lack of change) in their writing over time.

Participants' Impressions of the Problem-Based Conversations

In virtually all of the interviews, the participants report that the problem-based conversations had an impact on their understanding of teaching and their students' learning. Anita describes the experience as connective:

> Anita: This helps me make connections between classes like literacy. Like here we were talking about writing but then the context of classroom in writing, and it just- it brought together a lot of pieces for me because we saw the teaching, and then we were thinking about writing, and we had our lesson plans, and then we were also thinking about classroom management and it just brought things together that, there's really not a lot of room for that in any other place.

Tracy speaks to the benefits of hearing others' problems and seeing her colleagues in their teacher role through the teaching videotapes:

> Tracy: I think sometimes just seeing other people's problems or what's going on in their classrooms, it helps you think more about your own stuff too. I personally enjoyed seeing other people in the classroom, you know, I see [my colleagues] all here as students, but seeing them as teachers there, I thought that was interesting.

Similarly, Susan speaks to the benefits of linking her own limited experiences to those of her colleagues:

> Susan: I think we all like have our limited experiences, not limited exactly, but we're pretty mono-focused on our own student teaching and our classrooms right now. With these conversations, I get to compare everything like, "Oh, well in my class we do this," or you think about the things that you've done around someone else's problem.

When asked about the differences between working through problems with each other versus more experienced others (cooperating teachers, supervisors, and course instructors), Leslie and Maggie comment:

> Leslie: I think it's nice to know that you can just talk about these problems with my peers. More ideas and strategies [from non-peers] are always good but to let us, um, grapple with our own problems and figure out things on our own first and then have others help us may be a nice way to do it. I'm just not sure if I was talking to someone who'd been doing this for a long time if I really would've understood them as well [as the people here]. Just because those more experienced people wouldn't be coming from that same place.
>
> Maggie: And I think it's important too that we start thinking of ourselves as teachers and start really valuing our own experiences and what we know about, and offering that to our peers to try and, to start thinking of ourselves as, not…maybe not experts but as…
>
> Leslie: Getting there….getting there, you know, and
>
> Maggie: Developing….

Here, Leslie notes that there still may be a place for more experienced educators in these conversations, but it is useful to negotiate problems with peers before such interventions. The act of "thinking as teachers" seems to be a powerful experience that helps the participants imagine themselves as teachers at the same time that they are students.

Members of this group go on during their focus group interview to speak to the feeling that they need to be "transformed" by their teacher education experiences from their position as students to their new role as teachers:

> Maggie: I feel like this program needs to be transforming me and I'm not quite there, but I feel like I need to be there. And so I feel kind of like I'm not ready for a lot of these things. I was kind of dreading coming to this session because I felt like I wasn't ready to do this kind of critiquing and helping and suggesting. But after doing this, I realize I do have some of the knowledge and it gives me more confidence.
>
> Leslie: It was nice to be able to share things, when you don't normally get to share.

> Nancy: Yeah, I think these are the pieces that really help to kind of transform us out of being a student and into being a teacher. Personally, I think things like this would be nice *all* along the way, from the beginning of the program, all the way through.

In the following passage Erica provides a summary of her current understanding of her role as a teacher as it relates to student learning. She notes how the problem she experienced and her reaction to it is related to her lack of experience:

> Erica: I just wanted to say that I think that being student teachers and not being in the classroom and like learning all these things here, it's really easy to go into the classroom and try to teach a lesson and just look at something like this [problematic situation] after one lesson and be like, "Oh my gosh, I'm not an effective teacher [laughter]. The kids didn't get it." But I think being an effective teacher is being able to look at what the kids did get out of the lesson, and being able to continue on from there…

Rather than viewing one lesson as a make-or-break opportunity for her students' learning, Erica adopts a longer-term view of teaching and learning. The act of identifying a problem, bringing it to peers, and contextualizing it helped her to adopt more realistic perceptions of the teacher's role in facilitating student learning.

Discussion

Findings from this study suggest that a problem-based orientation toward initial teacher preparation favorably influences preservice teachers' initial professional development. The analysis of the data across the problem-based sessions illustrates how the participants depict the worlds where they are learning to teach as highly complex environments. The process of raising evidence-supported problems in a public space with peers provided an opportunity for the participants to approach, in a unique way, the complex teaching challenges that face them at this stage of their development. The problem-based conversations frequently enabled the participants to champion the "co-construction of knowledge through talk" (Achinstein & Meyer, 1998, p.6) and offered them access to a range of perspectives while fostering a climate of mutual vulnerability, risk-taking, and trust.

The following discussion addresses the two research questions that framed this study: (1) What kinds of knowledge about teaching and learning emerge from problem-based conversations between preservice teachers? and (2) What factors support the participants' engagement in the problem-based conversations?

Question One:

What kinds of knowledge about teaching and learning emerge from problem-based conversations between preservice teachers?

The data reveal that the exploration of subject matter, pedagogy, and assessment through problem-based and evidence-supported conversations frequently provided

opportunities to generate knowledge about teaching and learning. Through their conversations, the participants' problems became a mechanism to pool their collective knowledge, to rearticulate their problems as necessarily complex, to explore possible solutions, and to connect their problems to broader issues of teaching and learning.

The findings suggest that some of the attributes of the participants' problem-based conversations characterize more-expert teacher thinking (Hammerness, Darling-Hammond, & Shulman, 2001, pp. 226-227). For example, the participants found opportunities to share nuanced details about learners and their learning, to adapt instructional models to meet the needs of students, to generate multiple hypotheses about the reasons for students' misconceptions, to offer connections between their theories and the experiences of others, to provide elaborations that expand on those connections, and to make qualifications of their generalizations, observations and hypotheses. Data analysis revealed that even in the cases where the interactions were not so robust or dense that some evidence of these expert moves occurred, it is evident that the problem-based orientation of the conversations helped the participants to view themselves as a group of teachers collectively and directly improving their practice and, therefore, their students' learning.

Question Two:

What factors support the participants' engagement in the problem-based conversations?

Analysis of the data suggests that a number of factors contributed to the interns' thinking about teaching and student learning. Both the individual and focus group interviews indicate that the participants found their problem-driven conversations particularly meaningful because these discussions addressed a need for security and professional affiliation as these preservice teachers examined what they viewed as difficult teaching issues. The participants' shared experience of being novices who had similar problems associated with their work in schools supported their discourse by providing a safe environment in which they could explore these problems without fears of supervisory judgment.

Next, the use of student and teacher evidence helped the participants to contextualize their growing theoretical and practical knowledge base in light of their daily work with students. As previously noted, the groups' conversations allowed the participants to explore ways to adapt prescribed instructional models that initially seemed too rigid in order to meet the needs of their students in their particular classrooms. The specificity that video-based accounts of classroom practice and supporting teacher and student work brought to their conversations allowed the groups to make such models and theories more understandable and open to critique.

The autonomy for the participants to choose and frame their own problems was also a significant factor in the participants' investment in their conversations. In their individual and focus-group interviews, several participants reported that

because their problems were real and pressing, they invested significant time and thought into preparing for the conversations with peers and generally placed considerable value on the conversations as a tool for their professional development.

Lastly, the participants reported that early training experiences in how to engage in problem-based conversations helped during student teaching, when their problems were more prominent and when they were more directly involved with students. Before student teaching, the participants had several opportunities to practice using the consultancy protocol to approach previously-generated written and video-based cases. These training opportunities facilitated a comfort with the conversation format and helped the participants to develop a capacity to engage in the exploration of their problems during their student teaching assignments.

Implications

The findings from this study suggest the potential value of creating and supporting problem-based contexts in which preservice teachers, like those who are more experienced, can learn with and from each other as they engage in framing, talking about, and reflecting upon their problems. These findings begin to blur the professional opportunities provided to teachers, whether they are veterans or novices. Having opportunities to explore their problems in social and evidence-based environments may help those who are new to the profession of teaching and may provide a crucial bridge to similar opportunities as they venture into their teaching careers after preparation. Such professional learning communities, if situated in a preservice context, may also facilitate a problem-based orientation that may be transferred to the interns' future classrooms and schools, thus conferring a sense of ownership of new ideas as they apply them to their emerging practice.

Wilson et al (2001) note that an integrated understanding of subject matter, pedagogy, and assessment is an essential component of initial and ongoing teacher education. While the participants in this study likely did not arrive at a full understanding of these aspects of teacher knowledge through their problem-based sessions, the structural and normative supports provided by the sessions frequently permitted them to take up, negotiate, and connect aspects of these professional knowledge areas.

A number of challenging questions arise from a model that would emphasize a problem-driven pedagogy in teacher education. Increased levels of training and autonomy would need to be provided to preservice teachers to engage successfully in problem-based conversations. What amount of time and resource allocation is necessary for such efforts? What compromises might be necessary in terms of the existing course-and-field workloads if problem-based conversations are given a space within the limited time of preservice teacher education? This study argues for such conversations as an intellectual bridge between preservice teachers' roles as students and emerging professionals. Therefore, it challenges those who design teacher education programs and those who educate future teachers to determine how such professional

development opportunities fit with existing opportunities and where redesigning the learning opportunities during preservice teacher education may be necessary.

Directions for Future Research

The findings from this study further an argument for research that examines problem-based conversation as a mechanism for preservice teachers' professional growth. The research reported here examined the participants' reasoning as it was manifested in conversations about their problems and an examination of accompanying artifacts. What the data could not address thoroughly is the issue of whether and how these conversations translate to actual changes in classroom practice and student learning.

What is also unknown is the role of teacher educators in these conversations between preservice teachers. I noticed that the participants found value in their opportunity to talk about their conversations after they were finished. My role as researcher meant that I also worked as a discussion facilitator and questioner during the interviews after the sessions were completed. Future research may better clarify how to best support prospective teachers' conversations through such metacognitive approaches.

The findings from this study suggest that preservice teacher participants find value in talking with each other without the participation of supervisory figures. Yet, there may also be value in comparing conversations between preservice teachers to teacher networks that would also include more experienced educators. Future research could examine problem-based conversations between a network of educators that may include school leaders, cooperating teachers, methods instructors, and the preservice teachers. A study of such a context would provide insights into the conditions that optimize preservice teachers' professional growth and the overall goals shared by all of these stakeholders of improving students' learning. It is unknown whether conversations with such diverse representatives (and the power relationships that accompany them) would better connect the often disparate components of the teacher education continuum. It is also unknown whether (and if so, how) such problem-based conversations, particularly if they were focused on improving student learning, would provide professional development for all participants and not just the preservice participants.

Conclusion

According to several researchers and policy-makers, the goal of teacher education is to prepare highly-qualified teachers who can improve their students' learning (McDiarmid & Wasley, 2003; NCTAF, 2003). Highly-qualified teachers, according to these experts, need a deep understanding of subject area disciplines, the ways students learn, instructional practices, and assessments of student learning (Darling-Hammond, 1996). They need to develop skills for "keen observation" and

an ability to construct their own means for looking carefully and deeply at students' (as well as their own) learning processes and products (Darling-Hammond, 1996, p.17). Highly-qualified teachers also need to know how to inquire collaboratively with their colleagues on ways to improve student learning and reflect on their practice to improve their teaching and student achievement (Cochran-Smith, 1991; McDiarmid & Wasley, 2003).

Beginning teachers, no matter their preparation, will likely encounter a challenging transition from their preservice teacher education program to their roles as teachers in schools. An ongoing challenge for the field is to design experiences that better enable preservice teachers to connect the learning from their formative course experiences to the "stuff of teaching"— the lessons, student work artifacts, and associated problems that emerge during initial teaching opportunities.

The real work for those who structure and teach in preservice teacher education programs is to foster a better "capacity to inquire sensitively and systematically into the nature of learning and the effects of teaching...(and to) envision the professional teacher as one who learns from teaching rather than one who has finished learning how to teach" (Darling-Hammond, 2000, p. 170). Teacher educators can help their students make a transition from being student-thinkers to pedagogical-thinkers by providing venues that allow them to think about what teachers do in terms of how it helps students learn. Here, the responsibility for teacher education becomes more distributed to include the preservice teachers themselves and their capacity to explore and learn from their problems through conversation.

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Appendix 1: Consultancy Protocol[1]

Purpose: A Consultancy is a structured process for helping an individual or a group think more expansively about a particular, concrete dilemma.

Time: Approximately 50 minutes

Roles: Presenter (whose work is being discussed by the group); Facilitator (who sometimes participates, depending on the size of the group)

Steps:

1. The presenter gives an overview of the dilemma with which s/he is struggling, and frames a question for the Consultancy group to consider. The framing of this question, as well as the quality of the presenter's reflection on the dilemma being discussed, are key features of this protocol. If the presenter has brought student work, educator work, or other "artifacts," there is a pause here to silently examine the work/documents. The focus of the group's conversation is on the dilemma. (5-10 minutes)

2. The Consultancy group asks clarifying questions of the presenter—that is, questions that have brief, factual answers. (5 minutes)

3. The group asks probing questions of the presenter. These questions should be worded so that they help the presenter clarify and expand his/her thinking about the dilemma presented to the Consultancy group. The goal here is for the presenter to learn more about the question s/he framed or to do some analysis of the dilemma presented. The presenter may respond to the group's questions, but there is no discussion by the Consultancy group of the presenter's responses. At the end of the ten minutes, the facilitator asks the presenter to re-state his/her question for the group. (10 minutes)

4. The group talks with each other about the dilemma presented. (15 minutes). Possible questions to frame the discussion: What did we hear? What didn't we hear that they think might be relevant? What assumptions seem to be operating? What questions does the dilemma raise for us? What do we think about the dilemma? What might we do or try if faced with a similar dilemma? What have we done in similar situations? Members of the group sometimes suggest actions the presenter might consider taking. Most often, however, they work to define the issues more thoroughly and objectively. The presenter doesn't speak during this discussion, but instead listens and takes notes.

5. The presenter reflects on what s/he heard and on what s/he is now thinking, sharing with the group anything that particularly resonated for him or her during any part of the Consultancy. (5 minutes)

6. The facilitator leads a brief conversation about the group's observation of the Consultancy process. (5 minutes)

[1] Developed by Gene Thompson-Grove, Paula Evans, and Faith Dunne, National School Reform Faculty (NSRF), www.nsrf.org