TEACHER PERCEPTIONS ABOUT VALUE AND INFLUENCE OF PROFESSIONAL DEVELOPMENT

Tami S. Martin
Illinois State University
tsmartin@ilstu.edu

Gloriana González
University of Illinois at Urbana-Champaign
ggonzlz@illinois.edu

We used a situative perspective to examine teachers' perceptions of a professional development intervention that integrated lesson study, video clubs, and animation discussions. The analysis of interviews with the five geometry teachers who participated in the intervention during two consecutive years showed three characteristics of professional development that were valuable: designated time to collaborate, focus on student mathematical thinking, and use of animations to represent practice. A fourth characteristic, accountability for implementation, is also discussed. The findings have implications for designing professional development, because participants cited links between their experiences and changes in their practice.

Keywords: Teacher Education-Inservice/Professional Development, Geometry and Geometrical and Spatial Thinking, High School Education

Perspectives

Putnam and Borko (2000) cited the importance of creating situative learning experiences for inservice teachers and described aspects of such experiences that promote growth in teacher learning and practice. In a situated learning experience, teachers engage with others (e.g., in a discourse community) both within their own classrooms and outside their classrooms (Putnam & Borko, 2000). Although familiar contexts may help teachers make connections to their daily practice, there are limitations to professional development that occurs exclusively in a teacher's own classroom. Comfortable habits, supported by a local culture, are difficult to break. Discussions with others may serve as disruptors to entrenched patterns of behavior which may then spark reflection and change. Putnam and Borko described how discourse communities can help teachers face the risks entailed in making meaningful change. When a group explores new materials and strategies in a forum that draws on different perspectives and expertise, practice may become the subject of critical reflection. As a result, teachers may be empowered by knowledge drawn from and trust in the group to try new ideas that were previously seen as too unfamiliar and, thus, risky to use with students.

Lesson study (Lewis, Perry, & Murata, 2006) is one example of a professional development model that is both classroom-centered, and considers teaching and learning as objects of reflection by a community of practitioners. Hiebert, Gallimore, and Stigler (2002) concurred that effective professional development should be centered in the classroom, part of a long-term collaborative process, and focused on student learning and curricula. These perspectives frame our investigation of teachers' perceptions about valuable characteristics of professional development.

Purpose and Research Questions

The purpose of this study was to determine what teachers valued about a professional development experience that was designed to create a situative learning experience. In other words, we looked at ways that teachers might justify the value of different aspects of such an experience, including components of that experience that were both centered on their own practice, yet occurred away from their classroom in the context of a discourse community. Given that such situative learning experiences have been shown to induce powerful teacher learning, we examined the extent to which teachers reported such learning and the factors to which they attributed that learning. The following research questions guided our analysis:

1. Which aspects of the professional development intervention did teachers find most valuable and how did they justify that value?
2. What changes did teachers note in their practice and to what factors did they attribute those changes?

Methods

The teachers in this study were participants in a larger study focused on promoting teacher noticing and use of students' prior knowledge to inform lesson design, implementation, and reflection on implementation (González, Deal, & Skultety, 2016). The five participants were all high school geometry teachers, with 4–26 years of teaching experience, who taught in high-need schools in the Midwestern United States. Teachers participated in two iterations of a lesson study process. The teachers met in 3-hour monthly sessions that teachers called study groups. Each year, participants watched and discussed animated, cartoon depictions of several versions of a geometry lesson (i.e., animations; Chazan & Herbst, 2012), collaboratively planned and implemented a lesson on the same topic, watched and discussed videos of their own students participating in the planned lesson (in a video club; van Es, Tunney, Goldsmith, & Seago, 2014), revised the lesson they developed, and repeated the process.

The lessons topics (i.e., dilations and perpendicular bisectors) were predetermined by the research team. Because the focus of the lesson development and analysis was on identifying and building upon students' prior knowledge during instruction, the focus of study group discussion was on student understanding, rather than on the teacher actions during lesson implementation. Participants constituted a discourse community, as they worked together to plan the lessons and analyze video clips of students' work during the lessons.

The data for this paper are teacher self-reports from 20–60 minute individual interviews that the first author conducted at the end of each of the two years of the professional development experience. Teachers were asked to describe strengths and weaknesses of the study group, their perceptions about the goals of the study group, and the relative value of each aspect of the study group (e.g., animations, collaborative planning, analysis of student thinking). Participants were also asked to comment on whether the experience had an impact on their teaching.

The first author audio recorded and transcribed the interviews, using pseudonyms for each teacher. Transcripts were analyzed for common themes mentioned by participants using a grounded theory approach (Corbin & Strauss, 2008). In the first iteration, we used an open coding process, identifying any significant aspects that the participants noted, regardless of the question that they were addressing. In a second iteration, we looked more closely for participants' justifications for significant aspects of the professional development and examples participants provided of how their practice changed as a result of the professional development.

Results

The resulting themes from the open coding process are listed in Table 1, by teacher and year. Themes are grouped in broad categories: (a) aspects of the professional development that were significant for teachers in their own right (e.g., designated time to collaborate, forum for reflection, authentic to my curriculum or students, focus on one thing over time), (b) outcomes of the professional development (e.g., change in teaching practices), and (c) mechanisms that were inherent in the professional development that may have led to perceived outcomes (e.g., focus on students' mathematical thinking, focus on students' prior knowledge, accountability for implementation, use of animations to represent practice). Students' prior knowledge and students' mathematical thinking were related, and, indeed overlapped on occasion, but teachers were more likely to refer to students' prior knowledge when discussing lesson planning and students' mathematical thinking when

describing making sense of student ideas retrospectively (e.g., when reflecting on videos).

Table 1: Significant Aspects of the Professional Development by Teacher and Year

Theme	Year	Teacher 1	Teacher 2	Teacher 3	Teacher 4	Teacher 5
Designated time to collaborate	1	X	X	X	X	X
	2		X	X	X	X
Authentic to my curriculum or students	1	X	X			X
	2		X			
Focus on one thing over time	1	X			X	
	2			X	X	
Forum for reflection	1					
	2			X	X	X
Change in teaching practices	1	X	X	X	X	X
	2	X	X	X	X	X
Focus on students' mathematical thinking	1	X	X	X	X	X
	2	X	X	X	X	X
Use of animations to represent practice	1	X	X	X	X	X
	2		X		X	
Students' prior knowledge	1	X		X		X
	2	X		X		X
Accountability for implementation	1			X	X	X
	2					X

Note: Themes addressed in this paper are in bold. An "X" in the cell at the intersection of that teacher and the year within a theme, indicated that the theme was mentioned by that teacher at least once during the interview.

There were two themes that were mentioned both years by every teacher: (a) change in teaching practices (an outcome of their participation) and (b) focus on student mathematical thinking (a mechanism inherent in the learning experience that may have contributed to the outcome). A third theme, designated time to collaborate, was mentioned by every teacher in year 1, and by all but one teacher in year 2. A fourth theme, use of animations to represent practice, was also a potential mechanism for allowing change to occur, and was noted by every teacher in year 1 and reiterated by three of the teachers in year 2. We discuss each theme in more detail below and provide examples of teacher utterances that are representative of how teachers expressed each idea. Although a fifth theme, accountability for implementation of the new lesson, was not mentioned by all teachers, the three who did mention it were adamant about the importance of this factor in accounting for the effectiveness of the professional development. Results are organized by the two research questions.

Significant Aspects of the Professional Development
Teachers uniformly valued a focus on student mathematical thinking, and one justification for that choice was its role in sparking change in practice. There was also broad agreement on the value of designated time to collaborate, although justifications were a bit more diffuse. The use of animations was frequently cited and valued for its effect on the process.
Focus on students' mathematical thinking. The teachers named a focus on students' thinking as a beneficial aspect both years, and they attributed that value to video analysis, more so than to the animations. Teachers justified that a focus on student mathematical thinking was significant due to three main factors: (a) focusing on the student's role in instruction was novel to them, and it was something they did not believe was a focus of their teacher preparation programs; (b) listening to student thinking helped teachers understand why students respond as they do so that they can act on

that information; and (c) knowledge of student thinking sparked changes in their practice. In the excerpts below, teachers' justifications are highlighted (in italics) within their claims about the significance of a focus on student mathematical thinking. The year during which the claim was made is identified after the teacher number (e.g., year 1 is represented as Y1). Further details about changes in practice are detailed in a subsequent section.

Teacher 1 (Y1):   But I think the discussions that helped me the most were when we broke down what the kids did… That to me was huge, because, like I said, I've never thought about that part of it. *I've never thought about the kids being part of the process.* I thought about "I'm the teacher, I know everything." You know, so I thought that was the biggest thing there. When we really analyzed the kid's thought process that was huge.

Teacher 2 (Y1):   So, [I think the goal of the study group was] to help support me as a teacher *to create those [problem-based tasks]* and then from there then look at the student thinking to help *create better tasks* or help improve that specific task.

Teacher 4 (Y1):   The beneficial aspect is when we're sitting around the table and we're analyzing, so we're trying to get into the students' shoes and try to figure out what they're thinking during it. And then, it's not just how I think they're thinking, but I get to hear everyone else's thinking that they're [the students are] thinking. So it kind of *broadens my perspective of what I'm thinking about students' thinking*.

Teacher 1 (Y2):   And then if you go to the discussion on the student thinking, that was such a *foreign concept*. Like I said before, nobody talks about that. You're the teacher. I'm going to impart my wisdom on you and you're going to absorb it in like a sponge. And, unfortunately, that's the way a lot of education classes were. You were taught in the way the professors were taught in the way they were taught in the way they were taught. And it was all just teacher is the expert; they lecture; you get the material; you test over the material; you move on. It was never, *there was never discussions about, "Well why did this kid do this first?* Let's look at their paper. Let's look at the their steps."

Teacher 3 (Y2):   But it's still good to hear how students are thinking differently. So then *as a teacher I can be aware of how my students might approach problems.* So, that can either *change how I teach it* or just when I'm working with them and I see them doing this I can think, "*Oh, maybe this is how they're thinking I need to redirect them that way.*"

Teacher 5 (Y2):   I feel like as a professional, we, other than this study group, we've never necessarily just sat down and been like, "Let's look at student work and try to think of what they were thinking?" You never get time to practice that…. And generally you're just thinking Johnny's crazy and has no idea what he's doing. *But maybe secretly he just has a different frame of reference. And what he's saying actually makes sense to him.* And in his frame of reference makes sense. But *you're so clueless to his frame of reference that you just think he just doesn't make sense.* And I feel like that misunderstanding between student and teacher, is sometimes what turns kids off of math altogether.

Designated time to collaborate. All teachers indicated that they valued having a designated time to collaborate with other professionals, specifically geometry teachers. The teachers justifications were (a) they were able to see other teachers in action via excerpts of video-recorded lessons that were shared during the study group, and (b) they provided an opportunity to share ideas. In the excerpts below, teachers' justifications are highlighted (in italics) within their claims about the value of teacher collaboration. At times, teachers attributed their growth to collaborations, specifically, and these instances are highlighted, as well.

Teacher 1 (Y1):   Because to me that's the biggest advantage of things like this is when you *get to steal ideas* from people that are specifically doing what you're doing.

Teacher 2 (Y1):   I just think overall it was a really great experience, especially being able to talk to other teachers that are teaching geometry but in other buildings, I think was really valuable.

Teacher 3 (Y1):   That's how I feel like *I have been able to grow the most professionally is just through the collaboration* with other professionals.

Teacher 4 (Y1):   I feel like having to talk about specifics like as far as teaching geometry on like a regular basis has been really good for me and keeping me kind of like inspired, to fix things and do more and whatever. Because I feel like a lot of times when you are kind of like on your own, you kind of get in a rut and you start teaching the same things and you kind of no one really stirs the pot or makes you think, you know, unless you're like super self-motivated, like, to do that [laughter]. So it's kind of nice to be able to get together with professionals who are not necessarily at my school but are teaching the same concepts, same standards. And be able to *bounce ideas off* and *see what other people are doing* has been very good for … the teaching act. It's … kept a lot of my stuff fresh.

Teacher 5 (Y2):   But then it was also *giving each other ideas* of … you know because it's the same problem they did in their class, and they probably ran into the same misconception. But they handled it differently than I did. And it was *nice to see different people handling them in different ways*. And I feel like that's part of practicing is seeing it done different ways, but you never get to see each other's classrooms like that. So, it was just really neat to see.

Use of animations to represent practice. Teachers noted two reasons that animations were valuable: (a) it was more comfortable to critique the practice of an animated, cartoon image of a teacher, rather than a real teacher, because the anonymity of the teacher created a safe space for honest dialogue; and (b) there were fewer distractions (e.g., background noise, student offhand comments, or off-task behavior) than would be inherent in a video of real people.

Teacher 1 (Y1):   At first I was like, "Are you kidding me?" But I think the good thing about it was you weren't looking at a specific real person. It made you focus, *it made me focus on the content*. Because it was a cartoon setting and you knew it was scripted. So, you weren't looking at "Okay, how did the teacher say this?" You were looking at what did they say and how did the kids receive it and what did they say. So, *it really made me focus on what was being taught and what was being heard and what was being learned*, rather than "What kids were talking in this corner?" and "What was the teacher doing?" and that kind of thing.

Teacher 4 (Y1):   I think those are really helpful because I think what happens there is the focus is… you're not like … as a teacher or as a classroom *you don't feel at all defensive because it's not like… you're not being analyzed*. You're analyzing a student's thinking. So, it's easier to be more open and share that information.

Teacher 5 (Y1):   You know, you're looking at it and it's a cartoon guy. So you don't feel, *you feel very free to kind of like have criticism of it*. You know what I mean? It's like, you don't feel like your watching your buddy teach and you're like, "Why did you do that? That makes no sense." You know what I mean? So it's like… *it's not as personal*.

Teacher 2 (Y2):   Well first, the [animated] vignettes, I think, provided a good opportunity. We didn't use them as much. But, it provides *a good opportunity to look at something without the bias of certain groups of students or looking at the teacher* or … It kind of *takes away more of the personal aspect* of it, when *you're just looking at the vignettes*. So I think that was kind of nice. Especially as would like at the beginning when we were kind of getting to know each other or starting to kind of feel out what this process whole… was all about.

Accountability for implementation. Although only three of the teachers addressed this issue, we found it compelling and have included it here. Teachers stated that a significant aspect of the

professional development was the fact that there was accountability for implementing a practice (i.e., teaching the collaboratively developed lesson) that was a product of the study group. Often, this claim was made in response to a question in which teachers were asked to compare the study group with other professional development experiences. Teachers justified this claim by stating that being forced to attempt something new meant that they could not easily ignore the ideas that arose in the study group, as they might otherwise do after a professional development.

Teacher 3 (Y1):   So, like, and the fact that it's like I'm held accountable for it. It's not like I'm sitting in some like even a full day, a full professional development day maybe by my district or whatever. And like we could come up with some good ideas, like "we could do this and that." And maybe we'll throw something in the air, but sometimes like once teaching…Like once the year starts, once the… *we kind of can fall back into that same old grind*.

Teacher 5 (Y1):   So it's like very much like, "Here's some skills, now we're going to put them into practice. And, I'm coming to your school on Tuesday to see it being done." And you're like "Okay." So *it like forces you to like really do things*. Whereas a lot of PD is like, "They paid me to do this, here's a bunch of stuff, and I'm never going to see you again. So, use it or don't use it. I don't care." And then it's like not as effective. There's no follow up."

Teacher 5 (Y2):   And then they hold you accountable *because they're coming to your room with cameras*! So you can't just tell them you're going to do it and then go and not do it. You, like, *you gotta do it*!

Changes in Teaching Practices

Teachers identified several specific changes in practice, even though study group facilitators focused specifically on helping teachers analyze students' prior knowledge, and not on any of the participants' teaching practices. Changes in practice that were cited were (a) increased focus on how to launch a problem (b) increased focus on effective implementation of wait time, including anticipating student responses and formulating next steps; and (c) increased skill in implementing problem-based tasks or discovery activities. Launches were mentioned more often by teachers in year 1, which was the year during which they were a focus of the study group. Although a common launch was developed during group planning, during implementation, teachers tailored their launches to their own talents and knowledge base or to what they perceived would be more motivating for their students. The excerpts illustrate the types of changes teachers reported in their practices.

Teacher 1 (Y1):   One of the things that I think I've taken from this is that, we talked about a lot, kind of like *launching a problem*, and kind of how you'd build up a problem at the beginning. And, often times, I just kind of roll through, "Alright let's go, here's the paper, here's the materials, make it happen." Where I don't necessarily think about how to build that up or how to get those kids involved or kind of hook the students. And so, *that piece, kind of made me think overall, in my other courses, too, how can I try to get the hook involved more*.

Teacher 1 (Y1):   I think it goes back to thinking about what kids bring to the table. It made me stop and think about that when I was planning things, when I was presenting things, when I was doing my *wait time*, y'know. "*Don't just ask a question and wait. Think about their response, and formulate the next questions.*" So, I think just forcing me to think about what kids bring to the table was the biggest positive.

Teacher 5 (Y1):   I feel like it's *made me more thoughtful in how I go about presenting topics*. Especially something like in the first time. Like, *how do we discover this*? *How should I present it*? What's the *launch* gonna look like?

Teacher 2 (Y2):   And then I think I'm starting to do a better job of kind of *managing that bigger group, bigger task ideas*. And then, I want to do more of just creating more of these

task oriented. So that's my goal. I'm not there yet…. I think what I really appreciated and I think will benefit most from my teaching is really *looking at if it's more of these hefty problems*, like what are the *anticipated responses*? And then kind of game planning how I might do that.

Teacher 4 (Y2):   I mean, so *you are thinking about the way the kids are thinking about it which changes the way that you're writing the lesson*.

Discussion

Teachers identified several significant aspects of the learning experiences, situated both in their classrooms and in a context removed from those classrooms, that were consistent with claims in the literature about effective professional development. Specifically, teachers valued the opportunity to participate in a discourse community (Putnam & Borko, 2000), especially when members of that community were teaching peers. Teachers' justifications about the value of those discourse communities were fairly general (e.g., share ideas, seeing other teachers in action), and they may not have recognized the affordances of collaborating in that way. Putnam and Borko (2000) claimed that having the support of a discourse community can support the risk taking that is necessary changing practice. Although none of the teachers made explicit claims connecting their changes in practice to the discourse community, they did claim to have made such changes. The teachers did argue that accountability requirements of participation in the study group enabled them to take the risk of implementing a lesson that they may have otherwise left unimplemented. Perhaps this need for accountability could also be characterized as a disruptor to the teachers' existing practice (Putnam & Borko, 2000).

The teachers stated that they valued a focus on student thinking, rather than on teaching. Teachers noted that understanding students' logic (even if it was not correct) was an impetus for changes in teaching practice. Although this may seem counterintuitive, creating the need for change by seeing classroom events through the students' eyes was a more powerful motivator, and perhaps less intimidating than having a direct focus on the actions of the teacher. As one teacher implied, there is a tendency to be defensive, when one's work is the object of scrutiny. Thus, protecting teachers from a perceived vulnerability, by limiting discussions of teaching to those based on animated representations, encouraged dialogue and may have built the trust that was needed to sustain interactions later in the study group process, when videos from participating teachers classroom were analyzed.

Finally, the changes in teaching practice reported underscored the value of a focus on students' mathematical thinking in the study group. The changes reported (e.g., focus on the lesson's launch, increasing wait time, or listening carefully to what students say before responding) were indicative of an increased interest in student-centered learning. Thus, a focus on making sense of students' prior knowledge, encouraged teachers to reflect on how to modify their practice to find more opportunities to listen to students.

Overall, identifying characteristics of professional development programs that teachers find valuable is important because teachers may persevere in long-term, or time-consuming professional development if they see the inherent value. In our case, the teachers established the importance of having authentic experiences connected to their students and their curriculum. At the same time, the opportunities to collaborate with teachers from other schools and districts prompted them to discuss important problems of teaching. Resources used in the program such as the animations served as important vehicles for helping the teachers extend and connect their knowledge of their context (e.g., the geometry curriculum and their students) and their knowledge of teaching. The teachers' analyses of student mathematical thinking opened the door to examination of their own practices and moved them closer to the goal of effecting robust mathematical understandings in their students.

Acknowledgment

References

Chazan, D., & Herbst, P. (2012). Animations of classroom interaction: Expanding the boundaries of video records of practice. *Teachers College Record*, *114*, 1–34.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Los Angeles, CA: Sage. doi:10.4135/9781452230153

González, G., Deal, J. T., & Skultety, L. (2016). Facilitating teacher learning when using different representations of practice. *Journal of Teacher Education, 67*, 447–466. doi:10.1177/0022487116669573

Hiebert, J., Gallimore, R., & Stigler, J. W. (2002). A knowledge base for the teaching profession: What would it look like and how can we get one? *Educational Researcher*, *31*, 3–15. doi:10.3102/0013189X031005003

Lewis, C., Perry, R., & Murata, A. (2006). How should research contribute to instructional improvement? The case of lesson study. *Educational Researcher, 35*, 3–14. doi:10.3102/0013189X035003003

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, *29*, 4–15. doi:10.3102/0013189X029001004

van Es, E. A., Tunney, J., Goldsmith, L. T., & Seago, N. (2014). A framework for the facilitation of teachers' analysis of video. *Journal of Teacher Education, 65*, 340–356. doi:10.1177/0022487114534266