Designing Video Clubs to Support Teacher Learning

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Abstract: Video is a popular tool in many professional development programs. However, little is known about how video, and the contexts in which it is used, support teacher learning. This study examines teacher learning in the context of a video club designed to support teachers in “learning to notice” student mathematical thinking. In previous work (van Es & Sherin, in press), I found that the participants came to analyze student mathematical thinking in new ways. In this study, I examine how the design supported such development. In particular, I examine the nature of discussions and different features that came into play in those conversations. Analysis of the data reveals five features that interact with teacher learning: facilitator moves, teacher roles, quality of clip, norms for participation, and policy issues. Analysis points to how these features interact to help teachers learn to notice student thinking. This research provides insight into the design of video-based professional development to support teacher learning.

Introduction

A variety of professional development programs have been developed that use video to support teacher learning (Hatfield & Bitter, 1994; Wang & Hartley, 2003). Video is thought to be a useful resource because it can represent much of the complexity of teaching. It can be reviewed multiple times, from the same or different perspectives, enabling in-depth reflection of classroom interactions (Lampert & Ball, 1998). Further, when situated in a professional development context, the video record becomes a shared referent that teachers can discuss, which can support teachers moving from hypothetical discussions of what may have happened in a classroom to what did happen and why (Ball & Cohen, 1999; Rodgers, 2002). While video has become a popular tool for professional development, little is known about how video, and the contexts in which it is used, support teacher learning.

In this study, I examine teacher learning in the context of a specific video-based professional development program, namely video clubs. A video club is a professional development environment in which teachers come together to view and discuss segments from one another’s classrooms (Sherin, 2000). In this paper, I examine how the particular features of the video club context coordinate to support teacher learning. In particular, I propose that five aspects of the environment interact to influence teacher learning: facilitator moves, teacher roles, quality of clip, norms for participation, and policy issues. To begin, I propose the Learning to Notice and Social Arrangements frameworks to frame the study of teacher learning in the video club context. Then, I examine how various elements of this setting influence teachers learning to notice and interpret student thinking in new ways.

Theoretical Framework

Learning to Notice

Research on teacher cognition explains that teachers have various types of knowledge, all of which influence one’s teaching practice. These include, for example, subject matter knowledge, pedagogical content knowledge, and knowledge of context (Shulman, 1986; Wilson & Berne, 1998). In addition, I claim that the ability to notice and attend to classroom events is an important type of knowledge for teaching. Specifically, in prior research (van Es & Sherin, 2002), I proposed that teachers develop a different type of knowledge, the skill of noticing. I propose that “noticing” consists of three main aspects: a) identifying what is noteworthy in a classroom situation; b) using knowledge of one’s context to reason about such events; and c) drawing connections between the specific events one notices and more general principles of teaching and learning. Frederiksen (1992) describes the first aspect of noticing as making a “call-out,” which refers to an ability to focus in on what is important in a complex situation. There is a lot going on at any given moment in a classroom, and teachers need to select where
they will direct their attention. The second characteristic of noticing involves using knowledge of one's context to reason about noteworthy events. Prior research has found that as individuals gain more experience, they become more expert at making sense of situations they encounter in that domain (Lesgold et al., 1988). In teaching, teachers use knowledge of their students, curriculum, content, pedagogy, and school context to make sense of situations that stand out to them. Finally, the third aspect of noticing involves drawing connections between specific events and the broader principles they represent (Copeland, Birmingham, DeMeulle, D’Emidio-Caston, & Natal, 1994). For example, upon viewing a class discussion, a teacher might say, “I see this as an issue of assessment.” When teachers move from the specific to the general, they draw connections between the specifics of their practice and broader principles of teaching and learning.

Social Arrangements Framework

I view the video club as an activity system, with each participant situated in a broader social, cultural, and historical context (Cole & Engstrom, 1996; Vygotsky, 1987). This perspective allows me to examine changes in individual teachers' thinking as it is mediated through the interactions in the video club. Drawing on this research, I propose the following framework to study how the social environment influences the development of professional vision for reform pedagogy. I argue that three aspects of the video club environment are key to teachers’ learning to notice: a) the use of tools and resources in the environment; b) individuals' roles and the rules for participation; and c) the broader context in which the video club system is situated. In relation to tools, the video clips support teachers in learning to notice in different ways. For instance, replaying a video segment for clarity on a student’s explanation may influence what is noticed and how the idea is analyzed. In addition, the clip itself represents the designers’ perspectives, shaping what is possible to be analyzed and discussed (Heller, 1999). Further, the quality of the clips the group views influences what is available for discussion.

The second dimension consists of the individuals' roles and the rules for participation. For example, the facilitator may participate in ways quite different from the teachers initially, and the teachers may not participate in the same ways within and across meetings. For example, one teacher may take on the role of mathematics expert explaining the mathematics under discussion, while another may act as the informant explaining how district policies influence what happens in their classrooms. Rules refer to the norms and conventions for participating in the video club system. The rules of the video club determine who participates, what is discussed, and how to discuss the video segments to accomplish the goals of the meeting.

Finally, the local school and broader policy contexts influence teachers’ noticing (McLaughlin & Talbert, 1993). For instance, a video club comprised of volunteers may be quite different from one made up of teachers whose principal requires participation. Similarly, the type of mathematics curriculum materials that a district encourages the teachers to use may affect the issues that teachers raise for discussion. In addition, the current testing climate likely has an effect on what the group determines is important to discuss.

Using both the Learning to Notice and Social Arrangements frameworks, I examine the relationship between teachers’ learning and the design of video-based professional development. In particular, I examine how various features of the video club context support or constrain learning. At the same time, I examine how learning to notice influences each of the dimensions above. Clearly, a reciprocal relationship exists – just as the context interacts with teacher learning, as teachers learn to notice in this context, their learning influences how the environment develops over time.

Teacher learning in professional development

Research on teacher learning reveals that professional development typically has little effect on teachers’ practice (Cohen & Hill, 2000; Porter, Garet, Desimone, Yoon, & Birman, 2000). In such cases, the professional development experiences are short-term and disconnected from the particulars of teaching, and they provide few opportunities for teachers to collaborate to improve their day-to-day practice. While research has yielded examples of teacher learning in professional development (Franke, Carpenter, Levi, & Fennema, 2001), it is important to understand the critical features in these environments and how they coordinate with one another to influence teacher learning.

In prior research (van Es & Sherin, in press), I examined teachers’ learning to notice in a video club, particularly, learning to attend to and analyze student mathematical thinking. Recent reforms in mathematics
education call on teachers to be able to revise their teaching plans, often in the midst of instruction, based on the ideas students raise (Arvold, Turner, & Cooney, 1996; Ball, Lubienski, & Mewborn, 2001). Thus, I designed a video club to support teachers in developing skills to notice and inquire into student mathematical thinking in new ways. Analysis of pre- and post-interview data and of discussions from an early and a late video club meeting revealed that the nature of the teachers' comments changed over time. In the interview setting, the teachers viewed a series of video excerpts and were asked to comment on what they noticed after viewing each segment. In the pre-interview, the teachers attended to the students and to classroom climate issues, providing mostly general descriptions of what occurred. In the post-interview, the teachers made more comments about the student, now attending to their mathematical thinking and interpreting what they noticed with specific evidence from the segments. A similar shift was observed in the video club setting. Early on, the teachers' comments were focused on the student and their mathematical thinking, likely because the facilitator was prompting them to talk about these issues. Their comments were more evaluative in nature and based generally on events outside of the clips the teachers viewed. In the final meeting, the teachers increased their focus on student mathematical thinking, and they engaged in in-depth, detailed interpretations of these ideas based on the events in the clips they viewed. Additional information on these results is available in van Es & Sherin (in press). Research on professional development suggests that this shift is not typical; teachers do not typically change in ways facilitated in professional development. Thus, the driving question for this study is what happened in the video club context to support teacher development? Drawing on the frameworks presented above, I examine how participants interact with one another, and with the materials in the environment, to support teachers in learning to notice student mathematical thinking.

**Research Design**

**Video Club Design**

Data for this study comes from a group of teachers who participated in a year-long video club. The participants consisted of seventh and eighth grade elementary teachers from an urban school, with one to 20 years teaching experience. The club met ten times throughout the 2001-2002 school year, one or two times each month from October to May. The teachers shared clips from their own classrooms, on average two or three times throughout the year. The process for the ten meetings shared the same format. Prior to each meeting, a researcher videotaped two teachers' mathematics lessons. The researcher then viewed the tape and identified a brief segment highlighting mathematical issues raised in class and prepared a corresponding transcript for the video club meeting. The segments came from whole-class discussions, student-student interactions, and teacher-student interactions.

The video club sessions were designed to help teachers learn to notice and interpret students' mathematical thinking. The facilitators prompted teachers to examine students' ideas about the mathematics, to use evidence to support claims they made about students' thinking, and to interpret the students' understanding about the mathematics. This design is supported by recent research on teacher learning and professional development (Ball & Cohen, 1999; Smith, 2001), as well as mathematics teaching and learning (Carpenter & Fennema, 1992; Schifter, 1998).

**Data & Analysis**

Videotapes and transcripts of each of the ten video club meetings make up the data for this study. Qualitative methods, based primarily on fine-grained analyses of videotapes (Schoenfeld, Smith, & Arcavi, 1993), were used to study the interaction between teacher learning and the video club context. In particular, each meeting was divided into "idea units" (Jacobs & Morita, 2002). Then, each idea unit was coded along the following dimensions: Actor, Topic, Stance, Specificity, and Video-focus. The purpose was to capture what teachers attended to in these segments of conversation and to understand how they analyzed these events.

Next, I characterized the nature of the discussions teachers had in the meetings. In particular, each idea unit was coded as Substantive or Surface-level. This classification is in line with Bereiter's (1994) concept of "progressive discourse" and resembles the kind of discourse proposed by the National Council of Teachers of Mathematics (2000). Substantive refers to conversations in which participants proposed alternative viewpoints, built upon one another's ideas, and provided evidence or greater detail to support a claim. Further, substantive conversations focused on understanding student thinking and exploring worthwhile mathematical ideas. Surface-level refers to discussions in which little evidence was provided for claims and interpretations, the participants
talked generally about the issues they noticed, and the participants did not develop the ideas under discussion. In addition, surface-level discussions were less focused on meaningful mathematical issues.

Finally, I looked within each “idea unit” to identify features that appeared to influence the discussions that ensued. The following features were identified: facilitator moves, teacher roles, quality of clip, norms for participation, and policy issues. Facilitator moves refers to particular strategies the facilitator employed to engage teachers in meaningful discussions of video. Teacher roles refers to ways the teachers participated in the discussions and how their participation influenced learning. Quality of clip points to the specific nature of the clips that teachers viewed. Previous research explored these three dimensions independent of the others (Sherin, Linsenmeier & van Es, 2006; Meiling, 2004; van Es & Sherin, in press). Drawing on that work, I examine how each of these features influences the discussions that take place. In addition, I add two other dimensions to this analysis, norms for participation and policy issues. Norms for participation refers to different “rules” that appeared that governed the practice of analyzing video. Policy issues concerns topics that teachers encounter in their practice related to broader district, state, and national policy issues (e.g. standardized curriculum and state mandated testing) as they play out in their classrooms. I then created analytic memos (Miles & Huberman, 1994) that characterized these five features within each idea unit, for each video club meeting. Finally, I analyzed these characterizations across all of the idea units to identify patterns in how these features influenced the discussions that took place.

Results

Analysis of the video club meetings reveals several important findings about the relationship between the teachers learning to notice and the video club design. First, both the facilitator and teachers participated differently over the course of the series of meetings. Second, the video clips the teachers viewed influenced the discussions in important ways. Third, norms were established that supported teachers analyzing classroom interactions in new ways. Finally, the broader policy environment influenced what teachers noticed and how they discussed those events.

First, recent research points to the important role the facilitator plays in professional development (John, 2002; Le Fèvre & Richardson, 2002). Such research highlights the nature of teacher educators’ knowledge, as well as, how the teacher educators’ beliefs and stance to reform influence teacher learning in professional development. In this study, analysis reveals different moves the facilitator made to support teacher learning. Specifically, the facilitator solicited participant ideas, synthesized discussion, and acted as a participant. This last move, acting as a participant, appears to support teachers engaging in substantive discussions as the facilitator offers alternate perspectives to explain an event under discussion or builds on existing ideas to elaborate them further. While the literature on the role of facilitator indicates that facilitators may want to take a more hands-off approach (Barrett & Friedman, 1997; Madies & Shulman, 2000), the findings in this study suggest that the facilitator acting as participant was key for teachers to engage in substantive discussions of student mathematical thinking.

Second, the participants took on important roles in the meetings as well. In particular, in the idea units coded as substantive, analysis revealed that over time, the teachers came to play roles that encouraged in-depth analysis of student thinking. Specifically, they came to play the role of Promptor, pointing to noteworthy events in the video segments related to student thinking and raising them for discussion. In addition, they played the role of Critic, challenging one another’s ideas and interpretations, and this facilitated teachers engaging in deeper sense-making of the issues under discussion (van Es, 2004). Further, they shifted in the ways they played two other roles, and these shifts supported the group engaging in substantive discussions of student ideas. Specifically, in the role of Proposer early on, the teachers would offer a single interpretation or explanation of a student idea before shifting to a new topic. Later in the meetings, the teachers would propose multiple explanations or interpretations of a student idea. In the role of Builder, early on they injected statements into conversations that were tangentially related to the main point of the conversation. Later, in this role, their comments connected clearly to the ideas under discussion, pressing on these ideas and advancing the discussion in substantive ways. These changes in their participation, both in adopting new roles and in playing roles in new ways, suggest that the teachers had developed practices that were central to accomplishing the goals of the club.

The third important feature of the video club environment is the video clips the group viewed. Previous research reveals three important criteria for distinguishing video clips: a) Windows into student thinking; b) Depth of student mathematical thinking shown in the video; and c) Clarity of the student thinking shown in the video (Sherin, Linsenmeier, & van Es, 2006). Windows into student thinking refers to whether or not there is evidence of student thinking the video clip. Depth of student thinking includes whether or not students are exploring substantive mathematical ideas in the clips. Clarity of student thinking describes how easy (or difficult) it is to understand the
student thinking shown in the video. Another way to think of this is whether a student's idea is transparent or needs some work on the part of the viewer to understand.

Recall that the clips the group viewed came from the teachers' classrooms and revealed student thinking in different ways, with some clips leading to more productive conversations than others. In particular, I found that the depth of mathematical thinking shown in the clips did not necessarily ensure that a productive conversation would follow. In fact, there were instances in which the clips viewed were low in depth but provided multiple windows into student thinking, so the group was able to have substantive discussions. In addition, some clips were less clear than others and required some figuring out on the part of the participants. These clips often led to the group engaging in substantive discussions as well. One would expect then that clips in which students' thinking was quite obvious would lead to less productive discussions because the teachers figured it out rather quickly. Interestingly, there were some instances when teachers had productive discussions when the students' thinking was quite clear, and required little sense-making on the part of the teachers. This supports the notion that a variety of features of the video club context interact to support the group engaging in substantive conversations.

Fourth, the group established norms for discussing video, with some supporting and others constraining the discussions. Recall that the video clips the group viewed came from the participating teachers' classrooms. For most of these teachers, the only time their teaching had been videotaped was when they were student teachers. As practicing teachers, the participants had few opportunities to see one another teaching. Thus, many of them were opening up their classrooms for inspection for the first time, making some of the teachers feel uncertain, uncomfortable, and insecure about their teaching. With this in mind, the facilitators worked to establish norms to create a supportive environment, but also ones that would encourage deep analysis of classroom interactions.

Analysis of the data reveals that the facilitator established several norms to accomplish the goals of the meetings. They include: maintain a focus on student thinking; support interpretations with evidence; challenge assumptions not based in evidence; offer multiple interpretations; and clarify interpretations. At the same time, the teachers established norms for participation: support colleagues in their teaching and do not challenge beliefs about teaching and learning. Preliminary analysis reveals that some norms (e.g., do not challenge beliefs) constrained teachers from having substantive discussions about student thinking. In these cases, the teachers were more likely to let an issue fade from discussion rather than openly disagreeing with one another. However, other norms provided the basis for in-depth analysis of student thinking. For example, in idea units in which the norm to clarify interpretations appeared, group members restated interpretations of issues under discussion. In these restatements, the teachers either built on existing ideas or raised additional ideas, providing a context for detailed discussions to ensue.

Finally, local policy issues influenced teachers learning to notice in the video club. Over the course of the meetings, teachers continuously raised issues related to teaching a reform-based curriculum or to preparing students for state and district-mandated tests. Analysis reveals that idea units focused on such issues early in the meetings tended to be more surface-level. The teachers shared their ideas and opinions about such policies but there was little investigation of these issues. However, later in the series of meetings, when these issues were raised, they were often raised in relation to understanding student thinking. In addition, the teachers adopted an inquiry stance to examining these issues, attempting to understand their purpose and intent and using what they learned when analyzing student thinking to make sense of broader policy issues. This points to the interaction that exists between learning to notice and the features in the context that influence teacher learning. As these features influence teacher learning in the video club, the teachers influence how those features are made relevant to their learning in the video club setting. Specifically, it appears that as teachers developed in noticing and interpreting student mathematical thinking, they used a similar approach to discuss other noteworthy issues.

Discussion

The results of this analysis illustrate that different features of the video club context influence teachers' learning to notice. I want to also propose that particular features interact with one another to support or constrain the group engaging in substantive discussions of student thinking. For example, some video clips provided greater access to student thinking than other clips. In meetings in which teachers viewed clips of this type, analysis reveals that different norms for participation came into play. For instance, participants were able to support interpretations with evidence because they had several windows into student thinking. On the other hand, some clips provided fewer windows into student thinking, so teachers were unable to use the clips as a source of evidence upon which to base claims. This example shows that the different features of the video club context interact with one another in important ways to support and, in some cases, constrain teachers to learn to notice and interpret student thinking in
new ways. In ongoing work, I explore these relationships in order to characterize different ways the contextual features interact to influence what teachers attend to and how they discuss those events.

While these features coordinate with one another, it is also clear that as the teachers came to notice and analyze video in new ways over time, they began to engage in new practices that influenced other discussions in the meetings. For example, regarding the dimension of the local policy context, the teachers often discussed issues and challenges related to teaching a reform curriculum. Early in the meetings, the teachers would often voice their support or opposition to the use of the curriculum. Later in the meetings, however, the teachers adopted a more tentative stance to discussing the curriculum materials, inquiring into the reason it was designed in particular ways and into how that design was intended to support student learning. I propose that there is a reciprocal relationship here. As the teachers learned norms for examining student thinking and participated in roles differently over time, they developed practices for inquiring into the practice of teaching — into issues related to student thinking, pedagogy, and curriculum design.

Conclusion & Implications

The results of this paper illustrate how different features of the video club context influence teachers' learning to notice. This research is worthwhile as it has implications for designing video-based professional development that is productive for teacher learning. In ongoing work, I examine how the features interact with one another to support teachers having in-depth discussions of students' mathematical thinking. In addition, I also explore how developing practices in noticing the video club context influence what teachers notice and how they analyze those events in their classroom practice.

References


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