

PARTICIPANTS' ROLES IN THE CONTEXT OF A VIDEO CLUB

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Paper presented at the Annual Meeting of the American Educational Research Association

San Francisco, CA

April 8, 2006

The research reported in this paper was supported by the National Science Foundation under Grant REC-0133900. The opinions expressed are those of the authors and do not necessarily reflect the views of the supporting agency.

## ABSTRACT

This study examines the roles that participants play in the context of a video club. Video clubs are professional development meetings in which teachers watch and discuss excerpts of video from their classrooms. In prior research (Author, 2004), I reported that, over the course of a video club, participants came to notice and interpret students' mathematical thinking based on the events in the video segments. In this research, I adopt a situative perspective to identify key roles that participants played in the video club context. I then explore two of these roles in greater detail, Prompter and Critic, to understand the influence that teachers' adopting these roles had on accomplishing the goals of the video club. Investigating the roles participants play in professional development can further our understanding of how teachers interact to influence one another's learning and can inform the design of video-based professional development.

A key ingredient in mathematics education reform is the professional development of teachers. In recent years, a variety of programs have been developed to help teachers learn to teach in ways advocated by the reform movement. To date, much of the research on these programs explores the knowledge and skills teachers develop as a result of their participation (Gusky, 2000; Little, 1993). In recent years, however, research has advocated a situative perspective to studying teacher learning in professional development (Borko, 2004; Lave & Wenger, 1991; Putnam & Borko, 2000). In particular, researchers argue that it is critical to study not just what individuals learn in these contexts, but also how the social and physical contexts, and the interactions that occur within, influence learning.

In this paper, I apply a situative perspective to study the roles participants play in a particular professional development setting, namely video clubs. A video club consists of a group of teachers who meet to watch and discuss excerpts of videotapes of their instruction (Sherin, 2000). The particular focus of the video club discussed herein was to support teachers in attending to and interpreting students' mathematical thinking, an important tenet of mathematics education reform (Ball, 1997b; National Council of Teachers of Mathematics [NCTM], 2000; Rodgers, 2002). In prior research (Author, 2004), I reported that over the course of a video club, participants came to attend to students' mathematical thinking in important ways, making detailed inferences about the events they noticed, using the video segments as evidence for their interpretations. While this result is encouraging, an important question remained: how did the social and physical contexts influence learning? In this paper, I focus on the social interactions, examining the roles individuals adopted, as well as, how playing different roles interacted with the teachers' learning to analyze video in new ways.

The central goals of this paper, therefore, are twofold. First, I seek to characterize the range of roles that participants play in a video club environment. Second, I closely explore two key roles, namely the Prompter and the Critic, in order to understand both the ways that teachers adopt these roles, as well as, how playing these roles influenced the discussions that ensued in the meetings.

### Studying Teachers' Participation in Professional Development

As a first step toward understanding the developing community in the video club context, this research seeks to examine how participation among members of a community influences the interactions that occur. One implication of the situative perspective for teacher learning is that professional development environments are valuable when they embody a teacher learning community. For my purpose, I conceive of learning as a process of engagement, with individuals becoming more central participants in a community of practice (Lave & Wenger 1991; Wenger 1998). In particular, I consider learning in professional development as the distribution of expertise among members of the community, as individuals collaborate to accomplish goals (Pea, 1997). The focus here then is on the social relationships of the participants in the video club and how individuals co-participate to influence one another's development.

Teacher professional development, specifically, has a history of being short-term, individualized, and disconnected from practice (Ball & Cohen, 1999; McLaughlin & Mitra, 2001). Research has shown, however, that an important aspect of teacher learning communities is that teachers engage in long-term collaboration with their colleagues, focusing on issues that relate to the day-to-day practice of teaching (Darling-Hammond, 1997; Little, 2002). However, as Wilson and Berne (1999) point out, little research investigates the specific interactions and

dynamics that enable teacher learning communities to become a space for teacher development.

To make progress on this issue, I investigate how teachers participate in video-based professional development, in particular, the roles they adopt in this context, as well as, how such participation influences their learning to notice students' mathematical thinking in detailed ways.

To explore the range of roles individuals adopt and how they adopt them in this context, I refer to literature on role theory and group dynamics. This research proposes that individuals adopt formal and informal roles in group contexts (Cane, 2003). For example, Chiu (2000) identifies five productive roles that all group members should master in order to accomplish the group's goals: Facilitator, Proposer, Supporter, Critic, and Recorder. While these may not be the particular roles that appear in teacher professional development contexts, the idea is that individuals play various roles that will influence a group's interaction and goal accomplishment (Cohen, 1994).

Further, research on group dynamics shows that individuals take on different roles as they interact with the social world and that these are defined by one's individual interests and values, the purpose of the interaction, and one's interaction with others in the context (Blatner, 1991, Raffel, 1999; Zimmerman, 1970). Along these lines, this research will contribute to our understanding of the range of roles adopted in video-based professional development and how individuals play those roles in order to accomplish the goals of the group. In recent years, research has begun to explore the role of the facilitator (John, 2002; Le Fevre & Richardson, 2002). However, I contend that if we seek to establish teacher learning communities, we need to also understand how teachers participate in these contexts and influence the interactions that take place in the learning environment.

In addition to understanding the roles individuals take on, I seek to understand how adoption of these roles influences the discussions that ensue about the video segments viewed in the meetings. Research on social learning theory emphasizes the importance of looking beyond the individual to examine the interactions that occur between individuals to support development (Lave & Wenger, 1991; Vygostky, 1978). As stated by Putnam and Borko, “situative perspectives provide a powerful research tool, enabling researchers to focus attention on individual teachers as learners and on their participation in professional learning communities” (2000). As such, the goal herein is to identify the range of roles participants play, to study teachers adoption of two roles that reflect key goals of the video club, and to examine how their participation in these roles influences the teachers’ learning.

#### Data and Analysis

##### *The Mapleton<sup>1</sup> Video Club Design*

Subjects in the study included seven fourth and fifth grade elementary teachers from an urban school, who had a range of teaching experience, from one to over twenty years. The teachers taught in an urban school, and they were in their third year of using a reform-based mathematics curriculum. The teachers were recruited to participate in the video club by a district-level administrator and the school principal, and they were paid for their participation. The group met ten times throughout the 2001-2002 school year, one or two times each month from October to May. The meetings were 60 to 75 minutes long. At each meeting, the group viewed clips from two of the teachers’ classrooms, with the first half of the meeting used to

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<sup>1</sup> Mapleton is pseudonym for the school in which this research was conducted. Psuedonyms are also used throughout the paper to protect the identity of individual teachers.

discuss the first clip and the second half spent analyzing the second clip. Each teacher shared clips from his or her own classroom two or three times throughout the year.

The process of selecting segments for the group to view was the same for each meeting. A researcher videotaped two teachers' mathematics lessons before each meeting. The same researcher then viewed the tapes from each of the teacher's classrooms and selected a 5 to 7 minute long segment highlighting interesting mathematical issues raised in class. The segments came from either whole-class discussions, student-student interactions, or a student explaining at the board.

All ten meetings followed the same format. The researcher began each meeting by framing the viewing of the first clip the group would view, summarizing the mathematical topic and the lesson. The teacher whose clip was shown was also invited to provide background about the lesson. Because the purpose of the video club was to help teachers learn to notice and interpret students' mathematical thinking,<sup>2</sup> facilitation of the meetings<sup>3</sup> involved pointing out moments where significant student mathematical thinking occurred in the clips, asking the teachers to interpret these events and to support their claims with evidence from the clips. The facilitators had other goals as well, such as, developing a supportive and trusting environment,

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<sup>2</sup> This goal is supported by recent research on teacher learning and professional development (Ball & Cohen, 1999; Rodgers, 2002; Smith, 2001), as well as by research on mathematics teaching and learning (Carpenter & Fennema, 1992; Schifter, 1998).

<sup>3</sup> For seven of the ten meetings, the author was the primary facilitator. A second researcher was the primary facilitator for three of the meetings.

using teachers' ideas to inform the direction of the meetings, and valuing one another's ideas equally.

In addition, the teachers mentioned that they had other interests. Some teachers remarked that they wanted to participate because it gave them an opportunity to work with their colleagues, while others thought it would be valuable to view one another's teaching on video. Another motivation for participating was that the teachers could possibly earn professional development credit from their school district. While there were a variety of goals, overall, the group agreed that the purpose was to use video as a tool to reflect on mathematics teaching and learning.<sup>4</sup>

### *Data Analysis*

Data for this study includes the videotapes and transcripts of the ten video club meetings. Interview data was also used to triangulate findings from the analysis of the video club meetings. Qualitative methods, based primarily on fine-grained analyses of videotapes (Schoenfeld, Smith, & Arcavi, 1993), were used to examine teachers' roles in the video club setting. Discourse analysis (Goffman, 1981; Goodwin, 1981) was used to investigate how participants' talk in the video club influenced the particular roles individuals took on throughout the video club. The unit

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<sup>4</sup> The video club described herein is similar to other models in that the goal was to help teachers attend to and analyze students' mathematical thinking (Sherin & Han, 2004). Logistically, however, there were differences. For example, in this club, the facilitators selected the clips, whereas, in other models, the teachers and facilitators collaborate to select clips for the discussion. The different video club designs have implications for how teachers participate in the meetings, an important focus of future research.

of analysis consisted of individual speaking turns, with the assumption that each turn revealed a primary role that an individual played at that point in the conversation.<sup>5</sup> However, it was also important to consider the context in which these turns were taken, because it is through conversation and turn-taking that the roles were defined (Duranti, 1997; Sacks, Schegloff, & Jefferson, 1974).

Data analysis consisted of three phases. The first phase involved understanding the range of roles participants played in the video club context. To identify the roles participants adopted, I created a coding scheme based on a review of the literature on role theory and group dynamics to understand the various roles individuals take on in group contexts (Cane, 2003; Chiu, 2000). These were used to initially identify potential roles participants played in the video club meetings. However, other roles emerged in the video club data so the initial list was modified based on what the data revealed. As the coding categories evolved, the data was reexamined to ensure that each turn was placed into one of the categories. Once all of the turns were coded in terms of the roles, a second researcher reviewed a subset of the meeting transcripts to confirm that these were the roles participants played.<sup>6</sup> Inter-rater reliability was 81%. Any differences were discussed until agreement was reached. Initial analysis of these roles involved examining the function of each role in the meetings, the frequency with which each role was adopted, and who took on these roles throughout the series of meetings.

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<sup>5</sup> This contrasts with Chiu (2000) who allows for more than one role within a single turn.

<sup>6</sup> The second researcher reviewed four of the ten meeting transcripts. The four transcripts were randomly selected but were ones that occurred at the beginning, middle and end of the series of meetings.

The second phase of the data analysis involved characterizing two of these roles more fully. The roles that were selected were ones that reflected two key goals of the video club designers. Specifically, the role of the Prompter was examined in greater detail because it corresponded with the goal of helping individuals attend to the significant events in the video segments that the group viewed. Again, the goal of this particular video club was to help teachers notice and interpret students' mathematical thinking. Prior research reveals that teachers often attend to teachers' pedagogical strategies when analyzing teaching episodes (Sherin & Han, 2004). Therefore, I sought to understand whether teachers adopted the role that directed the group to notice and discuss students' mathematical thinking in the video segments.

In addition, the role of Critic was examined because it reflected the goal of supporting participants in exploring alternative explanations and interpretations for the events they noticed. Research has shown that teachers are more likely to act as supportive colleagues in professional development contexts (Barnett, 2002). In addition, prior studies have found that it is rare for teachers to engage in a discourse that involves challenging one another's thinking (Ball, 1997a; Darling-Hammond, 1997; Grossman, Wineburg, & Woolworth, 2000). Thus, I chose to investigate teachers' participation in the role of Critic because it would be in this position that they would disagree, challenge, and encourage interpreting students' mathematical thinking in a variety of ways and from different perspectives.

To understand how these roles played out in the meetings, a grounded theory approach was used to identify key dimensions for further analysis related to each role (Strauss & Corbin, 1998). Rather than analyzing the data with a pre-conceived notion of how these roles might function in the video club context, I used grounded theory to derive an understanding of these

roles from the data itself. Specifically, to characterize each role, I examined the data and identified four dimensions for further analysis. The first three dimensions I will discuss were analyzed at the level of individual utterances, while the final dimension of analysis was analyzed at the level of segments of discussion.

First, I examined what (Topic) and who (Agent) the teachers noticed in the comments the participants made when they took on each role. The topics included Mathematical Thinking, Pedagogy, Climate, Management, or Other (Frederiksen, Sipusic, Sherin, & Wolfe, 1998). In terms of Agent, I examined who was the focus of the comments: Student, Teacher, Self, Curriculum Developers, and District Administrators, or Other (Author, 2004). Teacher refers to comments about the teacher viewed in the clip, while Self refers to comments participants made about themselves. In several cases, they would talk about themselves as teachers or learners of mathematics so it was important to distinguish when they were commenting on themselves or the teacher in the clip. Instances in which teachers commented on the teacher in the clip, and the clip happened to be one from their own classroom, it was coded as Teacher.

Second, I examined how participants talked (Stance) about the events they noticed when they assumed each role. For the role of Prompter, I identified three stances, namely, Solicit, Redirect, and Expand. For the Critic, I identified two stances, Counter and Question. Each time the role was assumed, it was coded as one of these stances. Analysis involved examining patterns in who adopted different stances and how the stances interacted with the nature of the discussions in the meetings.

The third step related to characterizing the two roles involved examining whether or not comments teachers made when they assumed these roles reflected themes from the teachers'

mathematics identities. Using McAdams's (1993) life history interview protocol, which explores how people use stories to communicate perceptions of themselves, each teacher participated in a Mathematics History Interview. Using this data, Sherin, Drake, and Wrobbel (2004) characterized the seven teachers' mathematics identities based on their histories as mathematics learners and teachers. The goal of this interview was to understand the extent to which teachers' prior experiences as mathematics learners and teachers influenced how they perceive themselves presently, and in the future, as mathematics teachers and learners. In this study, the turns in which teachers adopted the two roles under investigation were analyzed to examine the extent to which their comments reflected the teachers' mathematics identities.

Finally, the segments of conversation were analyzed to understand how the discussion was influenced when these roles were being played. This analysis is similar to that conducted by DiMauro and Gal (1994) to understand how teachers' participation in a telecommunications networked environment influenced reflections on practice. In this study, the subsequent conversations were coded as Substantive, Surface-level, Closed, and Other. This classification is in line with Bereiter's (1994) concept of "progressive discourse" and resembles the kind of discourse proposed by the NCTM (2000). Substantive refers to conversations in which participants proposed alternative viewpoints, built upon one another's ideas, provided evidence or greater detail to support a claim. Further, substantive conversations often include multiple participants. Surface-level refers to discussions in which little evidence was provided for claims and interpretations, the teachers talked generally about the issues they noticed, and the teachers did not elaborate or build on one another's ideas. Closed means that the topic of conversation drew to a close once a role came into play.

After coding each of the dimensions for each role, a second coder analyzed a subset of the data for reliability.<sup>7</sup> Inter-rater reliability was 86%. Any differences were discussed and resolved through consensus. Data displays (Miles & Huberman, 1994) were created to reveal patterns related to the different dimensions of these roles.

The final phase in the data analysis involved examining the relationship between the roles of Prompter and Critic, as well as, other dimensions of the video club environment. Specifically, this involved identifying chunks of conversation in which both roles were adopted and examining when in the conversation each was adopted to understand which role may have influenced the nature of the teachers' talk in the discussion. In addition, this phase of analysis considered other factors that influenced the conversations that ensued when these roles were adopted. In particular, each time one of the two roles was taken on, the participants' comments were coded in terms of whether they were based on events in the video clip or events outside of the segments viewed to understand what, if any, relationship existed between the roles participants played and the video segments they viewed.

In the following section, I present the results of the data analysis. First, I provide a brief overview of the roles participants played in the meetings. Then, I discuss the two roles, Prompter and Critic, in greater detail to investigate their influence on the teachers' discussions in the video club context. Third, I discuss how these roles interacted with one another, and other dimensions of the context, to influence the discussions in the meetings.

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<sup>7</sup> A second researcher coded three meeting transcripts randomly selected from the ten meetings according to the coding scheme defined above. The three transcripts came from meetings that occurred at the beginning, middle, and end of the series of meetings.

## Results

### *Participants' Roles in the Video Club Meetings*

In order to illustrate the range of roles participants adopted, I want to give a sense of a typical discussion that took place in the meetings. In the following example, the teachers discussed a clip in which they viewed one student, Javier, solving various multiplication problems in the context of a game. The game was played the following way: Students are placed in pairs and given a stack of modified playing cards. Between 1 and 10 dots are printed on each card. Each student selects two cards from the stack and then multiplies the values on the two cards. The student who has the greatest product wins the round. Students are encouraged to challenge one another if they disagree about who has the greater product. In the video segment viewed in the meeting, Javier played several rounds of the game, with two different partners, selecting cards, multiplying the values, and in some instances, challenging, or being challenged by, his given partner. Upon viewing the segment, the participants had the following exchange:

Facilitator: So what did you notice?

Daniel: Javier doesn't know his times tables.

Wanda: Are we talking about the first [pair of students] or the second?

Yvette: Any of them. Cause it's the same...

Daniel: He's in both... They switched the partners.

Facilitator: The student on the right is the same.

Daniel: Well, on the positive side... when[Javier] drew [the cards] 8 [and] 6, he didn't know it [from memory], he used a chart, and then a drawing or two later, he got a [card with six dots] and then [a card with eight dots] and he knew 48 right then. So he had some kind of recall after using the chart and practicing.

- Wanda: And [later] he was counting on the card [when he drew the cards with 3 and 6 dots].
- Daniel: What was he doing?
- Wanda: He was counting the groups. (Teacher counts on hand to illustrate student counting different groups.)
- Yvette: He was counting it that many times.
- Frances: Yeah, he was keeping track. (Teacher taps on paper to illustrate.) He was counting one, two, three, four, five, six and then he was keeping track. So he knew he counted 6 one time, 6 the second time, 6 the third time.
- Wanda: Which I thought was interesting.
- Daniel: Well, then he knows what the meaning of multiplication is.
- Yvette: He just hasn't retained the facts.
- Frances: And for him, retaining is so hard.
- Yvette: And that's where [the curriculum] is at a really high level for these kids. What they need is a taste of facts every day.
- Frances: But you know... there is always that group of kids who don't learn those darn facts. [In third grade] we used to do five minutes [of facts] at least three times a week, and yet still...you'd think they know them.
- Yvette: But with the [students] clustered [in ability groups] last year, we did a lot of fact work and I could zero in on...
- Elena: What I'm finding though, because we differ on that whole clustering philosophy, that the kids who don't know [their multiplication facts], we make modifications for them, like with a chart or they use a slate board... and I think those are some modifications that could be made with kids who really do have a difficult time with their math facts...
- Facilitator: Can I just bring us back to the video for a second?

In this exchange, the participants took on a range of roles as they discussed Javier's mathematical thinking. Data analysis revealed that over the course of the ten meetings the

participants played two different types of roles, namely, Organizational and Discussion Roles  
(See Table 1 for a description and example of each role).

Table 1

*Types of roles participants played in the video club meetings.*

Role Types	Roles	Definition	Example
Organizational Roles	Coordinator	Informs group what clips will be viewed and presents agenda for meeting	“Today, we’ll take a look at a clip from Drew’s class.”
	Clarifier	Ensures all participants have access to same information	“Isn’t that the boy in the blue shirt?”
	Mediator	Diffuses tension among group members or keeps climate of meeting comfortable	“I’m sorry. I didn’t mean to belabor the point there.”
	Prompter	Directs group’s attention to issues to discuss	“So, what did you notice?”
Discussion Roles			“What does he mean when says, ‘I was counting?’”
	Proposer	Offers explanation for issues under discussion	“Maybe she thought the value of each side was 1, instead of 6.”
	Supporter	Supports participant’s interpretation	“That’s what I was thinking too.”
	Critic	Counters or calls into question explanation	“I don’t think that’s what he was doing there.”
	Builder	Provides additional information to develop explanation	“Then he had two lines [with 10 blocks in each] that he didn’t split, so that would mean he knew he needed two rows of 10.”
	Summarizer	Synthesizes ideas under discussion	“Are you saying that the mathematical language is what’s hard for kids?”
	Blocker	Disregards issues raised and closes the discussion	“I got very little out of those first two segments.”

In the excerpt above, the participants adopted both Organizational and Discussion Roles. In particular, the facilitator adopted the role of Prompter when she signified to the group that it was time to discuss the clip, asking, “So, what do you notice?” One teacher, Daniel, then played the role of Proposer when he claimed that Javier does not know his times tables. Wanda then

took on the role of Clarifier when she asked which pair of students they were focusing on, and Daniel, Yvette, and the facilitator played this role as they sorted out who was being discussed.

Shortly after, Daniel resumed playing the role of Proposer. This time, he argues that Javier has some understanding of multiplication based on the fact that, when he drew two cards with six and eight dots respectively, his answer was 48. Wanda followed in the role of Proposer when she points out that he used a counting strategy to multiply three and six. Additional roles came into play as the discussion continued. Yvette and Frances participated as the Builder when they provided details from the clip to support Wanda's proposal. Wanda then played a Supporter when, after Yvette and Frances explain the Javier's counting strategy, she remarked, "Which I thought was interesting." Daniel then maintains his position as a Proposer as he suggests that Javier knows the meaning of multiplication.

As the discussion progressed, Yvette adopted the role of Prompter when she said, "And that's where the curriculum is at a really high level for these kids..." Here, she shifted away from discussing Javier's thinking to commenting on the curriculum. Specifically, she talked about a weakness of the curriculum and then stated that the students need practice with their multiplication facts. A new role emerged, that of Critic, when Frances responded by stating that even when she had her students practice their facts every day, they still did not know them by memory. Yvette adopted the role of Proposer when she suggested that ability-grouping students enables teachers to spend more time on a particular skill. The role of Critic again came into play when Elena challenged Yvette's claim that ability grouping would help students learn their facts. She offered an alternative perspective, as she suggested that the teachers modify instruction for students who have difficulty learning their multiplication facts. This segment of the conversation

then concluded with the facilitator adopting the role of Prompter, directing the teachers’ attention back to the video segment. This discussion, and the movement of roles among the participants, was typical of what occurred throughout the series the meetings, with the teacher and facilitators adopting both Organizational and Discussion Roles as they discussed the video segments they viewed.

An important point to emphasize is that these roles are not the only ones that participants might adopt in a video club or other professional development context. Rather, they are the roles that appeared in the case studied herein. While this study begins to identify the range of roles participants play in video club contexts, future research will examine the extent to which these roles appear in other video-based professional development programs, as well as, attempt to more precisely define the range of roles that appear in such settings.

To be clear, the purpose of this paper is not to analyze the frequency with which participants took on these roles over time. Nevertheless, it is useful to have a sense of how the teachers adopted the various roles that were identified. For that purpose, Table 2 presents the average percentage of teacher comments in each role over all ten meetings. (More specific information concerning the roles participants adopted per video club can be found in Appendixes A and B.)

Table 2

*Average Percent of Teacher Comments in Each Role*

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Coordinator	Clarifier	Mediator	Prompter	Proposer	Supporter	Critic	Builder	Summarizer	Blocker
0.42	25.52	1.17	6.69	21.46	12.17	3.95	27.12	0.56	0.94

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In Table 2, we see that some roles were played much more often than others throughout the series of meetings, with the teachers taking on the remaining roles less frequently. To some extent, this is not surprising. In the case of the Clarifier, the teachers had a breadth of information about their students, the curriculum, and the school context, so they often provided details that would help situate the group's viewing and the discussions. In addition, the video club was designed to elicit teachers' ideas about the video segments. As such, they frequently played roles in which they offered interpretations and built on one another's ideas (i.e. Proposer and Builder). Likewise, other roles were played less frequently. For example, the role of Coordinator often came into play at the beginning and end of the meetings to set the agenda for the meetings. In addition, the Summarizer participated as a conversation drew to a close to wrap up and synthesize ideas.

Rather than focus on the frequency with which individuals adopted various roles, the goal of this paper is to characterize how the roles participants played interacted with the teachers' learning to notice students' mathematical thinking. Towards that end, the roles of the Prompter and Critic are discussed in greater detail below. While these were not the roles that the teachers played most often, they were examined more closely because they reflected two important goals of the video club meetings. In particular, the role of Prompter reflected the goal of directing participants' attention to noteworthy events in the video segments. I wanted to understand, then, how teachers played this role because it would reveal the extent to which they were being enculturated into being able to identify such events. The role of Critic reflects the goal of participants discussing multiple explanations of students' mathematical thinking. I sought to

understand how teachers participated in this role because teachers have a history of not questioning or challenging one another's thinking in professional development contexts (Ball, 1997a), such that they articulate their knowledge, beliefs, and assumptions about mathematics teaching and learning. However, this was an important goal of the video club designers and a worthwhile goal of professional development (Ball, 1997a). Therefore, I sought to understand the extent to which teachers adopted this role and played it in ways that helped the group accomplish the goal of exploring a variety of interpretations of classroom events.

### *A Closer Look at Two Roles: Prompter and Critic*

#### *The Role of the Prompter*

An important goal of the video club was to support teachers in attending to and interpreting students' mathematical thinking. In the role of Prompter, participants highlighted events that were noteworthy to discuss. Therefore, I analyzed teachers' participation in the role of Prompter, examining the extent to which they identified noteworthy events related to students' mathematical thinking and directed the group to discuss these events. Data analysis revealed two important findings related to this role. First, the nature of the teachers' participation changed over time when they adopted the role of Prompter. Second, the participants used different types of prompts, which influenced the subsequent conversations in different ways.

#### **Changes in Teachers' Participation in the Role of Prompter**

To begin, over the course of the series of meetings, the nature of the teachers' participation in the role of Prompter changed. Specifically, more teachers adopted this role over time, and they shifted in the issues they raised when they adopted this role later in the series of

meetings.<sup>8</sup> Early on in the series of meetings, just three of the teachers adopted the role of Prompter. However, in the middle of the series of meetings, most of the teachers adopted this role. In fact, in Meeting 4, six of the seven teachers adopted the role of the Prompter. This role moved among these six teachers through the ninth meeting, and again, six of the seven teachers adopted this role in the final meeting.<sup>9</sup> Participation by more teachers in this role is important because prior research on professional development highlights that teachers are generally passive in their learning (Burbank & Kauchak, 2003). The fact that all but one of the teachers took on this role suggests that the nature of their participation changed. Rather than following the lead of just two or three members of the club, they became active participants, as they highlighted events

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<sup>8</sup> As expected, the facilitators of the video club adopted the role of the Prompter more than the teachers over the course of the ten meetings. Across all meetings, this role was adopted about 17% of the time for all participants of the club, with the teachers playing it about one-third of the time it was adopted. It is not surprising to see this role played less frequently than the others. In this role, individuals initiate a topic for the group to discuss. Then, various other roles are adopted, with some participants adopting the same roles several times, to sustain a discussion. Examining how teachers played this role over the course of the meetings provides a lens for understanding the extent to which teachers became apprenticed into noticing students' mathematical thinking in their video analyses.

<sup>9</sup> The one teacher who did not adopt this role in meetings 4 and 10 was Drew, the first year teacher. There could be several reasons that he may not have taken on this role. One reason may be that he did not feel entitled to act as the Prompter since he was in his first year and was relatively new to the school community.

they identified as noteworthy. This suggests that they became more central members of the community (Lave & Wenger, 1991) as they adopted a role that previously belonged to just a few club members and helped shape the direction of the group's discussions.

In addition, the events that teachers identified as noteworthy changed over time. In the first half of the series of meetings, teachers who adopted this role prompted about multiple topics and about a mix of agents. Following are example prompts teachers used early on: "Do [the students] all have rulers at their desk?"; "But doesn't Lorraine get it then?"; and "How do you feel about teaching both [methods]? Do you teach them both ways then, or do you stick to just the conventional [method]?" These examples illustrate the teachers noticing a range of topics and agents, namely, the classroom management of the students, student's mathematical understanding, and teachers' pedagogical strategies.

In the latter half of the series of meetings, though, the teachers' prompts looked quite different. They were now more focused on the details of students' mathematical thinking. Following are example prompts to illustrate: "I'm not making the connection between the first part of her explanation and the second part...how she made that transition..." and "I didn't understand what he [meant], 'Since there's five going down, you can just put one up and over.'" Analysis of the teachers' prompts shows that, in the first five meetings, an average of 18% of the prompts focused on students' mathematical thinking, whereas in Meetings 6 through 10, nearly 50% of their prompts were focused on this same topic and agent.

These results suggest that the teachers' came to play a role that was important for accomplishing the goals of the video club over time, as they prompted one another to discuss specific issues related to students' mathematical understanding. This is noteworthy because it is

not a trivial matter for teachers to learn to attend to the particulars of students' mathematical thinking (Ball, 1997b). While prior research revealed that these teachers came to analyze students' mathematical thinking in detailed ways (Author, 2004), it did not examine the context that supported such development. The results here begin to explicate how teachers' participation in the role of Prompter interacted with their learning. In particular, as Prompters, the teachers participated, over time, in ways that enabled them to influence the direction of the talk in the meetings. This suggests that they had become enculturated into participating in the video club in a way that reflected a key goal of the video club designers.

### **Influence of Prompts on Discussion**

The second noteworthy finding related to the role of Prompter is that there were different types of prompts, and these prompts influenced the discussion in different ways. To begin, data analysis revealed three types of prompts: Solicit, Redirect, and Expand. (See Table 3 for a definition and example of each type of prompt.)

Table 3

*Definition of Three Types of Prompts*

Type of Prompt	Definition	Example
Solicit	Invites participants to discuss a noteworthy event	“And then she [says], ‘And then we gotta go back and check the next one. The next one would be one million.’ What is she talking about?”
Redirect	Closes the previous discussion and states a different noteworthy event	“But I wanted to say, I also think, Daniel, you had to show them a visual [representation].”
Expand	Invites participants to further develop an idea being discussed	“So, do you think when she’s more certain, he’ll challenge her [answer]?”

Overall, both the teachers and the facilitators used all three types of prompts throughout the series of meetings.<sup>10</sup> Interestingly, early on, the teachers’ prompts were mostly to Redirect, while later in the series of meetings, the majority of the teachers’ prompts were to Solicit. This further supports the claim that over time the teachers had greater control over the direction of the discussion in the group, as they used the Solicit prompt to initiate discussions about issues they deemed noteworthy and invited others to discuss these issues as well.

<sup>10</sup> While the teachers did use the Expand prompt, they did so much less frequently than the other types of prompts and much less than the facilitators. Thus, this analysis does not examine teachers’ adopting the role of Prompter in this way.

Another important finding is that these various prompts influenced the subsequent conversations in different ways. To illustrate, recall the excerpt in which the teachers analyzed Javier's understanding of multiplication. The facilitator began the discussion with a Solicit prompt, as she invited the teachers to discuss what they found noteworthy when she asked, "What do you notice?" Daniel initially proposed that Javier did not know his times tables, but he then reconsidered this proposal and suggested Javier did have some understanding of multiplication. The group then explored in detailed ways what Javier appeared to understand. Specifically, they proposed that there was some evidence in the video clip to suggest that he understood the concept of multiplication but he did not retain the multiplication facts. This was considered a substantive conversation because several participants collaborated to interpret what Javier did and did not understand about multiplication, talking specifically about events that occurred in the clip to support their claims. Analysis of the data revealed that over the course of the meetings, when Solicit prompts were used, the conversation that followed were substantive.

In contrast, when Redirect prompts were introduced into a conversation, they did not appear to influence the discussion in the same way. Specifically, data analysis reveals that the conversations that ensued tended to be more surface level. Rather than inviting participants to offer their ideas about the event that was identified as noteworthy, Redirect prompts appear to close the previous conversation, while also shifting the conversation to another issue to consider, without inviting others to remark on it. For instance, in the second meeting, the teachers discussed students' confusion about place value in the context of decimals:

Frances: Well, I even have some kids, it's so ingrained in them that [on the left side of the decimal] it is ones, tens, hundreds, thousands, and then you turn it around for decimals and it goes the other way. And I still have some kids getting that mixed up.

- Wanda: In my class, [the students want] to make it oneths. We've got to have oneths.
- Facilitator: Oh, I remember [wondering] why there isn't oneths, because there are tenths, hundredths...
- Wanda: You're oneths place is your line of symmetry and everything else is going beyond that. And so the decimal, if anything, should be under the oneths position.
- Facilitator: That still seems confusing to me.
- Wanda: Because there's actually, well...I wanted to say, that with improper fractions, that's where I start pushing division and how we divide decimals. So I actually write out,  $3/2$  means 3 divided by 2, [and ask] how are we going to do this? So I'll actually divide it out to the decimal point.
- Frances: Yeah. And again, the lesson I was doing in the video suggests teaching the fourths first, and then the halves...
- Yvette: And then Frances, [the curriculum developers] introduce thousandths in fourth grade and they change the value of the blocks right in the middle of the math series. So you are like (throws hands up in air)

Frances began this segment of the discussion pointing out a confusion her students had about decimal place value. She suggested that they understand the places to the left of a decimal (ones, tens, hundreds, and thousands) but that they have difficulty remembering the order of the places on the right side of the decimal. Wanda then introduced that her students get confused because they want there to be a "oneths" place. The facilitator follows by recalling her own confusion about decimal places, specifically why there was not a "oneths" place. Wanda followed with an explanation, but when the facilitator responded that she remained confused, rather than clarify this issue for the group, Wanda used a Redirect prompt to close the conversation about "oneths" and shift it to another topic, namely her pedagogical strategies for connecting fractions and

decimals. After this remark, rather than pursue Wanda's issue, Frances returned to discuss the video segment and the way the lesson had directed her to teach decimals. Yvette then followed with another new topic, commenting on how the curriculum developers change the unit value of the manipulatives they use in various lessons.

The conversation that followed Wanda's Redirect prompt is considered surface-level because, while multiple teachers speak, they did not respond to or build on one another's ideas. Instead, their comments appear to be three separate statements that are not clearly related. Further, their remarks do not move the discussion in a direction of developing an argument around a claim, in this case of pedagogical strategies that are useful for developing students' mathematical understanding of decimals.

In sum, these results reveal that the role of Prompter was a context in which participants could accomplish the goal of focusing the participants' attention on students' mathematical thinking. In addition, the results also highlight that the teachers took on this role over time in ways that reflected important goals of the video club designers, prompting one another to discuss specific issues related to students' mathematical thinking in substantive ways. However, this was not always the case. In some instances, teachers used Redirect prompts, and data analysis revealed a trend that these types of prompts often led to surface-level discussion.

Several important issues remain related to understanding the influence of the role of Prompter. One question in particular is why the facilitator took on this role so much more than the teachers. One reason may be that the facilitators organized the video club group. Therefore, they had particular goals at the start and may have used the role of Prompter to make those goals public to the group. In fact, the facilitators were conscious of their positioning as the leaders of

the meetings. By embedding the goal of attending to students' mathematical thinking in the discourse when adopting this role, the facilitators were able to accomplish other goals, that of valuing teachers' experience in their profession and participating as equals.

In addition, the facilitators selected the clips for the group to view in this particular model of a video club. Therefore, they spent a great deal of time thinking about what was interesting mathematically and what was noteworthy about students' thinking about the mathematics in the video clips. Thus, they would be more inclined to adopt this role because it was in this role that they could point out what they found noteworthy in the clips, specifically related to the goal of exploring students' mathematical understanding. An important question to consider is whether or not teachers, in a different model of a video club, who select clips for the group to view, either with or without the assistance of a facilitator, would adopt this role more frequently and play it in different ways from those identified herein. Such research would provide insight into ways teachers might self-facilitate video clubs, an important subject of future research.

### *The Role of the Critic*

Another central goal of the video club was to encourage participants to talk in new ways about the ideas they noticed. Prior research has found that teachers are often quick to judge events they identify as noteworthy (Friel, 1997; Richardson & Kile, 1999). In contrast, the video club was designed to encourage teachers to adopt a different stance, namely an interpretive one, when they discussed the video segments. This is not to say that judging events is not important to improving practice. In fact, research on teacher expertise suggests that expert teachers often make judgments based on interpretations (Berliner, 1994). However, the purpose of the video club discussed herein was to encourage participants to articulate the interpretations upon which they based evaluations, to realize that some events may have alternative explanations, and to

begin to explore those explanations. With that goal in mind, this research sought to understand how the role of the Critic was used to encourage participants to explore alternative explanations of noteworthy events in the segments viewed. While this role was not adopted frequently by either the facilitators or the teachers, it seemed an important one to examine more closely because it aligned with the goal of supporting teachers to explore a range of explanations from different perspectives. Again, the role of the Critic refers to the individual who disagreed or challenged an interpretation or explanation proposed by another member of the group, not an individual who evaluated what occurred in the clip.

Data analysis reveals three important findings related to the role of Critic. First, the teachers adopted this role more than the facilitators throughout the series of meetings, and when they played this role, their comments were more often focused on the students in the clips they viewed. Second, when the role of Critic was adopted in a discussion, the conversations that ensued tended to be substantive in nature. Finally, the role of Critic became a space for teachers to express their identities, enabling the group to consider the issues under discussion from various perspectives.

### **Nature of Teachers' Participation in the Role of Critic**

To begin, the teachers took on the role of Critic more than the facilitators over the course of the meetings, with the teachers adopting this role three times as often as the facilitators. Other research has shown that teachers are generally not critical in their interactions with each other (Ball, 1997a; Darling-Hammond, 1997; Grossman, Wineburg, & Woolworth, 2000). Instead, teachers prefer to use professional development as a place for peer support and the sharing of pedagogical practices (Barnett, 2002). There is evidence though, that in the video club context,

the teachers challenged one another's thinking and occasionally objected to proposals that each other made in the role of Critic.

To illustrate, we will return to the excerpt in which the group discussed Javier solving various multiplication problems in the context of a game. During that discussion, one teacher, Yvette, proposed that ability-grouping students helps teachers spend more time with students who have difficulty learning multiplication facts. Another teacher, Elena, adopted the role of Critic when she responded, "What I'm finding though, because we differ on that whole clustering philosophy..." Elena played the role of the Critic here as she publicly verbalized a different belief she had about grouping students compared to that of her colleague Yvette. This exchange illustrates the kind of discourse teachers engaged in throughout the series of meetings when they adopted the role of Critic, expressing disagreement and opposition about each other's ideas.

Interestingly, when teachers adopted the role of Critic, their comments tended to focus more on the student, rather than the teacher in the video segment, regardless of the topic they discussed. This is noteworthy because one would expect that when discussing pedagogical strategies, the focus would be on the teacher. However, of the 30 Critic remarks that the teachers made related to the topic of pedagogy, 57% of them were about the student, 27% were focused on the teacher, and 13% were about the curriculum developers. By directing the comments away from the teachers in the clip to the relationship between students and the pedagogical strategies they observed, the teachers may have been careful to avoid openly critiquing one another, keeping in line with an implicit rule of the club, which was to not evaluate one another's practice. In addition, they may have viewed themselves as remaining in line with an important

goal of the video club by interpreting the influence that a particular pedagogical strategy had on the students. Further, adopting this stance may have enabled the teachers to also explore a range of explanations for the events they noticed.

**Influence of Critic on Discussions**

Similar to the role of Prompter, the role of Critic was adopted in different ways. In particular, two different stances were associated with the role of the Critic, namely Counter and Question stances. (See Table 4 for definition and examples of each type of stance.) Both types of stances served to challenge an idea raised by a participant, however the Counter stance was more overt, while the Question stance tended to be more subtle in nature.

Table 4

*Two Stances Adopted by the Critic*

Type of Stance	Definition	Example
Counter	Disagree with or challenge the previous speaker’s comment and offer another perspective on the event being discussed	“Um, I don’t think so. I think [the curriculum] assumes [that this concept] is new for the students.” ““But to play devil’s advocate on that...”
Question	Questions the claim under discussion, without openly disagreeing with the individual who made the claim	“But is it a problem [that he solved the problem that way]?” “I don’t know. I’d like to see his paper to see what he wrote down.”

In contrast to the role of Prompter, which influenced the discussion differently when played in different ways, analysis of the data revealed that when the role of Critic was assumed with either stance, more than half of the conversations that ensued were substantive. In other words, after the Critic either countered or questioned the speaker, the subsequent conversations were ones in which the participants further explained their ideas, used evidence to support their claims, and in some cases, encouraged multiple participants to engage in the discussion.

To illustrate, consider the following discussion from Meeting 3. The group viewed a clip in which the class had been working on writing decimal values. The teacher, Drew, posed the following question, “Can somebody tell me how I would write five hundred three thousandths?” As the students were taking time to write this decimal on individual slate boards at their desks, one student, Terrence, asked the teacher, “How can it be...you said a hundred, not a hundredth. How can you say it as a whole number if it’s on the right side of the decimal?” In the clip, Drew and Terrence discussed Terrence’s question, and Drew attempted to clarify his framing of the question for the class. Upon viewing the clip, the participants had the following discussion:

Facilitator: So, what is Terrence’s confusion?

Wanda: Because you’re saying five hundred three thousandths and everything to right of the decimal is supposed to be “-ths.”

Yvette: And when I hear the word “and” that’s where I plug the decimal point. So I went back to [when you first said it] and [Terrence] may be correct here, because he’s thinking you said “five-hundred and three-thousandths.”

Wanda: That was an earlier child. And I really think [Terrence’s] problem is, he wants it to be five-hundredths, three-thousandths. He wants all the “-ths” on the right side of the decimal, but it’s just like when you read on the left side. You read the digits, “five-hundred three, comma, four-hundred two thousand.” You have to read the digit, then the [decimal point].

- Yvette: Was that Terrence that was talking, because I don't know... (Looking through transcript) See here [Terrence] said, "You said five-hundred and three-thousandths." He's thinking... this is what he's writing, five-hundred and three-thousandths ... (writes on paper the value she thinks Terrence wrote: 500.003) He's thinking you said five-hundred and three thousandths. Which, he heard you wrong...
- Elena: I interpreted it the same way Wanda was saying. He wants to know why on the right side of the decimal we're saying five-hundred.
- Yvette: I don't know. I would have to see a slate, to see what he wrote to say this is what he's thinking. Because if he wrote this (points to her paper)...
- Facilitator: That could make sense too. That could be another interpretation.
- Elena: That made sense.
- Yvette: Five-hundred "and," when you say that word "and," you put down that decimal. I'm thinking it's very simple. He did not hear you correctly.
- Wanda: Right, and I think with the part at the end, that's so hard to get that out of their vocabulary. They're used to saying five hundred "and" three... I agree we would have to look at the slate, but I don't think he was saying this. I think he was saying five hundred and three without thinking about "and" meaning decimal. And I think what he was getting at was the "-ths."

In this excerpt, both Wanda and Yvette offer interpretations for Terrence's confusion. They both then adopted the role of Critic, challenging each other's interpretations. Specifically, Wanda adopted the role of Critic when she refuted Yvette's proposal and pursued her initial idea: "That was an earlier child [who thought the teacher said 'and']. I really think his problem is this, he wants it to be five-hundredths, three-thousandths. He wants all the '-ths' on the right side of the decimal." She then developed her interpretation by further explaining her reasoning. "It's just like when you read on the left side. You read the digits, five-hundred and three, comma, four-hundred and two thousand. You have to read the digit, then the [decimal point]." Yvette then

turned to the transcript to further develop her claim about the Terrence's confusion. She said, "See, here he said, 'you said, five hundred *and* [italics added] three thousandths.'" Later, when the group seems to support Wanda's interpretation, Yvette more subtly adopted the role of Critic as she questioned Wanda's claim saying, "I don't know. I'd have to see his slate..."

In this excerpt, Wanda and Yvette used both the Counter and Question stances to challenge one another's proposals and to pursue their individual interpretations. As they challenged one another, the conversation became more substantive as they offered evidence for their ideas and explained their thinking in greater detail. In addition, other participants joined in the conversation, building on and supporting the interpretations proposed. This exchange illustrates the participants engaging in substantive discussions in which they explored various interpretations of the students' thinking and used evidence from the clip to support their claims. Clearly, several factors came into play in this discussion. However, the role of Critic seemed particularly important because challenging each other's ideas served as a catalyst for the two teachers using greater detail to further explain their interpretations.

While the role of the Critic appears to have influenced the participants discussing different ideas in greater detail, this role had less of an influence on shifting initial explanations teachers had of students' mathematical thinking. In the example above, the two teachers continued to pursue their individual ideas without abandoning their initial interpretations. In fact, in only 20% of the discussions in which the Critic role was adopted did the original Proposer show signs of considering the issue in the way the Critic offered. Even in these cases in which the initial speaker showed signs of taking into account an alternative position, the response from the initial Proposer resembled the following, "Maybe that is what he was thinking" or "I hadn't

thought of that before.” These statements show the teachers acknowledging and validating the Critic’s interpretations and suggest that the Proposer would be willing to explore alternative explanations further. However, the fact that the teachers do not validate other’s interpretations the majority of the time suggests that there may be limits in the influence of the role of Critic on teachers’ deeply exploring alternative explanations and adopting new perspectives in their analyses. Additional data analysis provides insight into why the teachers may have had difficulty abandoning their original interpretations of the events they noticed.

### **Critic as a Reflection of Teacher Identities**

The third result related to the role of Critic is that it became a context for teachers to express their identities as teachers and learners of mathematics. Sherin et. al. (2004) characterized these teachers’ experiences as mathematics learners and teachers, and analysis of the data reveals that their histories came into play when the teachers adopted the role of Critic. In particular, in the role of the Critic, the teachers would counter or challenge interpretations, with their identities influencing the perspective they took to respond to other teachers’ claims.

For example, Elena’s mathematics identity was concerned primarily with implementing a reform-based curriculum. For her, teaching for understanding was important, and she viewed the reform-based curriculum as a resource for accomplishing this goal. Further, she believed the curriculum helped her learn about how students thought about mathematics and to use their thinking when teaching them mathematics. When Elena adopted the role of the Critic, her comments often challenged other participants on issues related to students’ learning mathematics for understanding and reflected her support of reform teaching practices. When discussing Javier’s understanding of multiplication, for instance, Elena challenged Yvette’s claim that

ability grouping students would help them learn their multiplication facts. As a supporter of the curriculum, she offered an alternative perspective, that rather than abandon the curriculum, she explained that she made modifications to help students be successful. Like Elena, the other teachers often made comments that reflected their identities when they adopted the role of the Critic.

Thus, one possible explanation for why the teachers may have been resistant to embrace alternative explanations when they were raised by someone playing the role of the Critic is that the different interpretations were in conflict with their core beliefs about teaching and learning. Prior research reveals the persistence of teachers' conceptions related to their practice (Grossman, 1991; Thompson, 1984). It stands to reason that the teachers could not easily abandon their original interpretation for an alternative explanation because it may have contradicted what they currently believed about mathematics teaching and learning.

While the results of the data analysis related to the role of the Critic suggest that this role provided a context for participants to explore alternative explanations of students' mathematical thinking, there appear to be limitations of the extent to which this role helped the teachers to embrace other ideas and to engage in discussion about them. If a primary goal of video clubs, then, is to encourage teachers to not only explore alternative explanations, but to also accept and own those ideas as likely interpretations, then designers need to consider how to make this happen. The role of Critic may likely not be the position that would facilitate such thinking.

In addition to conflicting with teachers' identities, the teachers may perceive that the comments participants made when they adopted this role carried with them an evaluative stance. Therefore, the teachers may have been less likely to adopt a new perspective if they believed

their ideas were being criticized. Rather, they may have felt that they needed to defend their own ideas. Further, analysis of the data revealed that, when the facilitators adopted the role of the Critic, they Countered and Questioned, while the teachers Countered a majority of the time. It is not surprising that the facilitators were less inclined to Counter because they wanted to position themselves as equals to the teachers. By taking on the Counter stance, they could have been viewed as criticizing the teachers or as acting as the authorities on the issues being discussed, thereby violating the rule of being supportive of one another.

#### *Examining the Interaction Between the Prompter and Critic*

Thus far, I have characterized two roles that the teachers adopted in the series of meetings, discussed how the teachers participated in these roles over the series of meetings, and explained how participants adopting these roles influenced the discussions that took place in the meetings. Now, I turn to examine how these two roles interacted with one another to influence the discourse in the video club meetings. Research points to the importance of examining not just one dimension of a learning environment but the interaction among various parts of a system (Borko, 2004; Cole & Engestrom, 1993; Hutchins & Klausen, 1996). Here, I examine how the roles of Prompter and Critic interacted with one another to shape the discourse in the video club meetings.

Analysis of the data revealed several instances in which the Prompter and Critic interacted with one another to influence the discussions that ensued. Recall that one step of data analysis involved examining whether participants' remarks when adopting either roles were based on events in the clip. Analysis of the data highlighted several instances when the Prompter solicited the group to discuss an issue, based on events *outside* of the clip, and the conversations that followed were substantive. Further analysis revealed that in the majority of these instances,

the Critic entered the discussion to challenge a participant's proposal, which led to further discussion about the issue. Thus, the Critic had an important function here, which was to encourage the participants to articulate their ideas in more depth. In these instances, the Prompter played a key role of directing teachers to discuss noteworthy interactions. However, because the participants did not have a shared referent for this issue, the Critic helped to advance the conversation by challenging the ideas participants' introduced and thus, eliciting more detail and explanation from the participants. This finding points to the importance of examining the interaction among the parts of the system. First, without the role of Critic, the teachers would have had less substantive discussions when a Prompter directed the group to discuss an issue that was not in the clip they viewed. Simply examining the Prompter or the Critic roles in isolation would have missed this finding. Further, a systems perspective reveals that the Prompter and Critic were not the only factors of the video club that influenced the degree to which teachers engaged in substantive talk. Other dimensions include the tools used in the environment, the norms for participation, and the broader school context in which the teachers worked. For instance, future research will examine more specifically the features of the clips, then study the relationship between different types of clips with the role of Prompter and the different types of prompts they used, and finally, examine how different clips interact with different prompts to influence the discussions that ensue in the meetings.

### *Discussion & Conclusion*

This study highlights the range of roles that participants adopted in the video club, examines teachers' participation in the roles of the Prompter and the Critic, and considers how their participation in these roles influenced the discussions that took place in the meetings. In

addition, I discussed how the roles of the Prompter and the Critic interacted with one another, as well as, with other dimensions of the video club environment, to influence the discussions that ensued. Now, I will turn to a discussion of these results.

An important part of this research was to study the interaction between teachers' participation in the video club meetings and their learning to notice classroom interactions in new ways. As previously stated, the broader goal of the video club was to help teachers learn to attend to students' mathematical thinking and interpreting these events in detailed ways based on the events in the clips. In prior research (Author, 2004), I reported that the teachers who participated in this video club accomplished this goal. Here, I adopted a situative perspective to examine how the social context, and the interactions among members as they played different roles in the video club, influenced teacher learning. Specifically, I explored two key roles that may have supported teachers' learning to notice in this context. The findings reported herein suggest that the roles of the Prompter and the Critic were important ones for influencing teachers' learning to notice. More specifically, data analysis revealed that the teachers participated in the role of the Prompter differently over the course of the series of meetings. The fact that teachers' prompts focused more on students' mathematical thinking in the latter half of the meetings suggests that they were learning new ways of analyzing practice. In other words, they were becoming enculturated into a community of practice that values interpreting students' mathematical thinking. This is an important finding, as research shows that it is not a simple matter for teachers to learn to focus on the particulars of students' mathematical thinking (Ball, 1997b). The fact that the teachers in this club not only engaged in these discussions, but also prompted one another to talk about these issues, suggests that they had learned to attend to a

particular type of event and had become more active in directing the participants to discuss these issues as well.

The role of the Critic also seems to have influenced teachers' learning to notice but there were limitations in the extent to which it influenced teachers embracing new perspectives in their analyses of video. The Critic challenged other participants' proposals, and these types of remarks enabled the group to discuss multiple interpretations or to further develop their explanations. To some extent, then, the video club served as a learning community for the teachers, as they voiced a variety of interpretations for the events they noticed and discussed these interpretations in detailed ways. However, because the Critic could have been perceived as criticizing another's comment, presence of this role may prevent a group from functioning as a community, as members defend their own perspectives, and thus, do not engage in group knowledge building.

While this study makes progress on our understanding of how teachers participated in the video club meetings and how they adopted roles that reflected key goals of the video club designers, several questions remain. First, an important next step in this research is to deeply characterize the other roles participants played and examine how they interacted with one another to influence the discussions in the meetings. This research shows that the Prompter and the Critic worked together to support the teachers attending to students' mathematical thinking and interpreting what they noticed in detailed ways. Future research will examine how the other roles contributed to or constrained teachers' learning to notice students' mathematical thinking. In addition, I assigned one role to each speaking turn. Perhaps teachers play multiple roles simultaneously in the video club, as Chiu (2000) described. Thus, future research needs to

consider how playing a variety of roles simultaneously in the video club interacts with the discussions that ensue and with teachers' development in this context.

While this work begins to illuminate teachers' role playing in the video club describe herein, future research needs to situate their participation in the broader context of the video club and examine how teachers adopting different roles interacts with various dimensions of the environment to influence teacher learning.. For instance, data analysis reveals that an important aspect of whether or not the Prompter and Critic influenced the discussion was the extent to which those comments were based on the clips the group viewed. This points to the importance of understanding in a more detailed way the characteristics of the video segments the group viewed and then investigating how they influenced the nature of the discussions in the meetings, as well as, how certain types of clips interacted with the range of roles participants took on in the meetings. Research on activity theory (Cole, 1996) points to the importance of examining the social and physical contexts in which learning takes place to understand how the environment influences learning. Future research will investigate various aspects of the video club context, as well as the interactions among these parts of the system, to understand how they coordinate to influence teacher development.

Second, these findings have implications for the design of professional development environments. Research on teacher learning calls for long-term, sustained professional development (Little, 1993). The video club discussed herein consisted of ten meetings over the course of one school year, with the researchers having extensive participation – videotaping, selecting clips, and facilitating the meetings. The findings reported here show that the teachers in this club participated more actively over time, as they adopted the role of Prompter and

contributed to shaping the discussions by the end of the series of meetings. From a design perspective, it is important to consider how the teachers might take on other responsibilities of coordinating video clubs. For instance, selecting a clip that highlights interesting student thinking about subject matter is not a trivial matter. Research focused on the characteristics of clips that promote substantive discussions will be useful for guiding teachers and other professional developers in the selection of clips for video club meetings.

Finally, a different design would have likely resulted in teachers taking on various roles in different ways. In this study, the Prompter focused teachers' attention on important events related to students' mathematical thinking, while the Critic challenged participants' interpretations which facilitated further discussions of their ideas. An important question to pursue is what would happen if participants were given these roles explicitly and asked to try on different roles throughout the series of meetings. Barab, MaKinster, Moore, and Cunningham (2001) defined key roles for members to adopt in a networked-based professional development environment because they believed that assigning roles would encourage more active participation and ownership of their learning. A video club could take a similar approach and explicitly assign participants roles to adopt throughout the course of the meetings. This would provide further insight into how the roles participants adopt influences their participation in discussions over time, as well as, how individuals taking on various roles influences their learning in different ways.

## REFERENCES

- Author (2004). *Learning to notice: The development of professional vision for reform pedagogy*. Unpublished dissertation. Northwestern University, Evanston, Illinois.
- Ball, D. L. (1997a). Developing mathematics reform: What don't we know about teacher learning -- but would make good working hypotheses. In S.N. Friel & G.W. Bright (Eds.), *Reflecting on Our Work: NSF Teacher Enhancement in K-5 Mathematics*. Lanham, NY: University Press of America..
- Ball, D. L. (1997b). What do students know? Facing challenges of distance, context, and desire in trying to hear children. In B. J. Biddle, T. L. Good, & I. F. Goodson (Eds.), *International Handbook of Teachers and Teaching* (Vol. II, pp. 769-818). Dordrecht: Kluwer.
- Ball, D. L. & Cohen, D. K. (1999). Developing practice, developing practitioners: Toward a practice-based theory of professional education. In G. Sykes and L. Darling-Hammond (Eds.), *Teaching as the Learning Profession: Handbook of Policy and Practice* (pp. 3-32). San Francisco: Jossey Bass.
- Barab, S. A., MaKinster, J. G., Moore, J. A., Cunningham, D. J., & The ILF Design Team. (2001). Designing and building an on-line community: The struggle to support sociability in the inquiry learning forum. *Educational Technology Research and Development*, 49(4), 71-96.
- Barnett, M. (2002, April). *Issues and trends concerning electronic networking technologies for teacher professional development: A critical review of the literature*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

- Bereiter, C. (1994). Implications of postmodernism for science, or, science as progressive discourse. *Educational Psychologist*, 29(1), 3-12.
- Berliner, D. C. (1994). Expertise: The wonder of exemplary performances. In J.M. Mangier & C. C. Block (Eds.), *Creating powerful thinking in teachers and students: Diverse perspectives* (pp. 161-186). Fort Worth, TX: Holt, Rinehart, & Winston.
- Blatner A. (1991). Role dynamics: A comprehensive theory of psychology. *Journal of Group Psychotherapy, Psychodrama & Sociometry*. 44(1), 33-40.
- Borko, H. (2004). Professional development and teaching learning: Mapping the terrain. *Educational Researcher*, 33(8), 3-15.
- Burbank, M. D. & Kauchak, D. (2003). An alternative model for professional development: Investigations into effective collaboration. *Teaching and Teacher Education*, 19, 499-514.
- Cane, M. (2003). Group roles in community of inquiry. *Thinking* 16(3), 12-16.
- Carpenter, T. & Fennema, E. (1992). Cognitively guided instruction: Building on the knowledge of students and teachers. *International Journal of Educational Research*, 17, 457-470.
- Chiu, M. (2000). Group problem-solving processes: Social interactions and individual actions. *Journal for the Theory of Social Behaviour*, 30(1), 27-49.
- Cohen, E.G. (1994). *Designing groupwork: Strategies for the heterogeneous classroom*. 2<sup>nd</sup> Ed. New York: Teachers College.
- Cole, M. (1996). *Cultural psychology: A once and future discipline*. Cambridge: Harvard University Press.

- Cole, M. & Engestrom, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.) *Distributed cognition: Psychological and educational considerations* (pp. 1-46), Cambridge, England: Cambridge University Press.
- Darling-Hammond, L. (1997). Quality teaching: The critical key to learning. *Principal*, 77(1), 5-11.
- DiMauro, V. & Gal, S. (1994). The use of telecommunications for reflective discourse of science teacher leaders. *Journal of Science Education and Technology*, 3(2), 123-135.
- Duranti, A. (1997). *Linguistic anthropology*. Cambridge, England: Cambridge University Press.
- Frederiksen, J. R., Sipusic, M., Sherin, M. G., & Wolfe, E. (1998). Video Portfolio Assessment: Creating a Framework for Viewing the Functions of Teaching. *Educational Assessment*, 5(4), 225-297.
- Friel, S. N. (1997). Using video to provide "case-like" experiences in an elementary mathematics methods course. In J. Dossey, J. O. Swafford, M. Parmantie, and A. E. Dossey (Eds.), *Proceedings of the nineteenth annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (vol. 2, pp. 479-485). Columbus, OH: The ERIC Clearinghouse for Science, Mathematics, & Environmental Education.
- Goffman, E. (1981). *Forms of talk*. Philadelphia: University of Pennsylvania Press.
- Goodwin, C. (1981). *Conversational organization: Interaction between speakers and hearers*. New York: Academic Press.
- Grossman, P. (1991). What are we talking about anyway? Subject-matter knowledge of secondary English teachers. *Advances in Research on Teaching*, 2, 245-264.

- Grossman, P., Wineburg, S., & Woolworth, S. (2000). *In pursuit of teacher community*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.
- Gusky, R.G. (2000). What is professional development? In *Evaluating professional development* (pp. 14-39). Thousand Oaks, CA: Corwin Press.
- Hutchins, E. & Klausen, T. (1996). Distributed cognition in an airline cockpit. In Y. Engeström and D. Middleton (Eds.) *Cognition and communication at work*. Cambridge University Press: New York, NY, 15-34.
- John, P. D. (2002). The teachers educator's experience: case studies of practical professional knowledge. *Teaching and Teacher Education, 18*, 323-341.
- Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press.
- Le Fevre, D. & Richardson, V. (2002). Staff development and the facilitator. *Teaching and Teacher Education, 18*(8), 483-500.
- Little, J. W. (1993). Teachers' professional development in a climate of education reform. *Educational Evaluation and Policy Analysis, 15*, 129-151.
- Little, J. W. (2002). Locating learning in teachers' communities of practice: Opening up problems of analysis in records of everyday work. *Teaching and Teacher Education, 18*(8), 917-946.
- McAdams, D. P. (1993). *The stories we live by: Personal myths and the making of self*. New York: Guilford Press.

- McLaughlin, M.W. & Mitra, D. (2001). Theory-based change and change-based theory: Going deeper, going broader. *Journal of Educational Change*, 1, 1-24.
- Miles M. B. & Huberman, A. M. (1994). *Qualitative data analysis*. 2<sup>nd</sup> edition. Thousand Oaks, CA: Sage Publications, Inc.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA.
- Pea, R.D. (1997). Practices of distributed intelligence and designs for education. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 47-87). Cambridge, England: Cambridge University Press.
- 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(1), 4-15.
- Raffel, S. (1999). Revisiting role theory: Roles and the problem of the self. *Sociological Research Online*, 4(2). Retrieved January 15, 2004, from <http://www.socresonline.org.uk/socresonline/4/2/raffle.html>
- Richardson, V. & Kile, R. S. (1999). Learning from videocases. In M.A. Lundeberg, B.B. Levin & H.L. Harrington (Eds.) *Who learned what from cases and how? The research base for teaching and learning with cases* (pp. 121-136). NJ: Erlbaum.
- Rodgers, C.R. (2002) Seeing student learning: Teacher change and the role of reflection. [Electronic version]. *Harvard Educational Review*, 72(2). 230-253. Retrieved August 8, 2003, from <http://www.edreview.org/harvard02/2002/su02/s02ordg.htm>.
- Sacks, H., Schegloff, E. A., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking in conversation. *Language*, 50, 696-735.

- Schifter, D. (1998). Learning mathematics for teaching: From a teachers' seminar to the classroom. *Journal of Mathematics Teacher Education*, 1(1), 55-87.
- Schoenfeld, A. H., Smith, J. P., & Arcavi, A. (1993). Learning: The microgenetic analysis of one student's evolving understanding of a complex subject matter domain. In R. Glaser (Ed.), *Advances in instructional psychology* (pp. 55-175). Hillsdale, NJ: Erlbaum.
- Sherin, M.G. (2000). Viewing teaching on videotape. *Educational Leadership*, 57(8), 36-38.
- Sherin, M. G., Drake, C., & Wrobbel, R. M. (2004). *Teacher identity: An examination of teachers' views of themselves as mathematics teachers and learners*. Manuscript submitted for publication.
- Sherin, M.G. & Han, S. (2004). Teacher learning in the context of a video club. *Teaching and Teacher Education*, 20: 163-183.
- Smith, M.S. (2001). Practice-based professional development for teachers of mathematics. *Mathematics teaching in the middle school*, 7(8), 474-475. Reston, VA: National Council of Teachers of Mathematics.
- Strauss, A. & Corbin, J. (1998). *Basics of Qualitative Research, Techniques and Procedures for Developing Grounded Theory*. (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Thompson, A.G. (1984). The relationship of teachers' conceptions of mathematics and mathematics teaching to instructional practice. *Educational Studies in Mathematics*, 15, 105-127.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. New York, N.Y.: Cambridge University Press.

Wilson, S. M. & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: an examination of research on contemporary professional development. In A. Iran-Nejad & P.D. Pearson (Eds.), *Review of Research in Education: Vol. 24* (pp. 173-209). Washington, DC: American Educational Research Association.

Zimmerman, D. (1970). The practicalities of rule use. In J. Douglas (Ed.) *Understanding everyday life: Toward the reconstruction of sociological knowledge*. Chicago: Aldine PreThss. pp. 221-238.

## ACKNOWLEDGEMENTS

The research reported in this paper was supported by the National Science Foundation under Grant REC-0133900. The opinions expressed are those of the author and do not necessarily reflect the views of the supporting agency. I would like to thank Miriam Gamoran Sherin, Allan Collins, and Louis Gomez for their comments and suggestions.