

THE EFFECTS OF PARTICIPATING IN A VIDEO CLUB ON NOVICE TEACHERS'  
DEVELOPMENT

by

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A Dissertation  
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## **DEDICATION**

This is dedicated to my husband, Mark Repass, and Todd and Mary Repass, my in-laws. They have all loved, supported, and encouraged me for the last 22 years.

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## **ABSTRACT**

### **THE EFFECTS OF PARTICIPATING IN A VIDEO CLUB ON NOVICE TEACHERS' DEVELOPMENT**

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The purpose of this study was to investigate how participating in a video club affected novice teachers' development. The participants were five first-year elementary teachers, four females and one male, working in the same school system on the east coast. These teachers completed a pre- and post-analysis of a videotaped math lesson; allowed the researcher to videotape math lessons in their classrooms; participated in video club meetings; and completed an exit interview. Transcripts from the meetings and the exit interviews were analyzed and findings for each participant were reported. A cross-case analysis was also conducted to identify similarities and differences across the individual cases. Major findings from the study indicate that these teachers developed in several significant ways including: recognizing aspects of their teaching they could change; realizing the value of videotaping themselves and reflecting on their teaching; and recognizing that they could learn from and help each other. However, the findings also

indicated that novices need time to be novices. The study was not as effective at trying to accelerate their development in areas such as noticing and interpreting student thinking. The results of the study suggest that future research on novice teachers and video clubs needs to include more participants, focus on other curriculum areas, and last longer than one semester.

**Key words:** novice teachers, elementary teachers, teacher development, video clubs, videotaped math lessons

## **CHAPTER ONE: INTRODUCTION**

“Pedagogical knowledge is not seen as sophisticated knowledge because it overlaps with knowledge of childcare, is possessed mostly by women, held by members whose social-class standing is not high, and it is a form of knowledge thought to resemble common sense so closely that anyone can acquire it rapidly” (Berliner, 1991, p. 146).

Berliner’s words capture the essence of the dilemma the teaching profession faces as novice teachers begin their careers. Teaching is a complex occupation that requires time and experience to do well. Unfortunately, in the current climate of high standards and teacher accountability, time is not a luxury novice teachers are given. In most schools novice teachers are expected to perform at the same level as their more experienced colleagues from their first moments in the classroom (Kardos & Johnson, 2007). First-year teachers are supposed to be able to notice and interpret students’ thinking in order to make sound instructional decisions. These are skills that experienced teachers have worked years to develop (Berliner, 2004). Since beginning teachers are not given the time they need to build these abilities, alternatives need to be found that may shorten the length of time it takes to progress from novice to expert.

### **Statement of the problem**

This study was built on the premise that teachers enter the classroom as novices and need authentic classroom experiences to move toward expertise. One aspect of expertise that was particularly relevant to this study was the ability to notice and also

interpret relevant classroom events, which is an element of professional vision. Deborah Ball clearly defined what noticing entails:

Teachers...must notice a plethora of things in order to be successful. They must notice what a young person is thinking, and they must notice what is important about it. They must notice that a particular task interests a pupil and that a certain book fascinates him. They must notice when students are engaged, and when they are understanding. They must notice what makes an idea difficult and what a child already knows that offers a bridge to that difficult idea. And they must notice all of this, and more, in a fast-moving and complex environment overflowing with inputs (Ball, 2011, p. xx).

One way previous research has attempted to develop teachers' professional vision is through participation in video clubs, where teachers meet to discuss excerpts of classroom videos (Sherin & Han, 2004). This study employed a video club design, exclusively for first-year elementary teachers, in an attempt to develop their professional vision and move them toward expertise.

**Teaching expertise.** Berliner (1988) identified five stages on a novice-expert continuum that teachers may progress through during their careers. At the lowest stage are novices, who are learning how to teach. Berliner posits that teachers then move to becoming advanced beginners, who are building their content and pedagogical knowledge. Teachers at the third stage are competent and are distinguished by their ability to make conscious decisions about their teaching. Berliner labeled the teachers in the fourth stage as being proficient based on their reliance on professional intuition to make instructional decisions. Teachers in the last stage are considered experts, who appear to manage the complexity of teaching with little effort. Berliner (1994) also suggested key skills that expert teachers possess, including the ability to notice and interpret classroom events at a rather sophisticated level.



Some studies on teaching expertise have compared how novice and expert teachers differ in areas such as decision making and problem solving abilities (Swanson, O'Connor, & Cooney, 1990; Westerman, 1991). The results indicated that novice teachers tended to focus on surface details and solving management and organizational problems. Expert teachers looked for patterns in student behavior and used these to make decisions. Experts also differed from novices because they tended to use "if-then" reasoning in their attempts to problem solve.

Other studies have focused on the differences in how novices and experts use schemata and improvise as they teach. Peterson and Comeaux (1987) found that novice and expert teachers were able to recall classroom events with equal accuracy. But their findings also indicated that experts were able to use their well-developed schemata about teaching realities and students' thinking to analyze classroom events in greater depth. Results from two related studies (Borko & Livingston, 1989; Sato, Akita, & Iwakawa, 1993) indicated that experts' schemata helped them improvise and engage in impromptu thinking in the classroom.

When guiding classroom discussions, it is important to be able to think on one's feet. A few studies have investigated the differences in the types of dialogue that occur in novice and expert teachers' classrooms. Findings from one study indicated that expert teachers are more flexible in their thinking and are better able to engage the class in a variety of types of discussions (O'Connor, Fish, & Yasik, 2004). Another study suggested that expert teachers were able to engage their students in higher level thinking

based on their knowledge of content, strategies and their students (Qiong & Yujing, 2009).

Other research has focused on what teachers consider as they plan for instruction (Carter, Sabers, Cushing, Pinnegar, & Berliner, 1987; Clarridge, 1988; Leinhardt, 1989). The findings indicated that novice teachers lacked the content and pedagogical knowledge they needed to plan structured, engaging lessons. Carter et al.'s findings suggested that novice teachers focus on individual students while experts view the class as a whole and recognize the importance of establishing routines.

Two final aspects of teaching expertise that relate directly to this study are interpreting classroom events and reflecting on them. The findings from several studies indicated that due to a lack of experience, novices were literal in their interpretations of classroom events. Experts, who had a greater understanding of teaching, were able to make inferences and generalizations (Carter, Cushing, Sabers, Stein, & Berliner, 1988; Gonzales & Carter, 1996; Krull, Oras, & Sisask, 2007). A few studies (Copeland, Birmingham, DeMeulle, D'Emidio-Caston, & Natal, 1994; Fogerty, Wang, & Creek, 1983) considered how expert and novice teachers reflected on classroom events. The results from their studies indicated that as a result of more classroom experience, experts outperformed novices at seeing complex connections between (a) student and teacher actions; and (b) content and pedagogy.

Researchers have studied teaching expertise for over 30 years. The existing research paints a picture of expert teachers who make instructional decisions based on what they see in the classroom. The research indicates that expertise is developed over

time in the classroom and that it requires teachers to reflect on their teaching and work to improve it. Perhaps most importantly, expert teachers have the ability to notice significant classroom events and reflect on them, both of which are aspects of professional vision.

**Professional vision.** Goodwin (1994) recognized that people in different professions learned to pay attention to what was important in their fields of expertise. He claimed that “professional vision” took time and experience to develop and that two of its key components were noticing and interpreting phenomena. Mason (2002) applied Goodwin’s idea to the field of education, and labeled it teacher noticing. Mason posited that teachers have to be selective in what they choose to notice because of the high number of stimuli in classrooms. He believed that the value of what teachers notice was increased when they had the opportunity to discuss events with others who had shared the same experience.

The professional vision of both pre-service teachers (Conway & Clark, 2003; Edwards & Protheroe, 2003) and experienced teachers (Lefstein & Snell, 2011; Ross & Gibson, 2010; Sherin, Russ, Sherin, & Colestock, 2008) has been explored. The work with pre-service teachers indicated that although they were able to notice some things about their classrooms, they needed guided practice in order to notice and incorporate their students’ thinking into their instruction. The studies with experienced teachers indicated that they were able to make elaborate comments based on noticing pivotal events, student discourse, and level of student engagement. Their focus also tended to be on student/teacher interactions rather than on the teachers’ actions.

A second aspect of professional vision that has been investigated is how a teacher's ability to notice might be improved. These studies indicated that interventions that helped teachers reflect on their teaching also improved their ability to notice. Some of the strategies that were employed were diary entries (Mellone, 2011), written reflections of videotaped lessons (Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; Star & Strickland, 2008), and providing scaffolds for teachers to use when viewing videos (Brunvand & Fishman, 2006, van Es & Sherin, 2002).

A final intervention to improve professional vision that is particularly important for this study is a video club (Sherin & van Es, 2009; van Es & Sherin, 2002). Their findings indicated that participating in a video club helped teachers shift from: (a) focusing on the teacher to focusing on students and their thinking; (b) describing to interpreting classroom events; and (c) making general comments to making evidence based comments.

Professional vision is an ability that research indicates develops over time. It is not a skill that simply builds as a result of more classroom experience. It is something that teachers need to be supported in developing. This support may be in the form of reflective conversations with colleagues, completing written reflections, or through the use of video.

**Video in education.** One way for educators to experience a common event is by watching a video-recording. Numerous studies over the last 50 years have used video in some way. Classroom videos have been used to demonstrate exemplary lessons, to teach specific skills, and to help teachers reflect on their practice (Sherin, 2004). Researchers

believe that video is beneficial in teacher education because it: (a) depicts the complexity of the classroom and allows for situated learning (Brophy, 2004); (b) allows teachers to share a common experience and discuss it (LeFevre, 2004); and (c) provides a permanent record of what occurred in a classroom and can be viewed multiple times (Sherin, 2004).

Many studies have been conducted on the use of videos with pre-service teachers; some used video-cases (Beck, King, & Marshall, 2002; Copeland and Decker, 1996) and some used videos as prompts to analyze and reflect on classroom events (Harford, MacRuairc & McCarter, 2010; Santagata & Angelici, 2010; Santagata, Zannoni, & Stigler, 2007; Towers, 2007; Welsch & Devlin, 2007). Findings from the video-case studies indicate that creating a case and discussing it in a group setting helped pre-service teachers make meaning from them. The studies that used classroom videos as prompts suggested that video slowed down the teaching process and, with proper guidance, allowed pre-service teachers time to reflect more deeply on classroom events.

Research has also focused on different aspects of using video with experienced teachers. Some of these studies used video in professional development sessions. The findings from these studies indicated that while published videos, videos of peers, and videos of themselves were all valuable, it was more productive for teachers to begin by viewing videos from their own classrooms (Seidel, Sturmer, Blomberg, Kobarg, & Schwindt, 2011; Zhang, Lundeberg, Koehler, & Eberhardt, 2011). Findings from other studies suggested that video helped teachers understand student work by providing a scaffold and a forum for group discussion whether it occurred in person (Santagata, 2009) or online (Baecher & Kung, 2011; Kersting, Givvin, Sotelo, & Stigler, 2010).

Other studies have considered how videos might be used with experienced teachers to improve their teaching. DeCuir-Gunby, Marshall, and McCulloch (2012) explored its use to develop teacher reflection. Their findings indicated that classroom videos could be used to guide teachers to be more reflective about their lessons and see connections in their classrooms. Borko, Jacobs, Eiteljorg, and Pittman's (2008) findings indicated that teachers who used video were able to talk in greater depth about their students' thinking. Two studies considered how using video might lead to teacher change (Czaplicki, 2012; Tripp, 2010). Findings from both studies indicated that teachers were willing to change when presented with concrete evidence of their teaching, whether they watched the videos individually or in a group.

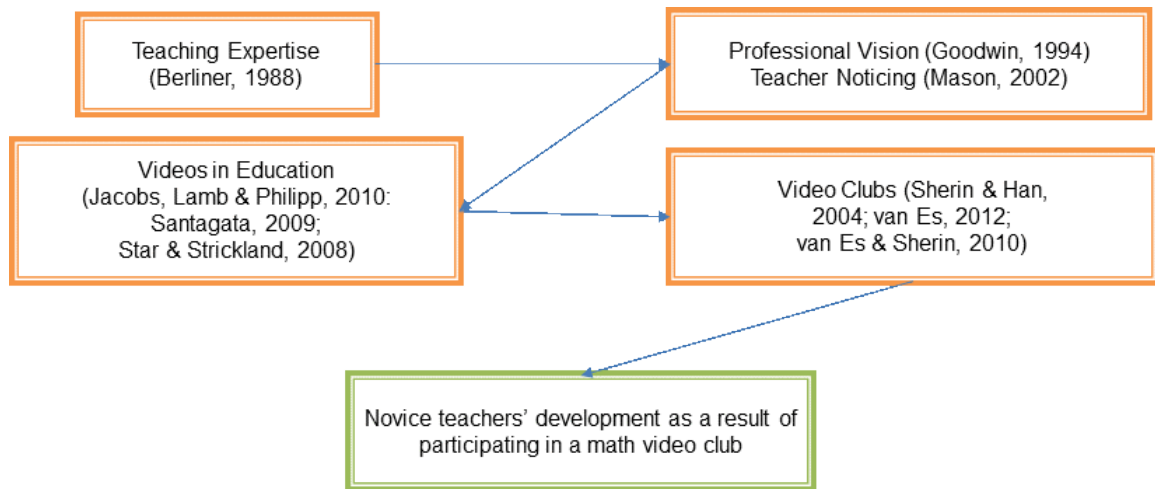
Video clubs have been used in different contexts to explore changes in teachers' ability to notice classroom events. A recent study investigated the effects of a science video club on teachers' ability to notice and interpret students' actions and thinking (Braaten, 2011). The findings from this study indicated that participating in a video club helped teachers see their teaching from a different perspective, and discuss their teaching with others. Two studies (Sherin, 2003; Sherin, Linsenmeier, & van Es, 2009) explored whether productive conversations occurred in video clubs. Findings from both studies suggested that it takes time to establish an environment where these conversations can happen and that the video clips need to be selected carefully.

The work of Miriam Sherin and her colleagues on teacher noticing in the context of math video clubs relates directly to this study (Sherin & Han, 2004; van Es, 2012; 2009; van Es & Sherin, 2010). These studies, some using the same participants, explored

changes in math teachers' professional vision over the course of the video club meetings. Their research suggested that the teachers typically moved from a focus on themselves and pedagogy to a focus on the students and how they thought about the math concepts. The teachers also moved from a descriptive stance to an interpretive stance that allowed them to make inferences about how their students understood the math and how they might change their instruction to meet the needs of their students.

Videos have been used in different ways to study teachers and teaching. Findings from the extant research indicate that using video can help both pre-service and experienced teachers develop their ability to: (a) analyze classroom events; (b) reflect on their teaching; and (c) adapt their instruction to the needs of their students.

**Summary.** Teaching is a complex profession, one where novices are expected to move toward expertise rapidly. To be considered an expert, they need to understand the content they teach, the strategies for teaching that content, and be able to listen to and interpret their students' thinking. Using classroom videos, particularly in the context of a video club, is one strategy that research has indicated moves novice teachers forward on the continuum toward expertise. Figure 1 shows how previous research informed this study, beginning with studies about teaching expertise. One aspect of expertise is professional vision, specifically teacher noticing. Video is one strategy that has been used to improve teacher noticing. Recently, video clubs have been used to assist teachers with building their ability to notice student thinking. This study intends to extend the existing knowledge base by exploring how participating in a video club affects novice elementary teachers' development.



*Figure 1.* Representation of how previous research informed this study

## Research Questions

When I began this study, I intended to focus exclusively on how participating in a video club affected novice teachers' ability to notice student thinking during math instruction. In reviewing the existing research, I found that it addressed the issues of teaching expertise, professional vision, and the role of video in studying teachers and teaching practices. However, none of the extant research addressed using video, specifically video clubs, in the context of professional development exclusively for first-year elementary teachers. Therefore, based upon the current knowledge of the needs of novice teachers and the possible benefits of using videos to move teachers along the continuum towards expertise, I proposed the following research questions:

1. What do these novice math teachers notice in relation to student thinking when they watch videos of classroom teaching, and how do they interpret what they notice?



2. How does their ability to notice and interpret student thinking change as a result of participating in a video club, and why?

However, as I began to collect and analyze my data, I realized that these first-year teachers were not yet able to concentrate on only one facet of the video clips. In addition to noticing student thinking, they were developing in other ways. Some of the data were answering my original questions, but I also had data that were telling me how these teachers were experiencing the video club and what they were learning from it. In an attempt to better capture what my participants were gaining from their participation in the video club, I used Maxwell's (2012) lens to reconsider my research questions. He wrote "the development of your research questions should be an iterative, ongoing process, not a one-shot 'step' in designing your study" (Maxwell, 2012, p. 88). With this in mind I adjusted my research questions. The revised question that guided my interpretation of the data was:

How did participating in a video club affect these novice teachers' development?  
Specifically:

- a. What did these novice teachers notice in video clips of math lessons and how did they interpret what they notice?
- b. What did these novice teachers learn from participating in the video club?
- c. What insights did these novice teachers gain from participating in the video club?

## **Significance of Study**

This study is significant because of the current atmosphere of teacher accountability and high standards for all teachers, even those just entering the profession. The No Child Left Behind Act of 2001 (NCLB) and the revised standards set forth by the National Council of Teachers of Mathematics (NCTM, 2014) have added to the pressures placed on teachers. The federal government outlined its beliefs about what schools should look like and what skills teachers should have in NCLB. The policy specified that schools would have high standards for every student. It also stated that every classroom would be taught by a highly qualified teacher who would be accountable for teaching a diverse group of students. In order to achieve these aims, teacher must have professional vision- they need to be able to know what their students are thinking, make sense of it, and adjust their instruction accordingly.

Beginning in 1989, the National Council of Teachers of Mathematics (NCTM, 2014) outlined the changes they believed were necessary to improve mathematics instruction. The standards specified by NCTM directed teachers to help students think more deeply about the big concepts in math. Teachers are expected to: (a) listen closely to student ideas; (b) attempt to understand their thinking (and ask questions if they needed clarification); and (c) base their future instruction on their students' understandings/misunderstandings of the math content.

In order for teachers, particularly novice teachers, to achieve the standards set forth by NCLB and the NCTM, they need guidance in developing their professional vision so that they are able to notice and interpret their student thinking. Past research has

indicated that these are not skills that develop naturally. Findings suggest that even experienced teachers need guidance and support in order to become better at noticing, interpreting and reacting to their students' thinking. This makes it even more important that ways to help beginning teachers develop these skills be explored.

Additionally, this study is significant because it used videotapes from the participants' classrooms to prompt conversations in the video club. This allowed these beginning teachers to see themselves and their colleagues teaching. This is important based on the existing research that indicates that teachers who are able to see themselves teach are more likely to reflect on their actions and adapt their instruction (Copeland & Decker, 1996; Tripp, 2010; Zhang, Lundeborg, Koehler, & Eberhardt, 2011). The teachers in the video club were able to view examples of their own teaching, discuss it with the other participants and reflect on both their actions and their students' thinking. This led them to make changes to their instructional strategies.

Finally, this study is significant because it may lead to changes in professional development that might help retain novice teachers. Some research indicates that nearly 50% of new teachers leave the classroom before their fifth year (Smith & Ingersoll, 2004). Although there are many things that a novice teacher should focus on, building an ability to notice and interpret student thinking is one area that separates novices from experts. If professional development programs are established that help novice teachers develop this skill, it may facilitate their growth and lead to better retention rates. Since previous research has not focused attention specifically on how novice teachers develop

in the context of a video club, this study intends to build upon and extend the existing research.

### **Definition of terms**

*A novice teacher* is a certified teacher completing his or her first year of full-time teaching responsibility in a classroom.

*Professional vision* is Goodwin's (1994) term for "...socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group." (p. 606).

*Professional vision in teaching* is defined by Sherin and van Es (2009) as, "...the ability to notice and interpret significant features of classroom interactions (p. 22).

*Teacher noticing* is Mason's (2002) term for how a teacher sees and interprets the classroom.

*A video club* is a group of teachers who meet to view and discuss video clips from their classrooms (Sherin & Han, 2004)

## **CHAPTER TWO: REVIEW OF THE LITERATURE**

The purpose of this study was to investigate how participating in a video club affected novice elementary teachers' development. Specifically, this study examined: (a) what these novice teachers noticed in video clips of math lessons and how they interpreted what they noticed; (b) what these novice teachers learned from participating in the video club; and (c) what insights these novice teachers gained from participating in the video club.

There is a general societal expectation that novice teachers perform like experts from the moment they enter their classrooms. Some of these beginning teachers have completed yearlong internships, some have spent a semester student teaching, and some have very little experience leading a class (Kardos & Johnson, 2007). Despite this lack of experience, they are expected to notice classroom interactions, spontaneously reflect on what is happening, and make instructional decisions. Research on teaching expertise indicates that it takes years of hands on experience in the classroom to build these skills (Berliner, 1988). In today's schools, where expectations for all teachers are high, a way to help first-year teachers move toward expertise more efficiently is needed. Establishing and facilitating video clubs in which these teachers can participate may be one way to accelerate beginning teachers' development.

Berliner (1988) posited the idea of a teaching continuum, where teachers move through five stages of development: novice, advanced beginner, competent, proficient, and expert. Two related areas that he believed were important indicators of teaching expertise were determining which events were worthy of attention and interpreting them to guide changes in instruction. Expertise is believed to develop after thousands of hours of teaching experience, somewhere between the fifth and seventh year in the classroom (Berliner, 2004; Feiman-Nemser, 2001). Previous studies have asked teachers at different points in their careers to view and discuss slides and videos of classroom instruction in attempts to assess their level of teaching expertise (Carter, Sabers, Cushing, Stein, & Berliner, 1988; Peterson & Comeaux, 1987). The findings indicated that more classroom experiences lead to an increase in teachers' ability to notice and react to classroom events, two components of teacher noticing (Mason, 2002). One way to provide teachers with more experience is through the use of video clubs.

Videos have been used for a variety of instructional purposes in teacher education programs over the years. Sherin (2004) traced the progression of video use from microteaching in the 1960s, to sharing best practices in the 1980s, to reflecting on teaching practices in the 2000s. Recently, researchers (Seidel, Sturmer, Blomberg, Kobarg, & Schwindt, 2011) have investigated the idea of using videos with both pre-service and in-service teachers to improve their ability to notice interactions in their classrooms and patterns in their students' thinking. Many of these studies involve individual teachers viewing and analyzing videos of classroom instruction, while a few of them describe the formation and use of video clubs to develop the teachers' abilities to

see the classroom (Sherin & Han, 2004; van Es & Sherin, 2010). This ability may take years to develop, as teachers develop from novices into experts.

As this brief overview shows, videos have had a place in teacher education for over 50 years, but we do not know much about how they might be used to help novices move along the teaching continuum toward expertise. This study will examine three areas of existing literature in an attempt to better understand this phenomenon: (a) teaching expertise; (b) professional vision; and (c) the use of video in teacher education.

### **A. Teaching Expertise**

The field of education has attempted to define what it means to be an “expert teacher” for years. Some researchers have explored this issue by observing experienced teachers and attempting to identify what characteristics make them experts. Another approach, taken by many in the field, has been to compare novice and expert teachers in an effort to discover differences in their planning for teaching, their actual teaching, and their reflections after teaching.

**Theoretical foundation.** Berliner conducted many studies on teaching expertise (Berliner, 1986, 1988, 1994, 2001, 2004). In a 1988 article, he suggested that teaching abilities develop along a continuum. Although not an empirical study, he provided a lens through which to view the differences in teachers’ abilities. Berliner suggested that there are five stages that teachers progress through and outlined the characteristics of each: (a) novice teachers learn the basics of how to teach; (b) advanced beginners build their strategic knowledge; (c) competent teachers set priorities and make conscious decisions; (d) proficient teachers use intuition in their daily decisions and behaviors; and (e) expert

teachers manage to do all these things with apparently little effort. In later work, Berliner (1994) identified key qualities he believed expert teachers possess including the ability to: develop automaticity, recognize patterns quickly and accurately, pay attention to the unusual, evaluate a situation, and reflect on a teaching experience. Perhaps most importantly, Berliner stressed the importance of experts having extensive context specific knowledge about their teaching situation.

Sternberg and Horvath (1995) added to Berliner's definition when they identified three additional components of teaching expertise. One of the elements they considered crucial was the creation of context-specific domain knowledge, which encompasses content knowledge and pedagogical knowledge that is carefully organized into useful scripts, structures, and schemata. A second factor in their definition of expertise is having greater insight into problem solving, pattern recognition, and pedagogical reasoning. Efficiency was the third aspect of expertise they considered important. Expert teachers have established routines that allow them to complete some classroom tasks, such as taking attendance and distributing papers, with an automaticity that allows them to reduce their cognitive load and concentrate on other aspects of the classroom.

Other researchers have expanded on these ideas of building expertise and studied the role of both cognitive load and deliberate practice (Dunn & Shriner, 1999; Feldon, 2007; Kirschner, 2002; Leinhardt & Greeno, 1986). Kirschner's cognitive load theory suggests that people can only hold so much in their working memory and that the more that can be automated and made routine, the more cognitive space will be freed up for more difficult tasks. One way this phenomenon manifests itself in teaching is with



beginning teachers. These novices use so much of their mental energy learning to teach, that there is little time left to recognize patterns or for deep reflection (Calderhead, 1989).

Feldon (2007) further developed this idea when he claimed that novice teachers are faced with cognitive overload as they attempt to make sense of sometimes overwhelming classroom environments. He identified two aspects of cognitive load that are particularly relevant for both experienced and novice teachers: intrinsic cognitive load—the content knowledge to be taught that is held in working memory; and extraneous cognitive load—common distractions such as someone walking into the room or the intercom buzzing. Feldon suggested that when teachers devote attention to extraneous items, they have less working memory available for thinking about and reflecting on instruction. He believed that beginning teachers could move toward expertise more quickly if they had the skills necessary to properly allocate their cognitive resources.

Leinhardt and Greeno (1986) conducted a study based on these ideas, by investigating how cognitive load affected teaching expertise. Eight expert teachers and four student teachers were observed multiple times over a three month period. Some of the observations were videotaped and the teachers were interviewed after the taping using simulated recall. The videotapes and the interviews were transcribed and coded. The findings indicated that teaching is a complex skill and that teachers have to deal with a large amount of information at one time. They also seemed to suggest that teachers' expert knowledge was closely tied to the teaching context in which they worked. The researchers concluded that the more routines teachers could establish, the more

information they would be able to keep on their “cognitive blackboard.” Their study led to the identification of two important features of an expert teacher’s classroom: automated routines and a consistent plan for instruction.

Dunn and Shriner (1999) considered the role of deliberate practice in the building of automaticity. They believed that expertise in any field, including teaching, was the result of effort on the part of practitioners to improve their practice. They reported the results of two separate but related studies that attempted to identify what teachers need to practice to build their expertise. In the first study, 136 elementary school teachers completed a questionnaire with questions about how they spent their time and what types of activities were most relevant to improving their teaching. Means were calculated for each question and the results seemed to indicate that teachers believed that preparing materials, mental planning, and evaluation were the most important skills to practice. In the second study, eight elementary school teachers were asked to complete activity logs and participate in interviews about teaching. The results seemed to show that teachers multitasked and that they spent a great deal of time, both during and outside of school hours, mentally planning for instruction. The researchers concluded that teachers who consciously think about their teaching and continually try to improve are the ones who reach expert status. Novice teachers have not had the opportunity to completely develop their skills yet and thus differ from experts in many ways.

**Comparing expert and novice teachers.** Studies that compare novice and expert teachers have examined many aspects of teaching including: teachers’ decision making and problem solving abilities (Swanson, O’Connor, & Cooney, 1990; Westerman, 1991),

teachers' use of schemata (Peterson & Comeaux, 1987), teachers' ability to use pedagogical reasoning and improvisation in their decision making (Borko & Livingston, 1989; Sato, Akita, & Iwakawa, 1993), the types of dialogue that occurs in their classrooms (O'Connor, Fish, & Yasik, 2004; Qiong & Yujing, 2009), and what teachers consider important when planning for instruction (Carter, Sabers, Cushing, Pinnegar, & Berliner, 1987; Clarridge, 1988; Leinhardt, 1989). Two key components of teaching expertise that have also been studied are how teachers interpret a classroom situation (Carter, Cushing, Sabers, Stein, & Berliner, 1988; Gonzales & Carter, 1996; Krull, Oras, & Sisask, 2007), and how teachers reflect on their own teaching (Copeland, Birmingham, DeMeulle, D'Emidio-Caston, & Natal, 1994; Fogerty, Wang, & Creek, 1983).

***Decision making and problem solving.*** The differences between novice and expert teachers' decision making abilities were explored in a study conducted at a public elementary school in northern Virginia (Westerman, 1991). The participants, five student teachers and their five cooperating teachers, were interviewed prior to teaching a lesson in an attempt to capture their decision making processes. Then the lesson was videotaped and the tape was used during a stimulated recall interview immediately after the lesson. Teachers also watched the video, without the sound, several months after the initial interviews and completed a self-report. The videotapes and interviews were transcribed and the researcher used constant comparative analysis to look for patterns of similarities and differences between the experts and novices. The findings seemed to indicate that expert teachers are more likely than novices to think about learning from the students' perspective during their planning, their teaching, and when they reflect.

Swanson, O'Connor, and Cooney (1990) evaluated the difference between expert and novice teachers' ability to problem solve. They hypothesized that novice teachers would focus on the literal aspects of a situation when solving a problem and expert teachers would make inferences based on the available information and prior knowledge. Forty-eight teachers participated in the study, 24 novice pre-service teachers and 24 expert mentor teachers. The participants were told the study was about teacher decision making and were given six vignettes about possible problems they might encounter while teaching such as: disruptive and argumentative students; and a lack of student motivation and attention. Each participant was asked to think aloud about how they would handle the situation. Their responses were recorded and coded. The findings indicated that novice teachers focused on surface details and were primarily concerned with problem solutions. The expert teachers looked for patterns of behavior and engaged in "if-then" reasoning in an attempt to find a solution. The researchers concluded that the ability to recognize patterns and use them to solve problems is one of the distinguishing characteristics of expert teachers.

***Use of schemata and improvisation.*** In their study, Peterson and Comeaux (1987) investigated how the novice teachers' and expert teachers' schemata differed in relation to recalling and analyzing classroom events that were presented on a videotape. Ten experienced high school teachers and ten student teachers, all working in a midwestern state, participated in the study. Prior to viewing the videos, the participants completed three ability tests-one which tested numeracy skills, one that tested vocabulary, and one that tested verbal skills. There were no significant differences in the content area tests,

but expert teachers scored significantly higher on verbal skills. Each participant then watched one video at a time, followed by a one-on-one interview about the interactions she saw in the classroom. The interviews were audio taped, transcribed, and coded. The findings indicated that the novice and experienced teachers did not differ much in their abilities to recall classroom events, but that the experts were better able to analyze the classroom learning with a greater knowledge base than the novices. The researchers concluded that experienced teachers have better developed schemata about classroom interactions and student thinking than novice teachers. These schemata help teachers improvise during instruction.

Borko and Livingston (1989) conducted a study to investigate how novice and expert teachers differed in their thoughts and actions while teaching. Four student teachers (novices), who were enrolled in a master's certification program in math education, and their cooperating teachers (experts) participated in the study. The data for the novices were collected during March and April, as they were finishing their student teaching. The data for the cooperating teachers were collected during May and June. The data for the study included pre- and post-observation interviews and observations of a math lesson. The interviews were transcribed and recorded. The findings indicated that although there were some similarities between the expert and the novices, such as being flexible in their planning, preparing mental plans, and taking advantage of non-teaching time to prepare, there were marked differences. The most dramatic difference between expert and novice teachers was in their ability to improvise, particularly when students asked unexpected questions. Borko and Livingston concluded that the expert teachers had

greater pedagogical knowledge, which allowed them to improvise when necessary, and that the novice teachers lacked this complex knowledge which affected their ability to improvise.

In a related study, novice and expert teachers' impromptu thinking was analyzed by examining their practical thinking styles (Sato, Akita, & Iwakawa, 1993), which consisted of three elements of teaching behavior: (a) making meaning from a lesson; (b) problem solving during a lesson; and (c) reflecting on the lesson. Five expert elementary school teachers who served as lead teachers and five randomly selected first year teachers were the participants in the study. Videos and instruction manuals were sent to the participants and they were asked to complete a think-aloud task and a written report task. The researchers audio taped and transcribed the think-aloud task. Both tasks were coded based on what the teachers said and how they talked. The findings indicated that expert teachers excelled in impromptu thinking, used multiple viewpoints, were accurate problem solvers, and used professional wisdom in their discussions of the videos.

***Classroom dialogue.*** Another aspect of teaching expertise that has been explored is the type of discussions that occur in teachers' classrooms. O'Connor, Fish, and Yasik (2004) used the Classroom Systems Observation Scale (CSOS) to study three aspects of classroom interactions: communication, flexibility, and cohesion. The researchers observed and recorded the frequency of behaviors (over a 50 minute period) in the classrooms of 35 expert teachers and 35 novice teachers from nine private and eight public elementary schools in an urban area of New York. Three t-tests were conducted with the data. The first found a significantly higher mean CSOS communication score (p

< .05) in expert teachers' classrooms. A second t-test found that expert teachers were significantly more flexible ( $p < .01$ ) than novices. The t-test for cohesion was not statistically significant ( $p = .22$ ). The results indicated that expert teachers are more flexible in their teaching than novices, and that more varied types of communication occurs in expert teachers' classrooms.

Qiong and Yujing (2009) compared expert and novice teachers in 15 elementary schools in China. They observed and recorded 55 math lessons in the classrooms of 16 expert teachers and 16 novice teachers. The videos were transcribed and the researchers used a three category framework to categorize the discussions: (a) teachers' response to student reasoning; (b) the source of authority in the classroom; and (c) the type of questions the teachers asked. After the tapes were coded, a series of t-tests were run. The first test found a statistically significant difference ( $p < 0.000$ ) between the level of authority in classroom dialogue in expert and novice classrooms. The difference in the types of questions these teachers ask (simple recall, explanation, and analyzing) were also statistically significant ( $p < 0.000$ ). There was no statistically difference in how the two groups reacted to student responses ( $p < 0.000$ ). The results indicated that experts asked more analytical questions and novices asked more simple recall questions. The researchers concluded that experts had more knowledge, which allowed them to think more deeply about their instruction and the questions they wanted to ask their students.

***Planning for and delivering instruction.*** Several studies have focused on what teachers pay attention to as they plan for and carry out instruction in their classrooms. A study conducted at the University of Pittsburgh investigated the differences between four

expert and two novice teachers' agendas, lessons, and explanations (Leinhardt, 1989). The participants were observed and videotaped over a three and a half month period, resulting in 25 hours of taped lessons. The teachers were each interviewed three times—once about their math content knowledge, and then before and after teaching each lesson. The videos and interviews were transcribed and divided into lesson segments. The amount of time spent on each lesson segment was calculated and the researcher created semantic net diagrams, which are visual representations of meanings and relationships between concepts. The results indicated that expert teachers have more detailed agendas, more structured lessons, and provide clearer explanations that helped students understand the math. Leinhardt concluded that experts' lessons are fast-paced, and highly organized with multiple representations of problems; and that novices' lessons are often fragmented, with long transitions, and unclear explanations.

Clarridge (1998) explored a similar topic with eight expert high school math teachers, five novices and five postulants (people who are experts in their field but do not have a background in education). The participants were given a half hour to plan a probability lesson and were then videotaped as they taught the lesson to a “class,” a staged room with students playing roles given by the researcher. The tapes were analyzed from four different perspectives: subject matter knowledge and delivery, connoisseurship and criticism, nonverbal communication, and teacher evaluation. The results indicated that: postulants were unable to plan a coherent lesson, deliver it clearly or engage the students; novices understood how to teach, but lacked content knowledge and struggled with management issues; and that experts presented engaging lesson, maintained interest,



and managed behaviors. Clarridge concluded that both content knowledge and pedagogical knowledge are important in the development of teaching expertise.

A study conducted by Carter, Sabers, Cushing, Pinnegar, and Berliner (1987) compared expert and novice teachers' ability to create a plan for taking over a math class. Three groups of high school math and science teachers were presented with the following scenario: *Five weeks into the school year, you are asked to take over a class. What do you do?* The teachers were provided with information about the students, the former teacher's plans and a textbook. They were given 40 minutes to plan for the first two days, and then were asked to recall general and specific information about the students and to make generalizations. The participants' answers, lesson plans, and any notes they took were collected and analyzed to determine what information each group considered important. The findings indicated that expert teachers looked at the class as a whole rather than focusing on individuals, and that they believed it was important to establish routines before they started teaching. The novice and postulant teachers noticed more about individual students and planned to begin teaching immediately. The researchers concluded that expertise results from a high level of specialized competence that is gained through reflection on classroom experiences.

***Interpreting classroom events.*** Slides depicting classroom instruction were used to evaluate teachers' expertise in a study conducted by Carter, Cushing, Sabers, Stein, and Berliner (1988). The participants were eight expert teachers, six novice teachers, and six aspiring teachers, each of whom completed four tasks. In the first task, the participants were shown a slide for a second and then asked to write down what they saw.

For the second task, participants were shown a different set of slides for three seconds each and asked to write about what they saw. This was repeated three times for each slide. The third task required the participants to view 50 slides arranged in order of events in the classroom. They were then asked to tell the researcher about the lesson based on evidence from the slides. In the final task, the participants were asked to view the same 50 slides, but were allowed to stop at any point to ask questions about the slide and discuss it with the researcher. The results of the study indicated that aspiring and novice teachers were literal in their descriptions, while expert teachers made more inferences about what they saw. Expert teachers were also better able to identify typical teaching situations than novices. The researchers concluded that experts were able to draw on their classroom experiences to analyze and make inferences about the slides. The experts were also able to focus on the important events in the classroom and ignore the incidentals that captured the novices and aspiring teachers' attention.

Gonzales and Carter (1996) explored the differences in how expert and novice teachers interpret classroom events in their study. Thirteen student teachers interning in elementary schools were paired with their cooperating teachers for the study. Data were collected through four interviews, conducted at four week intervals, with the student teachers and one interview with the cooperating teachers at the end of the placement. Participants were asked to identify teaching events that stood out to them and to explain how they understood these events. The results seemed to indicate that the cooperating teachers and student teachers identified the same events, but that their interpretations were different. The researchers concluded that expert teachers have a better

understanding of classroom events and are more able to situate them in a broader picture than the novices.

In a related study Krull, Oras, and Sisask (2007) investigated the differences in comments expert and novice teachers made when they viewed the same videotaped lessons. Five novice teachers and five expert teachers from Estonia were asked to watch a video and were told to comment on everything they thought and felt. After they viewed the lesson, they answered a series of questions. Both their comments and their answers were recorded and transcribed. The researchers used content analysis to organize the videotapes into lesson events and then coded them based on how both groups of teachers responded to each event. They then used constant comparative analysis in an attempt to identify differences between novices and experts. The findings indicated that experts are more aware of instructional events and various teaching strategies than novices. Krull et al. concluded that as teachers gain experience they hone their ability to interpret and reflect on classroom events.

***Teacher reflection.*** Research suggests that being able to reflect on teaching performance and to make changes is a defining characteristic of expert teachers. Fogerty, Wang, and Creek (1983) conducted a study that considered the differences between the reflections of three experienced teachers and five novice teachers at a university laboratory school. The participants were videotaped teaching small groups (between five and eight students), and were then interviewed using the tape for stimulated recall. The videos were coded using a two-step procedure: (a) points where teachers made decisions were identified and then coded based on the student cue; and (b) how the teacher changed

in response to the cue. The interviews were coded for the teachers' goals and their prior knowledge. The results indicated that experts had a greater variety of goals and more complex associations between student cues and teacher action than novices. The researchers concluded that experts depended on their prior knowledge to make sense of complex classroom situations.

A study by Copeland, Birmingham, DeMeulle, D'Emidio-Caston, and Natal (1994) focused on teachers' abilities to reflect on classroom interactions in order to make meaning from them. The 28 women who participated in the study were asked to view a video vignette and analyze it. The participants were divided into four groups: (a) seven neophytes, who were starting their education program; (b) seven apprentices, who were finishing student teaching; (c) seven masters, who possessed extensive experience in elementary education; and (d) seven laics, who were experts in their field but had no education experience. The participants completed four tasks for the researchers, each of which provided a different type of data. First, they viewed a four and a half minute video and took handwritten notes. Next, they participated in an interview that was taped and transcribed. Then, they sorted their own statements into categories. Finally, they created a story line description from the sorted statements, which was taped and transcribed. The researchers used constant comparative analysis to examine the data, looking for central themes and recurring ideas. The findings indicated that the teachers who had spent more time in the classroom seemed to be able to see how their actions affected the students and realize that pedagogy was as important as content. Copeland et al. concluded that more teaching experience is one factor that leads to increasingly complex linkages between

content and pedagogy and that experts are more skilled than novices in making practical generalizations.

**Summary.** Expertise in the field of teaching is becoming better understood as more studies are conducted. Although some people assume that more years of experience will result in a greater level of expertise, this is not always true. Sato, Akita, and Iwakawa (1993) succinctly addressed this misperception:

The concept of “expert” teacher is not only defined by the length of the teaching career or by the breadth of teaching skills. Teaching expertise should be regarded as a more complicated and more multifarious issue. If we respect teachers as thoughtful practitioners, we must define “expert” teachers in terms of their professional wisdom developed through long-term creative experiences.” (p. 102-103).

A common thread through the research on expert teachers is their ability to see the whole picture and make instructional decisions based on the needs of their students. The characteristics that these teachers possess are a result of not only years of experience in the classroom, but also of reflecting on that experience and constantly striving to improve. Expert teachers: are astute decision makers, are quick to recognize patterns, ask their students higher level questions, and use evidence from the classroom to make inferences. Perhaps most importantly, two areas in which expert teachers clearly outperform novices are: the ability to notice classroom events and the ability to reflect thoughtfully upon them, both of which are aspects of professional vision.

## **B. Professional Vision**

Teachers spend their days surrounded by the “blooming, buzzing confusion of sensory data” (James, 1890) of a classroom. These classes often have upwards of 20 students, each of whom needs the teacher to understand his thinking and help him

develop academically. In order to be effective, teachers must quickly learn which aspects of classroom life warrant attention and which can be ignored. They must learn to see the classroom and respond to each student's needs. They must develop what Charles Goodwin (1994) identified as *professional vision*.

**Theoretical Foundation.** Charles Goodwin's (1994) seminal work defined professional vision as, "...socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group" (p. 606). As Goodwin was an anthropologist, his article focused on professional vision in the fields of archaeology and law, however, the characteristics can be applied to education. He identified three practices that professionals constantly perform: (a) coding—noticing phenomena and aligning it with prior knowledge; (b) highlighting—marking important phenomena in some way; and (c) creating a material representation. He claimed that all situations are complex and that professional vision is a skill that must be learned over time through interactions with others in the same profession.

John Mason, a mathematics professor, built on Goodwin's idea of professional vision when he wrote about the *discipline of noticing* (2002). He agreed with Goodwin that situations are complex and that professionals need to be selective in what they notice. He used the term *marking* to explain how events are held in memory and reflected on later. Mason argued that an important aspect of noticing was to see what was occurring without interpreting or judging it. He thought a key factor in increasing the ability to notice was discussing an event with others who have shared the same experience, either by virtue of being there or by having seen it on video. Mason contended that, "experts

have an awareness that novices do not and becoming expert means... a certain extra ‘sense’ or awareness.” (p. 187).

**Professional Vision in the Classroom.** Recent studies have recognized the importance of exploring teachers’ professional vision, specifically what they notice and how they interpret classroom events. Some researchers have conducted studies to learn more about what both pre-service (Conway & Clark, 2003; Edwards & Protheroe, 2003), and experienced teachers notice (Ross & Gibson, 2010). Much of this research focuses specifically on what math teachers notice in their classrooms (Sherin, Russ, Sherin, & Colestock, 2008; Jacobs, Lamb, & Philipp, 2010). Research has also been done on how teachers adapt their instruction based on what they notice about the classroom and their students (Choppin, 2011). A final aspect of noticing that is particularly relevant for this study is how teachers’ ability to notice might be improved (Brunvand & Fishman, 2006; Mellone, 2011; Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; Sherin & van Es, 2009; Star & Strickland, 2008; van Es & Sherin, 2002; van Es & Sherin, 2008).

***What teachers notice.*** In their mixed methods study, Edwards and Protheroe (2003) investigated what student teachers learned to notice as they completed their student teaching assignments, also known as internships. The participants were 125 students enrolled in a master’s degree program at a British university. They completed an open-ended questionnaire at the beginning and end of their yearlong primary school internship. In addition to the questionnaire, the researchers chose six interns to observe twice—once during each of their student teaching placements. Twenty-four mentor teachers who worked with the student teachers were also interviewed twice. Responses to

the survey were compared to determine how the student teachers' perspectives had changed over the course of their internship. The interviews were transcribed. First a broad and then a fine-grained analysis were conducted to identify categories and meaningful themes. The findings indicated that with increased time in the classroom, the interns shifted from a focus on encouraging the students and involving parents to an emphasis on differentiation and using assessment to plan and respond to students. The researchers concluded that novice teachers need guided practice to develop their schemata and their ability to notice and interpret important events during instruction.

Conway and Clark (2003) studied what pre-service teachers noticed from a slightly different perspective. The participants in this study were six interns in a 30 week year-long program at a large university in the mid-west; three taught in suburban schools and three taught in urban schools. The interns participated in three individual interviews and focus group discussions, which were taped, transcribed and entered into NUD\*IST (a software program used to code qualitative data). The participants also wrote about their hopes and fears three different times during the study; these writings were subjected to content analysis. The researchers used an iterative process over the entire year to identify themes. The findings indicated that pre-service teachers initially focused on themselves, then moved to a focus on the task and situation, and finally to a focus on the student. The researchers concluded that pre-service teachers need time, guidance, and a supportive environment in order to move from an inward to an outward focus.

Ross and Gibson (2010) compared what experienced teachers and experts noticed during literacy instruction. The experienced teachers had worked in classrooms between



three and 25 years and the experts were university faculty with between 24 and 42 years of experience. The participants watched one of three videos: (a) a ninth grader learning a reader's theater script; (b) a second grader making words; or (c) a second grader participating in a paired reading activity. As they watched the video, the participants were asked to comment on whatever struck them as interesting. Their comments were captured on a digital recorder. The recordings were all transcribed. The experts' transcripts were coded first and their responses were used to develop six guiding questions that were used to evaluate the quality of the responses of all the participants. The results indicated that the university faculty provided elaborate comments, noticed pivotal events, interpreted and made hypotheses about student behavior, used evidence from what they saw to support their inferences, and were able to see the "big picture." The teachers, in contrast, tended to provide less detail, did not make many inferences and commented on isolated events rather than understanding the classroom as a whole. The researchers concluded that teachers need to be explicitly taught to recognize patterns and interpret student thinking. They suggested that video, peer coaching, and lesson observations might be strategies to help novice teachers develop these skills.

***What teachers notice during math instruction.*** In their study, Sherin, Russ, Sherin, and Colestock (2008) used video to explore what teachers noticed in the classroom. The participant was one National Board Certified teacher in his fifth year of teaching math in an urban public high school in a large midwestern city. He wore a small recording device and recorded 26 classroom events over three days. In addition to the 30 second events the teacher chose to record, the researcher taped the entire 90 minute

lesson each day and conducted post observation interviews with the participant. The data were analyzed in three stages: (a) the lesson plans and video of the whole lesson were reviewed to put the participant's comments and the clips into context; (b) the participant's comments and reflections were classified into broader themes; and (c) the participants' comments about how recording the lessons changed his instruction were carefully analyzed. The findings suggested that the teacher noticed student thinking, discourse, strategies, and student engagement. The researchers concluded that much of professional vision occurs unconsciously and that using video makes it easier to capture for later reflection and discussion.

Jacobs, Lamb, and Philipp (2010) explored three aspects of teacher noticing: (a) attending to students' strategies; (b) interpreting their mathematical understandings; and (c) deciding how to respond based on students' thinking. The participants, 131 K-3 teachers, including some prospective teachers and others with varying amounts of professional development, were asked to complete two tasks. In the first, they watched a video of students solving a subtraction problem; and in the second, they reviewed written samples from a multiplication lesson. The participants were asked to write responses to prompts based on the three factors listed above (attending, interpreting, and responding). Their comments were then given a score of 0, 1, or 2 depending on the amount of evidence from student work they included in their responses (0 = no evidence; 1 = limited evidence; and 2 = robust evidence). The findings indicated that teachers with more professional development experience were able to support their noticing with more evidence from the lessons and could formulate better plans for future teaching strategies.

The researchers concluded that teachers do not naturally notice student thinking and that they need guidance in order to develop these skills.

***Adaptations based on what teachers notice.*** In his study, Choppin (2011) investigated how teachers' attention to student thinking informs the way they adapt their instruction. During the implementation of a new math program in New York, 34 teachers were studied for five years. Of these 34 teachers, the instructional units from ten of their classes were collected. Five of these teachers were chosen to participate in a collective case study. The researchers observed and recorded at least one lesson in each classroom and then conducted a post-lesson interview with each teacher. Both the video and the audio of the interview were coded for three areas: noticing, connecting noticing to adaptations, and adapting challenging tasks. Noticing was further broken down into codes focused on how the teacher attended to student thinking: evaluation, providing details of thinking, and interpreting the details. The results seemed to indicate that teachers who noticed more were able to better adapt instruction to meet the needs of their students. Choppin concluded that there was a relationship between teacher noticing and the actions taken in the classroom. With this in mind, it is important to consider how a teacher's ability to notice might be improved.

***Improving teachers' ability to notice.*** Researchers have considered how using strategies such as individual written reflections, and the use of videos both individually and in the context of a video club might improve teachers' ability to notice classroom interactions. In a recent study Mellone (2011) investigated the use of diaries in helping teachers notice their beliefs and assumptions as they interact with their students. This

intensive case study, which focused on one high school math teacher in Italy, was part of a larger study that lasted three years and involved almost 100 high school teachers from Italy, Spain, Portugal, Poland, and Hungary. The participants were provided with research articles to read and were directed to write lessons in diaries and reflect on them. The participants also attended professional development sessions about metacognition and were invited to write scientific articles. The researcher collected the focus subject's lesson plans and diary entries. These were analyzed and coded for patterns and webs were created to show interactions between the teacher and students. The findings suggested that noticing behavior was not enough, teachers also needed to reflect on their behavior in order to make changes. The researcher concluded that keeping a diary is an effective way for teachers to monitor what they notice and how they adapt their instruction.

Rosaen, Lundeberg, Cooper, Fritzen, and Terpstra (2008) combined the use of written reflections with the use of videotaped lessons in their study. They investigated the extent to which, and in what ways, using video might help pre-service teachers reflect on their teaching in a more complex manner when writing reflections. Three female students enrolled in a master's degree program at a mid-western university and completing yearlong internships in elementary schools were the participants. They were asked to: participate in an initial interview, videotape a science or literacy lesson, reflect on the whole lesson, choose an excerpt from the video to reflect on, and engage in a discussion about the chosen excerpt. The researchers used cross case analysis to compare data from the first reflection with data from the excerpt aided reflection. They also divided the

written data into chunks and used these to develop coding categories. The interview data were used for triangulation. The findings seemed to reveal that reflections using the video were more specific, and focused more on instruction and the students. The researchers concluded that using video improved the participants' ability to notice, and that noticing is the key to changing instruction.

Star and Strickland (2008) conducted a quantitative study that explored the impact of video viewing on improving teachers' ability to observe classroom practice. Twenty-eight pre-service teachers enrolled in a secondary mathematics methods course and six math teachers enrolled in a doctoral program at a mid-western university were the participants. The data collection consisted of three parts: a written pre- and post-assessment of novice teachers' noticing the instructional features of an eighth grade math lesson; a post-assessment of the experienced teachers; and completion of a questionnaire based on the video with true/false, multiple choice and short answer questions. The data from the experienced teachers were used to validate the assessment. The pre- and post-assessments completed by the 28 novices were scored for correct answers and tables were created to compare and contrast accuracy. The results seemed to show that teachers noticed classroom management during the pre-assessment, but moved to noticing: the environment, the mathematical content, and the communication skills during the post-assessment. The researchers concluded that when the pre-service teachers were guided in their observations, the video intervention led to a significant improvement in teachers' ability to notice.

Brunvand and Fishman (2006) employed a mixed methods design to study how the use of scaffolds, consisting of edited videos that focus attention on what the researchers believed was important, affected what pre-service teachers noticed in the videos. The participants were 41 pre-service teachers enrolled in a science methods course at a mid-western university. They were randomly divided into three groups: (a) non-integrated scaffolds (NIS); (b) integrated scaffolds (IS); and (c) a comparison group. All 41 participants were interviewed before the treatment began and completed a pre- and post-lesson analysis. Participants in the NIS and IS groups watched edited videos of classroom footage (which included either integrated or non-integrated subtext written by the researchers), and kept electronic notes. Another source of data was the software used to share the video which captured the participants' mouse movements. The interviews were audio taped, transcribed and coded for content knowledge, pedagogical knowledge, and pedagogical content knowledge. The researchers used statistical tests to compare the responses of the different groups. The findings indicated that the use of scaffolds helped pre-service teachers notice what the researchers thought was important. Brunvand and Fishman concluded that using scaffolds improved a novice teachers' ability to notice and interpret student thinking.

In a related study, van Es and Sherin (2002) explored how using the Video Analysis Support Tool (VAST), a multimedia tool, might help pre-service secondary math and science teachers build their ability to notice classroom interactions. Twelve interns enrolled in an eleven month alternative certification program at a major mid-western university participated in the qualitative study. All 12 participants submitted a

written reflection about their teaching prior to beginning their internship. Over the next 11 months, six of the participants met three times to learn about and use VAST. The other six participants did not learn about or use VAST. At the end of the internship, all 12 participants were asked to videotape themselves teaching and reflect on their teaching and learning. The researchers coded the essays based on what the teachers noticed and what they said about what they noticed. The results indicated that using VAST helped pre-service teachers exhibit characteristics more commonly found among experienced and expert teachers: noticing more about student thinking, being more interpretive, and using more evidence in their responses. Based on their findings, the researchers concluded that teachers develop the ability to notice along a trajectory, beginning with simply describing classroom events and ending with interpreting events and making connections between them.

Miriam Sherin and Elizabeth van Es have conducted several studies in the last nine years that examine how participating in a video club, where teachers meet to discuss video clips from their classrooms, might improve a teacher's ability to notice classroom interactions. The participants in one study were seven fourth and fifth grade elementary teachers in an urban school (van Es & Sherin, 2008). The video club met ten times over a school year and the participants watched an average of two 5-7 minute clips at each meeting. Data were collected from the videotapes of the meetings, through two interviews with each participant, and two interviews with four teachers who were in a comparison group. Each participant watched three 2-5 minute clips and was then asked to comment on what he/she noticed. The analysis was conducted in four stages:

1. The pre- and post-interviews were transcribed and coded with the following categories: actor, topic, stance, specificity, and focus in an effort to see changes in teachers' comments over time. A one-tailed  $z$ -test was conducted, with results being statistically significant at the 0.05 level.

2. Transcripts from the video club meetings were coded with the same categories.

3. The percentage of comments related to each topic was calculated for each meeting and for each participant to determine an overall vision (broad or narrow).

4. Data from the interviews were used to help the researchers interpret the other data.

The results indicated that the participants talked differently about classroom interactions after attending the video club meetings and they followed different developmental pathways to change: (a) direct; (b) cyclical; and (c) incremental. The comparison group's comments did not change from the pre- to the post-interview. Van Es and Sherin concluded that participating in the video club helped teachers: focus on the student and his/her mathematical thinking, shift from describing classroom events to interpreting them, be more specific, and use evidence in their comments.

A more recent qualitative study conducted by Sherin and van Es (2009) also explored how video clubs affected teachers' ability to notice and interpret classroom interactions. The participants were teachers who participated in two different video clubs. One club consisted of four middle school math teachers from an affluent suburb of a major city on the west coast of the United States and the other club consisted of seven fourth and fifth grade teachers in the mid-west. Participants in both clubs attended



between seven and ten video club meetings. The researchers collected numerous types of data including: pre- and post-intervention “noticing” interviews after watching the same three-minute clip of a math class; videotapes of classroom observations, and videotapes of meetings. The interviews and meeting videos were transcribed and field notes were collected. The researchers looked at the tapes of the first and last meetings and coded comments based on the following idea units: actor and topic; stance used-describe, evaluate, or interpret; and strategy used to explore thinking. The observations were coded in four stages: whole class/large group, creation of analytic memos, broken into 2 minute units to see what the teacher noticed, and comparison of early and late observations for each teacher. The findings seemed to show that the teachers shifted their attention from the teacher to the student and began to attend to different things as the year progressed. They also moved toward interpreting the students’ mathematical thinking rather than describing it. Sherin and van Es concluded that participating in the video club improved these dimensions of teachers’ professional vision.

**Summary.** Professional vision in teaching, which is “...the ability to notice and interpret significant features of classroom interactions (Sherin & van Es, 2009, p. 22), is a skill that research has shown develops over time. It is not a skill that teachers naturally improve upon with more experience in the classroom. Teachers must be guided to notice and interpret classroom events through practice in a supportive environment that includes opportunities for rich discussions and deep reflection. One strategy that may help these beginning teachers develop these skills is to use video over a sustained period of time in a

context that allows teachers to work collaboratively in small groups that encourage reflection and analysis.

### **C. Video in Education**

Video has been used in many ways in teacher education, from microteaching to the more recent requirement, adopted in some states, set forth by the Teacher Performance Assessment (Madeloni & Hoogstraten, 2013). It requires pre-service teachers to complete video portfolios as part of their credentialing requirements. Using video to capture teaching has many benefits. In recent years, researchers have explored its use in a variety of settings and with different goals in mind.

**Theoretical foundation.** Advances in technology have made videos easier to use in both teacher education programs and professional development sessions. In the introduction to his book, *Using Video in Teacher Education* (2004), Jere Brophy identified several benefits of using videos: (a) they show the complexity of classrooms; (b) they provide a richer, more immediate experience than reading a case study; and (c) they provide an opportunity for situated learning because videos are the nearest approximation of being present in the classroom. Brophy cautioned that when using videos with novice teachers, clear goals need to be established and scaffolding needs to be provided. He thought beginning teachers would not be able to notice what was important without guidance.

A chapter by Deidre LeFevre (2004) in the same book claimed that, “Video may provide a shared common experience of practice through which teachers, for whom practice is usually an isolated affair, can learn in a more collaborative manner, examining

the uncertainties of actual teaching” (LeFevre, 2004, p. 239). She agreed with Brophy that facilitation is crucial in ensuring the value of using video. She believed that by watching unedited footage that contains some problematic situation, teachers could learn to take a more tentative stance in their observations, use evidence to support their opinions, understand multiple perspectives, and acknowledge personal beliefs.

In yet another chapter from Brophy’s book (2004), Miriam Sherin traced the progression of video use from microteaching in the 1960s, to sharing best practices in the 1980s, to reflecting on teaching practices in the 2000s. She also provided a rationale for using video in teacher education and suggested ways it might be used in the future. She claimed that video is beneficial for three reasons: (a) it provides a permanent record of what occurred in a classroom; (b) it can be collected and edited; and (c) it can be viewed multiple times for multiple purposes. Sherin then suggested possible uses for videos in the context of teacher education including: viewing them in video clubs, making hypermedia products, analyzing video with digital annotation tools, creating video portfolios, and establishing video networks.

Much research has been done in the last twenty years that examines different aspects of using video with both pre-service and experienced teachers. Studies have been conducted on teachers viewing videos alone, as a class, and as a participant in a video club. No studies have looked at forming video clubs exclusively for first year teachers, a gap this study seeks to fill.

**Using videos with pre-service teachers.** Researchers have used videos with pre-service teachers in several ways. Some have used video cases in an attempt to help

students link theory and practice (Beck, King, & Marshall, 2002; Copeland & Decker, 1996). Other researchers have shown videos in their classes to prompt discussions designed to help pre-service teachers learn to analyze (Santagata, Zannoni, & Stigler, 2007), and reflect on classroom practice (Harford, MacRuairc, & McCarten, 2010; Santagata & Angelici, 2010; Towers, 2007; Welsch & Devlin, 2007).

***Video cases.*** Teachers need to be able to make meaning from the events that occur in their classrooms. In their qualitative study, Copeland and Decker (1996) considered how viewing video cases might help pre-service teachers acquire this skill. The participants were 12 women completing a fifth year post-baccalaureate program in elementary education at a large university on the west coast. Each participant had taken the same classes from the same instructors. They were divided into four groups of three for the three-stage data collection process. First, they watched a four and a half minute video of a fourth grade teacher leading a Directed Reading Thinking Activity (DRTA) and were individually interviewed about what they noticed. Two weeks later, they watched the same video with two other women and discussed the video. Three weeks after that, they watched the same video a third time and had a second individual interview. The interviews and group discussion were audio taped and transcribed. The researchers used iterative analysis to identify central topics raised in the group discussion; then they compared the participants' initial and final interviews to see whether the participants' discourse changed and if they included some of the central topics in their final interview. The results indicated that teachers adopted, changed or created new topics

39% of the time. The researchers concluded that viewing videos in a group situation helped these teachers make meaning of classroom events.

Beck, King, and Marshall (2002) investigated whether pre-service teachers who were asked to construct their own video cases would be better at identifying, interpreting and analyzing exemplary teaching than pre-service teachers who did not create video cases. The participants were 62 students in their first semester of an elementary teacher preparation program at an urban university in California. Thirty-one students were randomly assigned to either the technology supported practice in observation (TSPO) group or a comparison group. The TSPO group constructed their own video cases, participated in a related email discussion, and wrote reflections. During the last class session the TSPO and the comparison group used the Video Observation Test to assess their knowledge. The researchers coded their online responses based on the participants' ability to interpret, rather than describe, sound instruction practice in language arts, math, and science (e.g. prior knowledge, active participation, use of visuals, use of assessments, and classroom management). They then used two tailed t-tests to compare the results. The findings indicated statistically significant differences between the TSPO and the comparison group in all three subject areas: (a) the p value for language arts was  $p < .001$  with an effect size of 1.23; (b) the p value for math was  $p < .01$  with an effect size of 1.15; and (c) the p value for science was  $p < .01$  with an effect size of .82. The researchers concluded that creating a video case deepened teachers' understanding of classroom interactions and student behaviors.

*Analyzing classroom events.* Analyzing teaching is a skill that novice teachers often lack, because it takes time to build. In their study, Santagata, Zannoni, and Stigler (2007) explored using video to help novice teachers move from literal descriptions of classroom events to interpretation and analysis of classroom interactions. The researchers conducted two related studies to obtain their results. In the first study, 38 pre-service teachers in their second year of an education program at a public university in Italy watched the same video before and after completing a course. They were asked to analyze the lesson and a scoring grid was developed to evaluate their analyses on five dimensions. A series of paired t-tests were conducted to compare the pre- and post-analyses on these dimensions: (a) elaboration-the difference was significant,  $t(34) = 8.66$ ,  $p = .000$ ; (b) links to evidence-the difference was statistically significant,  $t(34) = 4.35$ ,  $p = .000$ ; (c) mathematics content-the difference was statistically significant,  $t(34) = 4.85$ ,  $p = .000$ ; (d) student learning-the difference was significant,  $t(34) = 6.91$ ,  $p = .000$ ; and (e) critical approach-the difference was statistically significant,  $t(34) = .371$ ,  $p = .000$ .

In their second study, Santagata, Zannoni, and Stigler asked 64 pre-service teachers enrolled in a course at the same university, some in their first year and some in their second year, to watch two segments of the same lesson, complete a survey, and plan a lesson. Paired t-tests were used to analyze the pre- and post- test data on three dimensions: (a) number of instances chosen for discussion-the difference was minimal,  $t(29) = 1.320$ ,  $p = .197$ ; (b) number of words-the difference was significant,  $t(29) = -7.372$ ,  $p = .000$ ; and (c) the quality of the comments-the differences across five dimensions were all significant: (1) elaboration,  $t(29) = -6.81$ ,  $p = .000$ ; (2) mathematics

content,  $t(29) = -7.00$ ,  $p = .000$ ; (3) student learning,  $t(29) = -6.45$ ,  $p = .000$ ; (4) critical approach,  $t(29) = -3.2$ ,  $p = .003$ ; and (5) alternative strategies,  $t(29) = -3.72$ ,  $p = .001$ . The results across both studies indicated that when viewing a videotaped lesson, the participants, over a brief time, were able to improve their ability to focus on teacher actions and analyze student learning. The researchers concluded that because video slowed down the teaching process and gave the teachers time to consider classroom events, it allowed them to grow in their ability to both analyze and reflect on teaching and learning.

***Teacher reflection.*** Observing classroom events and reflecting on the theory behind the teachers' and students' actions is not an inborn skill; it must be taught. Santagata and Angelici (2010) conducted a quantitative study that used an observational framework to guide pre-service teachers in Italy to reflect on a video clip. The participants, 38 secondary education students, were randomly assigned to either the Lesson Analysis Framework (LAF) group or the Teaching Rating Framework (TRF) group. Both groups used videos, but in different ways. The LAF group solved problems the students on the tapes would solve, predicted how students would do on those problems, discussed learning opportunities, then watched selected clips of a math lesson, and responded to prompts. The TRF group was asked questions that required them to rate the effectiveness of the lesson plans, the strategies, and the appropriateness of the students' responses. Both groups watched the same five minute clip before and after the two treatments and responded to three prompts: (a) choose three significant moments in the clip; (b) evaluate the effectiveness of teaching strategies; and (c) how would you

teach the topic? Each response was scored on a two point scale (1 = descriptive and/or judgmental; 2 = integration of the instructional aspects and explanations for what occurred). An analysis of variance found that the LAF group preformed significantly better on the first two prompts: (a) prompt 1,  $F(1, 33) = 8.69$ ,  $p = .006$ ; and (b) Prompt 2,  $F(1, 33) = 6.56$ ,  $p = .015$ . A paired t test revealed that the LAF group improved significantly from the pre- to the post-test,  $t(17) = -2.150$ ,  $p = .048$ , while there was no change in the TRF group. The results indicated that using the LAF helped pre-service teachers reflect on teaching strategies and suggest alternatives, in contrast to the TRF participants whose performance remained virtually unchanged from the pre-test to the post-test. The researchers concluded that the choice of prompts affected what teachers attend to and reflect on in lessons and that productive reflection can be taught assuming appropriate prompts are used.

Welsch and Devlin (2007) conducted a quantitative study to explore how written reflections of participants who used video-based reflection differed from participants who relied on memory-based reflections. Students in two sections of a special education methods class at a large university were the participants. Class 1 had 17 students and Class 2 had 18 students. The participants who completed the memory-based reflection (MBR) were asked to plan and teach a lesson during their practicum and then respond to six prompts. The participants in the video-based reflection (VBR) group did the same thing, but they were videotaped while teaching and were able to review the video prior to responding to the prompts. Responses from both groups were analyzed using a three point rubric and statistical tests were conducted to compare across conditions, across



groups, and across time. A two sample t-test on the overall reflection profile did not find any significant difference between the two conditions,  $t(66) = 1.39$ ,  $p > .05$ . However, on two items there was a statistically significant difference: (a) did the students learn what you intended,  $t(66) = 2.35$ ,  $p < .05$ ; and (b) effectiveness of strategies,  $t(66) = 2.04$ ,  $p < .05$ . The means the VBR ( $M = 16.35$ ) and the MBR ( $M = 16.26$ ) were similar in Class 1; while the VBR ( $M = 16.15$ ) slightly outperformed the MBR ( $M = 15.17$ ) in Class 2. The findings indicated that the participants were more accurate in discussing student learning and teaching effectiveness when they used the video to assist their reflection. The researchers concluded that while deeper reflection may occur with video, novices still need careful guidance in order to learn to reflect.

Harford, MacRuairc, and McCarten (2010) investigated using peer-videoing to increase student teachers' ability to reflect. The participants were 20 student teachers working with middle school age children (ten in the Republic of Ireland and ten in Northern Ireland). Participants in the same school were paired up and asked to videotape each other. They were also asked to maintain reflective journals that focused on planning, differentiation, classroom management, and student learning. In addition, they were asked to select and bring a ten minute clip to class and be prepared to lead a discussion about it. Entries from the reflective journals were analyzed using a constant comparative method in an attempt to see changes in their entries over time. Findings indicated that participating in peer videoing improved participants' ability to reflect and also changed how they taught. The researchers concluded that with guidance, pre-service teachers

could move from a focus on the technical aspects of teaching to a deeper reflection on the theory behind the practice.

Videos have been used with pre-service teachers in several ways. Video cases, either commercially available or student-created, have been used to help prospective teachers see the classroom. Some research has focused on helping novice teachers analyze classroom events while other work has focused on building reflective ability. Videos have also been used to build these skills with experienced teachers.

**Using videos with experienced teachers.** Other research on using videos in education has focused on experienced teachers. Recent work has focused on helping these teachers develop through professional development sessions (Baecher & Kung, 2011; Kersting, Givvin, Sotelo, & Stigler, 2010; Santagata, 2009; Seidel, Sturmer, Blomberg, Kobarg, & Schwindt, 2011; Zhang, Lundeberg, Koehler, & Eberhardt, 2011). Other work has considered how videos might be used to improve reflection (DeCuir-Gunby, Marshall, & McCulloch, 2012; Wright, 2008), deepen discussions (Borko, Jacobs, Eiteljorg, & Pittman, 2008), and lead to teacher change (Czaplicki, 2012; Tripp, 2010).

***Videos in professional development.*** In a recent mixed methods study, Seidel, Sturmer, Blomberg, Kobarg, and Schwindt (2011), investigated the effects of analyzing oneself on video versus viewing others on video. The participants were science teachers in Germany and Switzerland; 38 teachers had experience with video analysis and 29 teachers did not. The participants attended a one day workshop focused on using video to analyze teaching and were then divided into three groups: (a) video-experienced who

watch their own video; (b) video experienced who watched others' videos, and (c) video non-experienced who watched other's videos. The participants all viewed the videos individually, using the Learning from Classroom Videotapes Framework, which suggested stopping every 10 minutes to comment. They also participated in group discussions and completed a questionnaire. The written comments were coded to identify themes, and multivariate analysis of variance was used to determine differences in the responses to the questionnaire among the three teacher groups. An analysis to determine differences in immersion and resonance found differences between the groups,  $F(6, 124) = 3.56, p = .003, \eta^2 = .15$ . A second test, which compared the teachers' evaluation of authenticity and motivation found a difference between the three groups,  $F(4, 108) = 2.59, p = 0.41, \eta^2 = .09$ . Results indicated that video-experienced teachers watching their own teaching were more immersed, more motivated and noticed more about the activities in the classroom than the other two groups. The researchers concluded that professional development sessions should begin with teachers watching themselves teaching and then move to videos of others teaching.

Zhang, Lundeberg, Koehler, and Eberhardt (2011) conducted a similar study, using qualitative methods, to examine the benefits and problems of using commercially available videos, colleague videos or self videos in a professional development program. The participants were 26 science teachers who engaged in a week long summer program and then a year-long teacher research project. Multiple forms of data were collected including: three teacher surveys, final reports from teachers, a panel discussion, individual phone interviews, videotapes of all group discussions, facilitators' notes, and

artifacts from the participants. The researchers also conducted a case study of one kindergarten teacher to gain a deeper understanding of how she benefitted from the three types of videos. The data were read and reread to establish a coding scheme to identify common themes. The findings indicated that the participants found all three types of video useful, with videos of themselves scoring the highest on a scale of one to five ( $M = 4.6$ ), followed by peer's videos ( $M = 4.2$ ) and commercially available videos ( $M = 3.7$ ). However, each type of video had unique benefits and challenges. The published videos allowed participants to see other teachers implement problem based learning, but the difference in grade level and content sometimes made it difficult for them to relate to the topic. In the peer videos, participants could discuss shared problems and goals with their colleagues, but the videos often showed the students working rather than the teachers teaching. The study identified several benefits to viewing one's own video. It could be watched individually or in a group, it offered the rare opportunity for self-observation it allowed the teachers to see how the students' viewed them, it provided time to analyze student discourse, and it enabled them to notice more about the classroom. Some teachers mentioned having anxiety about being videotaped and a concern about technology issues. The researchers concluded that all three types of videos should be used during professional development, because the different types of video allowed for different types of learning. The participants were able to learn from models of exemplary teaching, reflect on their colleague's work and offer new insights, and see their own teaching from an entirely different perspective.

Baecher and Kung (2011) investigated the effects of using a self-paced online workshop to help teachers learn to observe and analyze video. The participants were 47 students enrolled in a graduate certification program with an emphasis on English for Speakers of Other Languages (ESOL) at a large northeastern university. The workshop consisted of a pre-assessment, three modules with the same video but different foci (response opportunities, teacher praise, teacher response to error), and a post-assessment. Data collected included: participants' answers to the pre- and post-assessment and observation worksheets completed during each module. The researchers used descriptive statistics and the constant comparative method to establish categories; and then used an iterative process of putting participants' comments into the corresponding categories. The results indicated that participants were better able to see beyond the superficial, were less judgmental, used more evidence to support their comments, had a better understanding of pedagogy, and were more reflective. The researchers concluded that analysis could be taught with an online platform, but that novices needed scaffolding in order to develop their analytic skills.

Santagata (2009) used a multi-year study to explore the effects of a video-based professional development course on teachers' ability to understand and analyze student work. The course was for math teachers who taught in low performing schools. The participants were 33 sixth grade math teachers working at five middle schools. The teachers met at a central location in groups of eight to ten to watch a video and then to respond individually using Visibility software, which was followed by a group discussion. The groups met six times during the school year and the researcher collected

written responses to 72 questions. Other data sources included: field notes from the sessions, classroom observation notes, and researcher memos. Data were analyzed in a three-step process: marking incorrect answers, putting problems missed by 2/3 of the teachers on a problematic list, and reviewing the list to group similar mistakes into categories. The findings after the first year indicated that teachers were engaged and interested, but had difficulties answering the questions. These problems fell into three categories: (a) knowledge of math concepts; (b) understanding student thinking; and (c) analyzing student work. When asked to explain student thinking, their responses were superficial, they tended to talk about the class as a whole rather than focus on individual students, and they did not use evidence to support their comments. Santagata concluded that effective video-based professional development needs to: (a) ensure teachers understand the content; (b) provide scaffolding for analyzing student work; and (c) provide models for discussing students and reflecting on teaching.

A related quantitative study by Kersting, Givvin, Sotelo, and Stigler (2010) also used video to investigate the relationship between teachers' knowledge and student learning. The participants were 237 self-selected math teachers in grades five through seven in elementary and middle schools in southern California. The participants watched 13 short clips of classroom events showing: (a) teachers assisting during independent work; (b) teachers responding to student errors; and (c) whole class discussions. They used the Classroom Video Analysis, a tool that allowed participants to describe student/teacher interactions in a written response. The researchers were most interested in comparing participants' mathematics knowledge for teaching (MKT) and their classroom

video analysis (CVA). The responses were coded and compared as an overall score and on four dimensions. A statistically significant positive relationship was found between teachers' overall scores on the MKT and the CVA,  $r(223) = .618, p < .01$ . The analyzing math content dimension produced the highest correlation,  $r(223) = .608, p < .01$ , while the other subscales had moderate correlations, with all p-values  $< .01$ : (a) analyzing student thinking,  $r(223) = .489$ ; (b) alternative teaching strategies,  $r(223) = .520$ ; and (c) level of interpretation,  $r(223) = .547$ . In the second stage of the study, the researchers looked for correlations between the CVA and student gains. The only dimension where the correlation was significant was alternative teaching strategies,  $r = .521, p < .05, R^2 = .27$ . The results indicated that teachers' content knowledge is an important factor in their ability to analyze student work, and that teachers' ability to make meaning of classroom interactions has an effect on their instructional decisions. Kersting, Givvin, Sotelo, and Stigler concluded that using video analysis provides researchers the opportunity to understand teachers' knowledge and how they apply it in classroom situations.

***Teacher reflection.*** In his study, Wright (2008) used qualitative methods to explore whether a video enhanced reflection process improved teachers' ability to reflect. The participants were five untenured teachers and one principal from the same elementary school in a middle class neighborhood in Utah. Each participant completed a baseline reflection, a video-enhanced reflection, and an exit survey. They were also observed in the classroom and participated in both individual and focus group interviews. The researcher used thematic analysis to identify patterns in their thinking, looking specifically for examples of description, analysis, and actions. Wright divided his

findings into five sections: (a) getting started—the findings indicated that the participants were positive about the experience and eager to begin the study; (b) teachers’ experience with written reflections—the findings suggested that it helped them plan their reflections, but they preferred the video-based reflection; (c) video-based reflection experience—the findings indicated that it provided multiple perspectives which gave the participants more insight into the teaching context; (d) video-supported consultation experience—the findings seemed to suggest that consultation was an important piece in the reflection process; and (e) principal’s experience—the findings indicated that the principal believed the consultation had a positive effect on the teachers, particularly novice teachers, ability to reflect. Wright concluded that video helped build reflective ability because it allowed teachers to notice more and focus on areas that needed improvement, perhaps due to the additional perspectives it provided. He credited four elements with contributing to the success of the participants in his study: (a) an established method for reflecting; (b) providing a tool and time to reflect; (c) giving participants a clear rationale for the need to reflect; and (d) providing support from a peer or a mentor.

DeCuir-Gunby, Marshall, and McCulloch (2012) analyzed teachers’ ability to reflect on video data following intensive professional development in a mixed methods longitudinal study. The participants were 49 teachers from six different schools who received the intervention and one comparison school with 16 participants. All the schools were in urban areas of Raleigh, North Carolina. The participating schools were divided into cohorts: Cohort 1 participated for three years; Cohort 2 for two years; and Cohort 3 for one year. The data sources were: a videotaped math lesson, videotaped reflection



sessions lasting between 45 and 90 minutes, and field notes from classroom observations. The lesson rubric from the videotaped lesson was subjected to an analysis of variance, which indicated significant differences between the Cohorts in three categories: (a) illuminated thinking,  $F(3, 420) = 14.31, p = .000$ ; (b) accepting multiple methods,  $F(3, 420) = 7.50, p = .000$ ; and (c) language matching,  $F(3, 420) = 4.60, p = .004$ . They also found that Cohort 1 outperformed Cohorts 2 and 3 in all areas, and that Cohort 3's results were not significantly different from the comparison group. The reflection sessions and field notes were coded for thematic content resulting in the identification of 27 codes which were grouped into larger categories. The findings for these indicated that the longer teachers participated in the professional development, the more reflective they became in areas such as describing lessons, identifying with teachers, and seeing connections in the learning. The researchers concluded that video could be used to teach reflective skills that would ultimately impact classroom instruction, but that it required time.

Borko, Jacobs, Eiteljorg, and Pittman (2008) used mixed methods to investigate whether using video to promote reflection might lead to more productive discussions during professional development sessions. The researchers were interested in changes in how teachers talked about their teaching as a result of using the Problem-Solving Cycle (PSC). The PSC involved: solving a math problem, teaching it to their students, videotaping the lesson, and watching the video focusing first on the teacher's role and then on student thinking. The participants were 16 middle school math teachers in Colorado. Eight attended workshops about PSC and eight did not. Data collected

included: videos, teachers' written work, field notes, and interviews with the teachers. All the data were coded and subjected to quantitative analysis based on four categories: when, who, what, and content. In addition, the researchers used written reflections, and transcripts from interviews to create four qualitative vignettes. The findings indicated that teachers who used PSC talked in more depth and more analytically about specific issues in the classroom, such as focusing on student thinking, considering complex student solutions, and acknowledging their own mathematics content knowledge limitations. Borko, et al, concluded that using video, from both their own and their colleagues' classrooms, allowed the participants to engage in productive discussions that focused on new teaching strategies and student thinking.

***Teacher change.*** In two recent studies Tripp (2010) and Czaplicki (2012) explored how videos might be used in professional development to help teachers change their practice. Tripp used qualitative methods to investigate how video might influence the teacher change process. The participants were seven secondary teachers in different content areas (three were special educators, two taught religion, and two taught ESOL). The participants were asked to watch and annotate four videos using MediaNotes. The researcher then interviewed them individually about their experiences. Written artifacts provided an additional data source. The researcher read and reread the annotations, the interview transcripts, and the artifacts to identify common themes which were entered into NVivo, a software program that aids with qualitative data analysis. The findings indicated that teachers changed in four areas as a result of using video analysis to reflect on their teaching: (a) seeing the need for change; (b) considering ideas for changes; (c)

putting the ideas into action; and (d) evaluating the changes. The comments from the participants emphasized that they recognized the need to change because the video allowed them to actually see themselves teach, which provided them with a new perspective. Tripp concluded that teachers were willing to make changes because of six key aspects of participating in the study: (a) it focused on specific examples of their teaching; (b) it helped them see their teaching from a new perspective; (c) they trusted the feedback they received; (d) they felt responsible for changing their practice; (e) they were able to remember to change their practice; and (f) they could see the changes.

Using a qualitative case study, Czaplicki (2012) studied the effects of using video as part of a Critical Friends Group (CFG) to promote change in classroom practice. The participants were nine teachers at an urban elementary school in Georgia who met regularly in a previously established CFG. The data collected were classroom videos, written reflections, meeting transcripts, participant interviews, and researcher memos. The researcher used an iterative process to identify six themes: change in attitude, shared teaching practices, pedagogical driven conversations, change in student engagement, promotion of teacher reflection, and captured classroom practice. The findings indicated that as a result of using video as part of the CFG, the participants had a greater sense of community, where they could collaborate and learn from each other. In addition, the study found that teachers learned about student engagement, and that the video captured moments in the classroom and allowed for greater teacher reflection. The researcher concluded that discussing videos in a CFG could lead to changes in teachers' attitudes

about the use of videos, support more sharing of instructional practices, encourage more pedagogically based discussions, and has the potential to change classroom practice.

Videos have been used with experienced teachers in many ways to help move them forward in their ability to analyze, reflect on, and discuss teaching and learning. Videos have been part of both online and face to face professional development. Teachers have viewed and analyzed commercially produced videos and videos of themselves and colleagues. They have watched videos individually and in groups, but it seems the most dramatic changes are results of teachers working in groups to analyze and discuss video.

**Video clubs.** Video clubs are one way to engage teachers in viewing and analyzing videos together. Studies have focused on different types of video clubs, such as science clubs (Braaten, 2011), and clubs that focus on facilitating productive conversations (Sherin, 2003; Sherin, Linsenmeier, & van Es, 2009). But most of the existing research on video clubs focuses on math teachers and building their ability to notice classroom interactions and the roles that they play in the club (Sherin & Han, 2004; van Es, 2012; 2009; van Es & Sherin, 2010).

**Science video club.** In a recent study Braaten (2012) used qualitative methods to investigate how teachers learn from each other while participating in a science video club and how their experience in the group was supported by their classroom practice. The participants were 16 science educators, including classroom teachers, district level coaches, and university researchers. A subgroup of three classroom teachers (one high school and two middle school) agreed to participate in a focus group. The video club met once a week and focus group teachers were observed at least once a week. Data

collection included: transcripts of meetings; transcripts of participant interviews; field notes from observations; and student work samples. The data were analyzed using discourse analysis that looked for changes in teacher talk. In addition, notes from the observations were subjected to constant comparative analysis that looked for changes in classroom practice. The findings indicated that teachers' stance toward inquiry changed over the course of the video club meetings. In early meetings, the video-taped lessons were traditional-lecture based, with teachers evaluating correct/incorrect answers. After discussing how their instruction could be changed in the video club meetings, later video-taped lessons featured inquiry based lessons with teachers posing questions and students working together to find possible answers. Braaten concluded that participating in a video club helped teachers think about their teaching in new ways, use an inquiry stance more often, and discuss their teaching with others.

*Video clubs focused on productive conversations.* A small scale qualitative study by Miriam Sherin (2003) examined how video clubs could guide teachers and researchers to have productive conversations. The participants were Sherin and two experienced high school math teachers. The teachers' instruction was observed and videotaped daily for six weeks; in addition field notes were taken. The video club met weekly to watch one or two five-minute video segments. These meetings were videotaped and transcribed. The researcher used fine grained analysis of the videotapes to investigate the interactions during the video club. The transcripts were evaluated in an iterative process to identify patterns in discussion. The results indicated that over the six weeks both Sherin and the teachers expanded what they said. In addition the teachers developed new ways to

analyze what took place in their classrooms. Sherin concluded that it was important to value the expertise of both classroom teachers and university researchers when they participate in a video club together.

Another qualitative study by Sherin, Linsenmeier, and van Es (2009) explored how using video clips from teachers' classrooms might deepen the content of their conversations during a video club. The participants were seven fourth and fifth grade teachers with between one and 19 years of experience. They participated in a video club that met once a month from October to July. At each meeting, a video clip from one of the participant's classrooms was viewed and discussed. In addition, each meeting was videotaped and transcribed. The researchers analyzed the data in three phases: (a) they rated each clip as low, medium or high on each of three dimensions (extent that it was a window into student thinking, depth of thinking, and clarity of thinking); (b) they determined the nature of discussion about each clip-focus on student thinking, discuss important math content, and engage in joint sense-making; and (c) they compared coding of video clips with coding of video club discussions. The findings indicated that clips that were low, medium, and high on different dimensions could all result in productive conversations, but there were three sub findings: (a) when teachers discussed a clip that was high in depth, a productive discussion did not always result; (b) clips that are low in depth may lead to productive discussions; and (c) clips with both high and low clarity can lead to productive conversations, depending on the other characteristics of the clip (window and depth). The researchers concluded that video clips that are carefully selected can be used to prompt discussions. In addition, they suggested that using videos

from the participating teachers' classrooms allowed for more productive discussions, perhaps due to a sense of ownership or accountability.

***Math video clubs focused on noticing.*** Miriam Sherin and her colleagues have conducted extensive research on math video clubs, sometimes using the same participants and data to explore different aspects of the same meetings. In one such study (van Es, 2009), examined the way teachers' roles change over the course of a year using the same participants and data as the study summarized above (Sherin et al., 2009). Van Es used fine grained analyses of the videotapes and the constant comparative method to learn what roles participants played in the video club and how those roles changed from October to July. Discourse analysis was used to determine if the participants used one of the following roles during each meeting: (a) prompter—prompts the group to describe student thinking; (b) proposer—interprets and offers a variety of explanations for events on the video; (c) builder—develops ideas and uses evidence for claims; or (d) critic—offers alternative interpretations for events they noticed. The findings indicated that the participants changed over time, specifically prompting more discussions focused on student thinking, becoming more tentative in their opinions, using more evidence to support their claims, and questioning others more about their interpretations. Van Es concluded that given the opportunity, the teachers were able to engage in communal reflective inquiry discourse and to take on a variety of roles.

Another study conducted by Sherin and her colleagues relied on the same participants and much of the same data as the aforementioned study (Sherin et al., 2009). In this study, they investigated how participating in a video club influenced the

participants' thinking by evaluating their comments during meetings, their self-analysis, and changes in their instruction (van Es & Sherin, 2010). In addition to attending the video club meetings, the participants in this study also participated in 30 minute exit interviews after the last meeting. The researchers analyzed the transcripts of the meetings to determine the actor, topic, stance, specificity, and evidence the participants used in their comments. The interviews were summarized and instances of learning were highlighted. The transcripts were evaluated for themes related to changes in teaching. The findings indicated that participants changed in all three areas. They became more attentive to student thinking, they became more interpretive and less evaluative, and they paid more attention to the curriculum. The researchers concluded that participating in a video club can lead to changes in teachers' beliefs and practices.

In a more recent study, van Es (2012) used the information gleaned from working with the seven fourth and fifth grade teachers in a monthly video club to suggest a framework for exploring issues of teaching and learning in the classroom. Van Es used the videotapes and transcripts from the ten video club meetings and analyzed them in four stages: (a) analytic memos were written to look for evidence of community; (b) a matrix was used to examine the videos for evidence of community, (c) transcripts were coded using the Learning to Notice Framework (three aspects of teacher noticing—identifying significant events, using knowledge to reason about events, and making connections between events and broad principles of teaching); (d) an overall analysis of the group's level of community was completed based on information from the first three stages. The findings indicated that the facilitator was instrumental in keeping the discussion focused



on the students, rather than on the teacher's actions or other incidental aspects of a typical busy classroom. The facilitator also played an important role in managing social interactions, although there was a sense of community in the club. Van Es concluded that teachers became better collaborators as time progressed, and were more adept at noticing and discussing student work, but they needed guidance.

A much cited study by Sherin and Han (2004) used qualitative methods to examine the learning that took place during a year-long series of video club meetings. The participants were four seventh and eighth grade math teachers from a middle school in the San Francisco Bay area with experience ranging from four to 28 years. The data that were collected included videotapes of both monthly video club meetings (from September to June) and classroom instruction. Both groups of videotapes were transcribed. The researchers used iterative cycles to analyze the data, looking for changes in topic. They identified five types of issues: pedagogy, student conceptions, classroom discourse, math content, and other. The two most common topics (pedagogy and student conceptions) were analyzed for changes in discourse over time. The results seemed to show that discourse shifted from teacher-centered to student-centered and from simple descriptions to detailed analyses of student thinking. The researchers concluded that the video club had provided a place for critical collegueship which resulted in some type of learning for all participants.

**Summary.** The use of videos in professional development is an important addition to teacher education. They have been used in a number of ways and continue to be used in new ways. The existing research indicates that using video improves the

ability to notice and reflect for all participants and specifically helps pre-service teachers link theory and practice, experienced teachers see the need to change their practice, and video club participants engage in more productive conversations.

### **Summary of Literature Review**

The journey novice teachers make along the road to expertise is a complex one. They must learn the curriculum they are teaching, the strategies to best teach that curriculum, and determine how to meet the needs of their diverse group of students. In addition to these demands, they also need to build a capacity to notice student interactions and thinking and develop the ability to reflect on their teaching in the moment, a form of reflection in action (Schon, 1984). The use of video, particularly in the context of a video club, is one approach to accelerate novice teachers' journeys. Existing research has shown that using videos with experienced teachers is effective at improving their ability to notice student thinking and increasing reflection, as long as clear goals are established and appropriate scaffolding is provided. This study intends to extend this research by exploring how participating in a video club affects novice elementary teachers' development, specifically in the areas of: (a) noticing and interpreting classroom events depicted in video clips of math lessons; (b) learning new skills; and (c) gaining insights into the benefits of participating in a video club.

## **CHAPTER THREE: METHODS**

The purpose of this study was to investigate how participating in a video club affected novice teachers' development. Specifically, this study examined: (a) what these novice teachers noticed in video clips of math lessons and how they interpreted what they noticed; (b) what these novice teachers learned from participating in the video club; and (c) what insights these novice teachers gained from participating in the video club.

To answer these questions and to be consistent with previous research on using videos in teacher education, this study employed a qualitative design with a multiple case study framework. It included a pre-post analysis of teachers' ability to notice and interpret events from a ten minute video clip of an elementary math lesson. Participants also took part in monthly video club meetings. In addition, an exit interview was conducted to gain insight into participants' perspectives about what they noticed, what they learned, and what insights they gained. These interview data were triangulated with the pre-post analyses and transcripts from the meetings to determine what effects participating in a video club had on these novice teachers.

### **Setting and participant selection**

A purposeful sample of five novice teachers, four women and one man, in a mid-size suburban school district in a mid-Atlantic state participated in this study. More information about each participant is included at the beginning of each case study.

Previous work with novices have defined them in various ways: pre-service teachers (Borko & Livingston, 1989; Leinhardt, 1989; Peterson & Comeaux, 1987), first year teachers (Berliner, 1988; Krull, Oras, & Sisask, 2007), and teachers in their first three years in the classroom (Kardos & Johnson, 2007). This study defined novices as teachers completing their first year of full time teaching responsibility in an elementary classroom.

**Participant selection.** In order to recruit the participants, I obtained permission from the Director of Professional Learning in the participating county to attend the New Teacher Institute (NTI), a three day orientation provided by the county in late August. I created a display board that provided information about my study and included an interest form (Appendix A) for possible participants to complete. I placed this display in the cafeteria where the NTI attendees would gather for breakfast, lunch and large group sessions. In addition, I met with the veteran teachers who led the kindergarten, first and second grade sessions and asked them to include a brief overview of my study in their presentations. I also provided them with copies of the interest form.

I anticipated being able to recruit all my participants by the end of the three-day session. The participating county hires an average of 200 teachers each year, which led me to assume that there would be a high number of potential participants. However, I failed to consider that only about two-thirds of these new hires were elementary teachers and that of that number, only half of them would be primary grade teachers (kindergarten-second grade). An additional obstacle was that only a small percentage of those who met the other criteria fit my definition of a novice teacher. In the end, I only managed to recruit one participant during the NTI.

My next step in recruiting participants was to contact the principals of the elementary schools in the participating county. I emailed them explaining that I was conducting a study and would like to meet with them to discuss recruiting participants from their schools. Only seven principals had hired first-year teachers to work in the primary grades, one of whom taught at my school, which left six possible participants. I met with these principals and they provided me with the names of the teachers in their schools that met the criteria and might be interested. I sent these teachers emails and four of them agreed to participate.

I visited the schools to meet with each participant individually. I provided each teacher with a binder that included: a letter explaining the study (Appendix B), two copies of the informed consent form (Appendix C), and twenty-five copies of the parent permission forms (Appendix D). The same day I visited the teachers, I also met with the principals and asked them to complete the principal permission form (Appendix E).

**Rationale for participant selection.** This study worked with first-year teachers because previous research has shown that noticing students' actions and thinking is a feature of expert teaching and that this skill only develops after years of experience (Mason, 2002). In addition, beginning teachers are learning and gaining insights into their roles in the classroom. By working exclusively with novice teachers, this research made it possible to study these aspects of teacher development from the beginning. It was important for me to choose participants who taught in the primary grades (kindergarten-second grade) for several reasons. The first was personal. My teaching experience has been exclusively in the primary grades and this is the curriculum and student age group I

know the most about. I believed it would be easier for me to facilitate meetings with teachers from these grade levels. A second reason was that these teachers were more likely to encounter similar situations in their classroom; and based on the expectations established by the state standards, the skills their students were working on were comparable. A third reason for choosing these participants was that a common math assessment is used in these grade levels that attempts to assess students' understanding of number sense on various tasks. Because teachers spend a large portion of their instructional time on lessons designed to build their students' number sense, many of the videotaped lessons showed students practicing these skills. A final reason for choosing participants in the primary grades was that they were not under the pressures of teachers in grades three to five to prepare their students for the state standardized test given at the end of the year.

By choosing participants teaching in the same county, differences in curriculum materials, professional development opportunities, teaching loads, and expectations were minimized. The participating school district uses two math curricula both published by Pearson, EnVisions Math and Investigations in Numbers, Data and Space. Different schools and different grade levels implement the curricula in different ways, but the vocabulary and the skills are consistent across the district. The district also offers county-wide professional development opportunities through an online system ([www.mylearningplan.com](http://www.mylearningplan.com)). Teachers who are new to the county participate in the same training in August at the New Teacher Institute, which includes a three-hour session on the math curriculum. Class sizes are consistent across the county with the average being

22:1 in the elementary classrooms. All teachers are expected to spend 75 minutes each day on math instruction.

If the participants had taught at the same school, factors such as school culture and mentoring practices could also have been accounted for. However, the participating school district is not large enough to have schools that hired four first-year primary grade teachers in the same year. In an attempt to account for differences in teaching environments, information is included in each case study about: school size, class size, student demographics, degree of paraprofessional support, types of support provided in the school (mentors, specialists, professional development ) and whether or not the school receives Title I funds.

**Participant relationships.** Part of my responsibility as the facilitator of the video club was to establish and maintain positive relationships with the participants. I used several strategies to accomplish this. I attempted to set up a trusting, collaborative environment where the novice teachers felt comfortable sharing and discussing their videos. I did this by clearly explaining that the intention of the meetings was not to evaluate each other, but to reflect on student thinking and build the teachers' ability to notice that thinking. Another strategy I used was being respectful of the participants' time by beginning and ending meetings on time. A final tactic I used was providing snacks at each meeting, in an attempt to create a more relaxed atmosphere. I believe these actions helped me form productive relationships with the participants.

## **Data Collection**

This semester-long qualitative study collected several types of data from the five first-year teachers. Before the initial meeting and after the last meeting, the teachers used a website that allowed them to view and tag a video of an elementary math lesson. During the semester, the participants attended five video club meetings where they watched and analyzed videos of both themselves and their colleagues teaching. In a final meeting, the three of the participants independently watched and commented on the same video they watched prior to attending the video club meetings. After the final meeting, I completed an individual exit interview with each participant in an attempt to understand better their experiences as members of the video club.

**Pre/post analysis of a video clip.** Prior to the first video club meeting, the participants viewed and analyzed a ten-minute video clip showing students in a first grade classroom learning about place value, specifically tens and ones. After a brief tutorial on how to use the website, [www.beasmartercookie.com](http://www.beasmartercookie.com), to tag events and annotate the video, each participant independently accessed the website. They were asked to tag anything they found noteworthy in the clip. In addition to providing time stamps for tagged events, the website also allowed the users to add text to explain why they chose to highlight certain events. The website maintained a record of the participants' responses for later analysis.

After the final video club meeting, three of the participants met once more to individually view and analyze the same video clip. After they had finished their analysis, I provided them with a copy of the comments they made during their initial and final



viewings of the clip. I then asked them to compare what they noticed and to comment on how their ability to notice student thinking changed from the beginning to the end of the study. Because only three of the participants completed both the pre- and post-analysis of the videotape, it was not helpful in the way I originally anticipated. I was not able to use the data to see how the participants' ability to notice student thinking had changed. However, I was able to include some of the data in the case studies for the three participants who completed both analyses.

**Videotaped lessons.** As part of the study, the participants agreed to allow me to videotape several math lessons in their classrooms. I asked the teachers to share dates and times that they would like me to come during their math block. I then created a schedule to ensure that I visited each teacher at least three times. I used a Flip UltraHD Video Camera; this allowed me to move around the room to capture both the teacher's instruction and the students' work. The internal microphone was strong enough to record both the teachers' voice and the students' conversations when I stood near them. During the first videotaping session, several students in each classroom waved at the camera and seemed to have a hard time concentrating on their work. However, by the second time I visited each classroom, the students did not even seem to notice my presence.

After each videotaping session, I downloaded the videos onto the hard drive of two computers (the desktop computer in my classroom and my laptop) and to an external hard drive. The reason for saving the video in three places was in anticipation of potential technology problems. After each video was downloaded, I reviewed it and chose a short clip, lasting about three minutes, from each teacher's classroom to share during the next

video club meeting. Some previous studies included the teacher in the selection process (Sherin & Han, 2004; van Es, 2009), but I decided to choose the clips for two reasons. The first was practical, novice teachers are often overwhelmed by the demands of the first year in the classroom (Fry, 2007). The participants in this study had already agreed to participate in the video club and I did not want to take more of their time. The second reason was that I did not think that these novice teachers had enough experience seeing student thinking to be able to choose clips that showed events that would elicit rich discussions in the video club meetings.

When deciding which clips to use in the meetings, I borrowed ideas previously used by Sherin, Linsenmeier, and van Es (2009) when they researched the effects of incorporating videos into professional development. Their work considered three factors when deciding which clips to use: (a) the *window* into student thinking they provided; (b) the *depth* of student thinking they showed; and (c) the *clarity* of student thinking they portrayed. They found that videos with both high and low depth could lead to productive discussions and that if videos were high in both windows and depth, productive discussions could occur with both high and low clarity. In keeping with these guidelines for prompting productive discussions, I chose videos that provided high levels of depth of student thinking and both high and low levels of clarity.

A deviation from previous research was my decision to use brief video clips. Earlier studies used longer clips that featured older students working together to solve math problems and participating in class discussions about their thinking (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Santagata & Angelici 2010; Sherin & Han, 2004). The video

clips for this study showed kindergarten, first and second graders playing games with partners or completing math stations in small groups. Because of their maturity levels, these students did not talk at length about the math concepts they were exploring. Based on this, it seemed logical to use shorter clips. This also allowed all the participants to see a brief video clip from their classroom at each meeting.

After I chose the clips, I saved them on both a flash drive and on an external hard drive (again for security purposes). I then transcribed them and made copies so that the participants could more easily follow along with the video during the meetings.

Permission to videotape the students was obtained via consent forms from parents prior to the first taping (Appendix C). The form explained the purpose of the study, emphasized that confidentiality of students would be maintained, and explained that if they changed their minds at any time they could withdraw their child from the study. Each participant had a few students whose parents did not want them to be included in the videos. When I visited the classrooms, the teachers seated these students out of camera range and told me who they were so I could avoid them as I videotaped.

**Video club meetings.** Sherin and Han (2004) defined video clubs as, "...meetings in which groups of teachers meet and discuss excerpts of videotapes from their classrooms" (p. 164). I borrowed their ideas in establishing the club, but I deviated from their work in that I chose to work exclusively with novice teachers.

I originally planned to have four 60-minute video club meetings. However, due to low attendance at the November meeting, I scheduled a fifth meeting; as presented in Table 1. Some clips prompted more conversation than others, which resulted in a few

meetings lasting slightly longer than an hour. The video club met in my classroom, which had a computer, a mounted projector, and a white screen that allowed for easy viewing of the video clips.

Table 1

*Video club meeting dates, times, topics, and number of participants present*

Date	Time	Featured Videos	# present
October 1, 2013	4:30-5:45	1. Collect \$0.25-Michele 2. Guess My Number-Michele	5
October 29, 2013	4:30-5:40	1. Tens Frame-Elizabeth 2. Double Dice-Joe 3. Towers of Ten-Emma 4. Pattern Blocks-Molly 5. Take from 13 & Bump-Lisa	5
November 19, 2013	4:30-5:30	1. Balancing Act-Lisa 2. Shape ID-Molly 3. Hungry Alligators-Emma 4. Sorting Leaves-Joe 5. Class Discussion-Elizabeth	2
December 17, 2013	4:30-6:00	1. Place Value # 1-Lisa 2. Small Group Addition-Molly 3. Dot Cards # 1-Emma 4. Whole Group Fractions-Joe 5. Sorting Buttons-Elizabeth	5
January 14, 2014	4:30-5:45	1. Place Value # 2-Lisa 2. Independent Addition-Molly 3. Dot Cards # 2-Emma 4. Equal and not Equal-Joe 5. Unifix Cube Patterns-Elizabeth	3

At the first meeting, I showed two clips from my classroom. I believe this allowed the participants to understand better what types of activities I wanted to capture in the clips from their classrooms. It also provided them with an opportunity to practice the

analysis process before they started analyzing videos from their own classrooms. In all the subsequent meetings, a brief video clip from each participant's classroom was viewed and discussed. Before each clip was shown, the featured teacher established the context for the clip and explained what the students were doing. The participants were encouraged to take notes as they watched the video using the provided recording sheet (Appendix F). I served as both the facilitator of and a participant in each meeting.

Previous research on using videos for professional development indicated that meetings were more effective when the facilitator provided appropriate scaffolding and guidance (Santagata, 2009; Santagata & Angelici, 2010). With this in mind, I provided the participants with a recording sheet based on the framework for professional noticing developed by Jacobs, Lamb, and Phillip (2010). They suggested that facilitators provide prompts to guide the discussion because people may interpret the same event differently. Their work focused on three aspects of students' math thinking: (a) attending; (b) interpreting; and (c) deciding how to respond. I adapted their prompts to meet the needs of these novice teachers:

1. Describe in detail what you noticed in this video clip.
2. Explain what you learned about these students' understandings and misunderstandings.
3. Pretend that you are these students' teacher. What is your next step?

These prompts served as a scaffold for the participants as they developed their ability to notice students' actions and thinking. They also provided a common vocabulary and a starting point for discussions. However each participant's experience was unique,

which resulted in different developmental paths. These differences will be further explored in the next chapter.

In addition to providing prompts to steer the discussion, I also tried to effectively and efficiently guide the meetings. As a result of her extensive work with teachers and video clubs, van Es (2011) developed a guide to facilitate discussions. In leading the video club meetings for this study, I used her framework, which included three dimensions: (a) program structure; (b) discourse structure; and (c) interpersonal interactions. Program structure focused on the logistical aspects of the meetings, e.g. establishing the context for viewing the videos, making sure the teachers understood the math concepts being taught, and appropriately pacing the discussions.

The second dimension, discourse structure, was more relevant to the video club meetings in this study. Van Es suggested three ways to guide the discourse during a meeting: (a) open the discussion; (b) focus the discussion; and (c) probe inferences. After we viewed each clip, I used the prompt, “What did you notice?” to open the discussion. Once the teachers began talking, I used prompts to focus their discussion on certain aspects of what a student said or did in the clip. When the participants made inferences, I asked them what evidence they used to draw their conclusions.

The third dimension of van Es’ framework, interpersonal interactions, was especially important for this study. The teachers in this study did not know each other prior to their participation and the timeframe of the study was relatively short. With this in mind, it was important for me to validate the teachers’ input, be supportive, and share my ideas as an equal in the group. By incorporating these moves in my facilitation of

meetings, I believe I helped put the participants at ease and encouraged them to share their ideas and opinions.

I used my iPad to videotape the meetings in addition to audio taping them. I did this because I believe a person's body language can say as much about their attitudes and their beliefs as the comments they make. I wanted to capture both expressions of the participants' thinking. Having both an audio and video record of the meetings also helped me determine who was saying what as I transcribed the recordings, especially when voices overlapped each other.

**Exit interviews.** After the last video club meeting, I scheduled a thirty-minute interview with each participant, as displayed in Table 2. I arranged to meet in the teachers' classrooms in an attempt to put the participants at ease. During the interviews, I used an interview guide (Appendix G) as a starting point for the conversation. But as the literature suggests (Weiss, 1994), I deviated from the guide as the interview progressed in order to build on the teachers' comments. I took notes during the interviews; but also audio taped them to ensure accuracy. Immediately following each interview, I wrote a memo in an effort to capture information that was not captured on the tape, such as the participant's actions and the surroundings.

Table 2

*Schedule of exit interviews with participants*

<b>Participant</b>	<b>Date</b>	<b>Location</b>	<b>Time</b>
Joe	January 19, 2014	His classroom	4:15-4:50
Molly	January 27, 2014	Her classroom	4:10-4:40

Elizabeth	January 30, 2014	Her classroom	4:30-5:15
Emma	February 3, 2014	Her classroom	4:30-5:15
Lisa	February 7, 2014	Her classroom	4:15-5:00

## Data Analysis

The data that were analyzed included: transcripts from the video club meetings; transcripts from the exit interviews; memos I wrote during data collection; and teachers' annotations of the videos from the pre/post analyze of a video clip. My first research question about noticing classroom interactions led me to include some organizational codes, such as: (a) students' thinking; (b) students' strategies; and (c) students' misconceptions. I kept these codes in mind as I studied the transcripts and memos, but I also concentrated on creating substantive codes, which "...implicitly make some sort of claim about the topic being studied..." (Maxwell, 2013, p. 108). Some of these codes were: eye-opening, preoccupied, overly-critical, stop and listen, and talking with a group.

**Video club meeting and interview transcripts.** I started data analysis immediately after the first video club meeting. I remained in the classroom after the teachers left and wrote a memo detailing my observations about the meeting. I included some initial theories about the participants' personalities and my interpretation of how the meeting had gone. I did this at the conclusion of each meeting and each interview.

I transcribed the recording from each meeting and read through it several times before the next meeting. I did this to help me understand how I was facilitating the group, how the participants were interacting, and to see what I might be missing. I wrote memos



to remind myself of topics I wanted to explore further, and questions I wanted to ask in later meetings. I also did this in between interviews, which helped me improve my interviewing skills and made me aware of adjustments I needed to make in the interview guide.

Because I chose to treat each participant as a separate case, I initially studied the interview transcripts to identify substantive codes that were unique to each teacher. I wanted to understand what each teacher was thinking and what he or she was learning from the video club. I then reread the meeting transcripts and used these codes to label the participants' comments. I also established several new codes based on their comments in the meetings. After I coded the interview and meeting transcripts for each teacher, I looked for commonalities. Then I grouped the codes for each participant based on topic similarity.

Once these groups were established, I wrote summarizing sentences that made some claims about what was going on with each participant in the context of the video club. These sentences were used as row headings in individual matrices, which I modeled after Sarah Daily's work, as suggested by Maxwell (2013). Then I placed each coded comment in the corresponding cell of a separate matrix for each participant. This allowed me to see where the holes were in my data and what I needed to look for as I read through the transcripts again. After I completed each matrix, I looked for connections between the sections of the matrix. I wanted to understand how each participant was experiencing the video club meetings.

I then studied the matrices for the individual participants looking for patterns in the data. I used these to create a sixth matrix that included themes that appeared in more than one individual matrix. By placing the comments from the five participants next to each other I was able to see the commonalities and differences across and between the participants. These data were then be used to draw some conclusions about the effects of participating in a video club on these novice teachers. This data analysis method was used because the research questions focused on “how” and “what” questions which were best answered by analyzing what participants said and by looking for common themes, as well as differences, in their thinking (Maxwell, 2013).

**Pre/post analysis of a video.** Participants used [www.beasmartercookie.com](http://www.beasmartercookie.com) to tag and annotate a ten minute video of an elementary math lesson. Because only three participants completed the post analysis I did not have enough data to create a frequency graph as I had originally intended. However, I was able to code the three participants’ comments and place them in the corresponding cells of their individual matrices.

### **Validity Threats**

This study had several validity threats. The first of these was the possibility of my bias affecting the way I collected data and what I considered relevant to the study. In an attempt to account for my possible bias, I wrote a researcher identity memo, as suggested by Maxwell (2013). This memo helped me recognize my beliefs about first year teachers and about the role that video can play in education. Once I was aware of these beliefs, I made a conscious effort to understand how they affected how I led meetings, the data I chose to collect, and the way I chose to interpret the data.

A second validity threat is the problem of reactivity in three situations: my influence on the students in the classrooms I videotaped; my influence on the participants at the video club meetings; and the participants' influence on each other. The teachers and I tried to minimize the impact of my presence in their classrooms in two ways. Before my first visit to each classroom, the teacher explained to the students that I would be coming and that I wanted to see how they solved math problems. When I arrived, I took a minute to show the students my camera and explain that I would not be able to use the recording if they were not on task. These strategies seemed to help students focus more on their work and less on the camera. In addition, I taped in each room multiple times. Each time, the students seemed more comfortable and paid less attention to me.

Another situation where I needed to be aware of the problem of reactivity was in my role as both a participant in and the facilitator of the video club meetings. I had to be present in the meetings to guide the discussion and scaffold the learning, but my presence changed the conversation. It was sometimes hard to determine to what extent my presence affected what the teachers said so it needs to be acknowledged as a possible validity threat. I addressed this potential issue by keeping detailed researcher memos. Following each meeting, I remained in the classroom for several minutes to record my impressions of the participants and the meeting. I kept these memos and referred to them as I analyzed my data.

A final area where reactivity was a potential problem was the effect the participants had on each other during the meetings. It was unavoidable that the participants' comments and actions were sometimes influenced by what the others said

and by how they behaved during the meetings. I addressed this potential issue by asking questions about it in the exit interviews. The participants all claimed that hearing what others said helped them with their own interpretations. One participant said that, “It was very easy to come up with thoughts because we were all kind of talking them through together.” In any small group, participants take on different roles. This happened in the video club meetings, with some people speaking more and some listening more. I addressed this issue in two ways. First I created a recording sheet (Appendix F) which provided an opportunity for quieter members to share their ideas. In addition, I attempted to create a trusting environment in which to conduct the meetings. However, since none of the participants was familiar with each other prior to the meetings this was not an easy task. Trust requires time and the sharing of common experiences. As the meetings progressed, I believe the participants began to trust each other more, which was reflected in their increased willingness to share their ideas.

In order to address other possible threats, I used several strategies suggested by Maxwell (2012): triangulation, “rich” data, and member checks. I used triangulation by collecting data from multiple sources: (a) transcripts from video club meetings; (b) transcripts from individual interviews; (c) artifacts I collected; (d) memos I wrote after classroom visits; and (e) memos I wrote after video club meetings. These sources allowed me to write “rich” descriptions of each participant and the effects that participating in the video club had on them. I was also able to compare and contrast the data across all five cases to draw my conclusions. I also conducted member checks in an effort to ensure accuracy in my interpretations. I sent each participant a copy of his or her case. I asked

him or her to review it and tell me if I had misinterpreted their comments. I used these three strategies in an attempt to address possible validity threats.

### **Summary**

This study used qualitative methods to investigate how participating in a video club affected novice teachers' development. The data included a pre- and post-analysis of a videotape, five video club meetings where clips from the participants' classrooms were viewed and discussed, and exit interviews. The data were analyzed for each participant and across the five participants. In the following chapter, a case study is presented for each participant.

## **CHAPTER 4: FINDINGS**

Novice teachers face multiple challenges as they enter their first classrooms. They are expected to manage the classroom efficiently, plan engaging lessons for students, notice and interpret their students' thinking, and accurately assess student progress (Berliner, 1988; Feiman-Nemser, 2001). The purpose of this study was to examine how one intervention, a video club, affected five novice teachers' development, specifically:

1. What did these novice teachers notice in the video clips of math lessons and how did they interpret what they noticed?
2. What did these novice teachers learn from participating in the video club?
3. What insights did these novice teachers gain from participating in the video club?

Robert Stake's (2006) interpretation of multiple case study research is that a single case becomes meaningful because it is part of a group of cases that have common features. He uses the term "quintain" to identify the group that is studied and the term "case" to identify each part of the quintain. In this study, the video club is the quintain and each participant is a case. The findings for each participant were considered individually because each person's situation and interpretations were unique. However, the goal in studying each case was to understand the quintain better, so a cross-case analysis was also conducted.

This chapter is divided into two parts: (a) the individual cases; and (b) the cross case analysis. Each participant's case is organized using the research questions as an outline. The data are further divided into sections detailing what aspects of the math lessons the participants noticed, what they learned from participating, and what insights they gained. The topics for these subsections are based on two types of codes: (a) etic codes—which are based on my interpretation of the data; and (b) emic codes—which are taken directly from the participants' comments (Maxwell, 2013). The cross-case analysis identifies themes that appear in multiple cases and themes that are unique to each case.

### **The Individual Cases**

Each of the five participants gained something from participating in the video club, but each one's path was different. Each teacher had a different background, completed a different preparation program, and taught in a different setting. Because of these differences, each teacher viewed and interpreted the videos through their own lens. Each teacher also participated in the study differently. Not one participant attended every meeting and some missed multiple meetings. Appendix G provides an overview of each teacher's participation in the study. A figure that shows which activities related to the study each of the novice teachers' participated in is included at the beginning of each case study. The diamonds represent the meetings and the triangles represent other activities, such as dates I videotaped in their rooms.

Each case begins with a background section. This includes personal information about the participant, information about his or her participation in the study, and the setting in which he or she teaches. This information is provided because the individual

teachers' personalities and teaching contexts affected how they experienced the video club. The findings section follows the background section and includes three subsections: (a) noticing and interpreting classroom events; (b) learning new skills; and (c) insights gained. Following the findings is a section detailing each participant's unique "Aha!" moments, those times when they expressed something significant about their teaching or about the realities of teaching in an elementary school.

At the end of each case a figure is included that provides an overview of each participant developed in the video club. The dates for each activity are listed at the top of the figure and the important aspects of what the teacher noticed, learned and gained are shown below the dates on which they occurred. The aspects shown in green are the most salient aspects of participating in the video club for each of these novice teachers.



## LISA

### Background

**Personal information.** Lisa is a 26 year-old teaching in a second grade inclusion classroom. She graduated in 2010 from a public mid-sized university on the east coast with a bachelor's degree in psychology. She worked as an Applied Behavior Analysis therapist for two years before returning to the same university to complete her graduate degree, earning her teaching license and master's degree in education in 2013. Of the five participants, Lisa was the only one currently working in the school in which she completed her student teaching placement. She also had the opportunity to work with her current grade level team when she served as a long term substitute during the spring of 2013. The school had several new teachers, but she was the only first-year teacher.

During the study, Lisa was completing her first semester of teaching in a school with a population of over 900 students. She had 24 students including 11 girls and 13 boys, two of whom have autism. Four students were Black, two were Hispanic, 14 were White and four students were identified as other. Five students were considered economically disadvantaged. The two students with autism had one-on-one paraprofessionals to assist them, but Lisa had no other support during math instruction.

**Participation.** Lisa agreed to participate in the study during the training for teachers new to the county at the end of August. The facilitator of the Colleague and

Mentoring Program (CAMP) at her school talked with her about the study and told her it would be a good professional development opportunity and that it might be good to put on her resume. Lisa agreed, filled out the interest form, and emailed me to arrange a meeting. During this meeting, I explained the study and provided Lisa with the necessary forms. She seemed eager to participate, explaining that she saw the video club as an opportunity to gain additional feedback, something that she valued. Lisa also said, “I think feedback in general is just very beneficial because they’re like a third party...they’re coming in and getting a snapshot of your classroom and...they can say what they see and things that you can do better.” She shared that during her student teaching placement, she had videotaped and critiqued a lesson. She cautioned that, “I perform very badly on videotapes...because I get very anxious.” The same day I met with Lisa, I also met with her principal. During our meeting, he explained that he did not usually hire first-year teachers, but he shared that he had confidence in Lisa since he had the opportunity to observe her during student teaching and while she was substituting.

Despite Lisa’s best intentions, her attendance was not consistent. She was 20 minutes late to the third meeting because she was locked out of the building. Once she was able to get in, she was full of apologies and immediately joined the conversation. She missed the last meeting, but came by afterward to explain that the maintenance men had arrived to install her Smart Board and she just forgot. She was very apologetic and even offered to watch the videos at home. During our interview, Lisa talked about how bad she felt about missing a meeting and realized that it affected the discussion. She said, “when everyone wasn’t there it definitely impacted our conversation.” She also worried that she

had not done as much as she could have, commenting that, “I felt like I wasn’t able to give my best to the group just because of time. And that’s not fun, just because you want to.” Of the five participants, Lisa was the most conscientious about participating in and contributing to the study. Figure 2 provides a summary of Lisa’s participation.

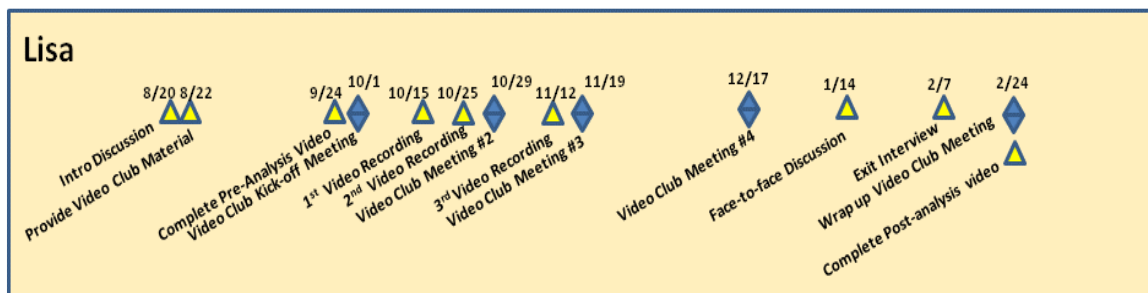


Figure 2. Lisa's participation in the study

**Setting.** Lisa’s large classroom was in the newest elementary school in the county, with a bathroom in the room and a door leading to a courtyard in addition to the door to the hallway. Twenty-five desks were arranged into groups of five with each group having a number hanging above it so that Lisa could call students by table number. The desks faced each other so that students could work together. Stations were set up around the edges of the room—listening, reading, math, and word study. A word wall hung over the cubbies for students to reference as they wrote. There were small signs with the numbers one to 13 on them hanging on walls and desks around the room. These were “zones” where students went to play partner games.

Each time I arrived to videotape (October 15, 2013, October 25, 2013, and November 12, 2013), Lisa was standing by the document projector teaching a whole

group lesson and students were in their seats working in their math notebooks. At the conclusion of the whole group lesson, Lisa explained the partner activity they would be working on, paired students up, and gave them the necessary materials. She then walked around the room, monitoring student progress as I videotaped students completing the activity.

## **Findings**

When I interviewed Lisa at the end of the video club to discuss how it affected her development as a first-year teacher, she was able to identify ways in which she believed her knowledge base had expanded by participating. As I reviewed the data sources: (a) the video club meeting transcripts; (b) the exit interview transcript; (c) Lisa's recording sheets from the meetings; and (d) Lisa's pre- and post-analysis of the ten minute math lesson, I found evidence of development in the three areas that the research questions addressed. Lisa: (a) noticed and interpreted classroom events; (b) learned new skills; and (c) gained insights from participating in the video club.

**Noticing and interpreting classroom events.** As I analyzed the data, I identified seven aspects of classroom events that Lisa noticed. The first three are facets of teaching that focus on Lisa and her development. The last four focus on students' development and their thinking. Three of these relate directly to the recording sheet I provided to the participants at each meeting (Appendix F).

***Aspect 1: Shift in focus.*** At the second meeting, I arranged the videos in order from kindergarten to second grade. I thought it would be interesting for the group to see how students develop over the years. Lisa was very quiet as we watched the first four

videos, only making one brief comment. When I asked her to introduce her video clip, which featured students playing a subtraction game, she began with, “It was a new game and it was a fail!” She was so worried about her actions and how she was performing as a teacher that she was not able to focus on the students and their thinking. She explained that she did not have the correct materials for the students, that she had neglected to provide them with the tools they needed to be successful, and that she had rushed to prepare a lesson because I was coming to videotape. It was hard for Lisa to watch her students and comment on their thinking. Most of her comments focused on what she, as the teacher had done wrong. When her students did not understand something, she said, “it was more of a reflection on me because I didn’t properly explain the task at hand.”

Lisa’s reaction at the fourth meeting, which occurred seven weeks later, was different. I showed the videos in descending order this time, beginning with second grade. Lisa was more comfortable introducing her video clip, sharing some background information about the place value game her students were playing and acknowledging that it did not all go as planned. The comments Lisa made about her video clip during this meeting were more focused on the students’ thinking:

what’s interesting with that is that once they placed the card down, they couldn’t move it. I said it was glued to the paper, so if they took a risk to put an eight in the tens place because they wanted that nine and then they got a two, sorry! They were having to think ahead and having to strategize, which is hard for them.

Lisa was also more active in the video club discussion about other teachers’ video clips during this meeting. She made comments about both the students and the teachers featured in the clips. A clip from a first grade class showed students practicing an

addition strategy where they begin with the smaller number and add the larger number—a strategy referred to as “counting on.” Lisa said, “it was almost like they started with the smaller number because that’s what they know, they’re so used to rote counting.” After seeing kindergarteners participating in a class discussion, Lisa commented, “It’s like a true number talk. You’re not lecturing at them, you guide them and lead them versus telling them.”

When we talked during the interview Lisa said, “It took me probably the first two or three (meetings) to get over the self-consciousness.” She admitted to being intimidated at first by the idea of being videotaped. She thought I was going to focus on her and she wanted to “appear that I know what I’m doing, when that’s not always the case. As was seen in the videos at times.” In later meetings, Lisa realized, “it was about the students and their thinking and it kind of changed my focus off of me and onto the kids.” Lisa was able to change the focus of her noticing from herself to the students from the first meeting to the last. At the December 17, 2013, meeting Lisa said, “I’m over looking ridiculous.”

*Aspect 2: “Remove myself.”* Lisa worried about what she was doing and how she would be portrayed in the video clips from her classroom. She eventually realized that by “removing herself” she gained more from the experience. She admitted that during the first few meetings when the other teachers commented on the clips featuring her students, it was hard for her. She said, “It took me the first few to remove myself from the comments and realize that they’re strictly talking about my kids’ thinking.” Realizing this allowed Lisa to analyze the students’ thinking in all the videos. She commented that, “You were really able to just talk about their math thinking which was nice because you

didn't have all the distractions.” After watching students in a first grade class working on number combinations during the third meeting Lisa said, “I think sometimes our standards are not developmentally appropriate. Like what we require is not age appropriate. You know, like sums, combinations of nine or combinations of seven.” Once Lisa was able to remove herself from the comments made by the other participants and the videos showing her classroom, she was able to notice more about student thinking and interpret it in light of the state standards.

Another piece of evidence that indicated Lisa was beginning to realize the importance of “removing yourself” from the situation was the difference between her pre-analysis of the ten minute video on [www.beasmartercookie.com](http://www.beasmartercookie.com) and her post-analysis of the same video. Prior to the first video club meeting, Lisa made general comments about what the teacher and the students were doing:

I like how she had the students repeat her or count with her to help engage the students. I also like that the students were required to use a variety of materials to make groups of ten to help the students understand they can use counting by ten strategy with any materials. I think it is important that the students had to figure out how many bags or rubber bands they needed because it required them to think in groups of ten versus ones.

In her post-analysis, Lisa continued to focus primarily on the teacher and the strategies she used to help the students understand the concept of place value. But she also identified specific examples of students' understanding:

I like how the students made a connection to their calendar in the classroom. They realized they were making groups of ten like they make groups of ten with straws for the number of days they have been in school. I love the exit cards she created as a formative assessment. The little blond girl understood the objective because she was trying to explain to her partner that 20 rubber bands was way too many. The teacher did a great job of encouraging math thinking and discussion with her

students by asking them how many bags do they need and why. She never told them the answer even if they were wrong. She let them problem solve and figure it out on their own even when they would ask for 42 bags!

After participating in the video club meetings, Lisa noticed the teacher and the students rather than solely the teacher. As she watched the videos, Lisa seemed to begin to notice and understand how the students were developing their mathematical thinking.

*Aspect 3: “Exploring math.”* During the wrap up session, Lisa talked about how her beliefs about teaching math had changed. She said, “I realized the importance of guiding students to the answers versus telling them the answers. I also saw the other teachers (in the video club) encouraging their students to problem solve and ‘explore’ math versus ‘do’ math.” Several comments Lisa made during the meetings show that she noticed when the other participants gave their students opportunities to explore the math. When she talked about a video showing second graders from my class having to exchange money, she said,

So he was going to have make change because there wasn’t six pennies. He was going to have to do something and to hear him thinking out loud, like he realized at that point, but then he kind of froze, like, “Ok, where do I go from here?”

During our interview, as Lisa talked about how she would like to teach math, she returned to the idea of allowing students time to use different manipulatives to explore math concepts. She said, “I definitely saw the benefits of teaching a whole group lesson and then providing an opportunity for the kids to have that application piece.” However, Lisa felt like this was hard to do in her classroom, given the number of students and the lack of support. She said, “in an ideal world, it’d be nice to have a para(professional) or some type of support in here.”



*Aspect 4: Growth in students' understandings.* Lisa was able to identify several examples showing how her students and her colleagues' students were gaining new mathematical understandings in the video clips. Watching students from her own class playing a subtraction game during the second meeting Lisa said, "it was good to see once I gave them their tools they knew how to use them and they were successful." Seven weeks later, at the December 17, 2013 meeting, she said, "my students were able to understand this [place value] game because they already had a strong concept of greater than and less. They started building it when they used a number balance to compare the sums of addition sentences. We saw that video a few meetings ago." Lisa seemed to think that she was able to see the growth in her students when comparing their thinking in earlier videos to their thinking in later videos. During the interview, she said, "I could really see what they went from at the beginning of the year to what they are now and to think where they're going is exciting."

Lisa also saw the "in the moment" growth in the video clips of students from other classrooms. While watching second graders in my class play a game where they used place value clues to guess the number their partner was thinking of, she noted, "the first time they were saying more than/smaller than. But then they adopted the word after the teacher corrected them. And they started saying greater than and less than." At the fourth meeting, Lisa recognized that first graders were taking a shortcut while playing a game where they turned over two cards and added the number of dots together. She commented that, "if they have a five and one and their friend got a seven and an eight, what's the point? They can clearly see that there's more, which is an important skill." A

comment Lisa made during the interview captured the fact that she was noticing student growth, “that they were actually gaining understanding of concepts was cool! Hey, I taught them that!”

**Aspect 5: Strategies used.** Lisa noticed the strategies that students were using as they played math games and solved problems together. When watching her class play a place value game, during the fourth meeting, she realized that her students were able to think ahead, “It was good to see Mary saying ‘I want a three and a four.’ So she had already pre-thought what number she wanted in order to get the space she wanted.” Lisa also recognized when her students were using strategies she had taught them, “I saw a couple kids run to their desk and use their number line and run back to their boards.”

At the December 17, 2013 meeting, the club watched a clip from a first grade class that showed students playing an addition game. Lisa realized that “they started with the smaller numbers because that’s what they know.” When discussing the game with the other members of the video club, she also realized that the students were not able to use a strategy her class uses, “see ten and just add two more. Oh, they don’t know that yet!” The videos helped Lisa notice how students were solving problems.

**Aspect 6: Misconceptions.** Another facet of student thinking that Lisa noticed was when her students had misconceptions about the math concepts they were learning. While watching the clips, she saw opportunities to re-teach a concept. At the fourth meeting, the members of the video club watched a clip showing students in Lisa’s class playing a subtraction game. Lisa realized that one of her students needed some additional practice, “Todd had trouble articulating his thinking. So that would be something I should have or

would have gone back to revisit, like force him to use the numbers in a math sentence.” During our interview she commented that seeing her students work on the videos helped her “know where I’m at and where I need to take them. Just like a reinforcer to me that they’re getting it or not and if we need to take a couple steps back and relook at this.”

Lisa was also able to identify instances when students in other classrooms needed more help understanding a math concept. She pointed out an example of a misconception at the first meeting as she watched second graders in my class playing a money exchange game. She said, “the next step of putting the nickels to the dimes and then the dimes and nickels to a quarter tripped them up.” At the fourth meeting, Lisa noticed that first graders who were using the counting on strategy (beginning with the smaller number and adding on the larger number) sometimes did not begin with the larger number. Instead, “they would move it so the smaller number was first....I think that it’s their comfort zone though, like rote counting.” Seeing both her students and those of the other participants in the video clips helped Lisa identify areas where students might have misconceptions and need additional help.

***Aspect 7: Development across grade levels.*** Watching videos of her students and comparing them to the videos from the kindergarten and first grade classrooms helped Lisa see how students’ thinking develops over time. Lisa became most aware of the gains students made during the December 17, 2013 meeting. The group watched a kindergarten class sorting buttons by attributes. After the clip ended, Lisa said, “it’s amazing what it’s grown from, from being five! And that’s only two years! During the interview, Lisa mentioned that it was nice to:

see kindergarten, first, and the progression. That sometimes when you get frustrated that a kid doesn't know their addition facts like that. But they're learning the concept of adding, putting two things together in kindergarten and first grade. And then the repetition and the application comes more in second grade. So kind of seeing where they've come from and where they are now. Even if I were to see a third grade it would be cool to see where they're going when they leave me.

The videos provided an opportunity for Lisa to see how students in the two grades below hers developed their mathematical thinking. Because she was able to "visit" these classrooms, Lisa seemed to have a better understanding of how foundational math skills were taught.

As a result of participating in the study, Lisa noticed seven aspects of classroom events in the video clips of math lessons. She noticed three aspects that focused on herself: (a) she noticed that she needed to shift her focus from herself to her students; (b) she noticed that when she removed herself from a situation she was able to understand better what the students were doing; and (c) she noticed that she needed to allow students to explore the math and figure things out for themselves. She also noticed four aspects of students' development and thinking: (a) she noticed that students' mathematical thinking developed; (b) she noticed the strategies the students used; (c) she noticed the students' misconceptions; and (d) she noticed a predictable pattern of growth in skills across grade levels.

**Learning new skills.** Another area in which Lisa benefitted from participating in the video club was in learning new skills and considering how she might apply them in her classroom. I identified four lessons that Lisa seemed to learn as the video club meetings progressed.

***Lesson 1: Learning from others.*** Lisa displayed an eagerness to learn in many situations. She explained that she readily used the resources in her school when she needed help with instruction. She relied on her former student teaching mentors in first and fourth grades, her current mentor in second grade, and even her administrators to provide her with suggestions and feedback. Lisa shared that, “[her principal] observed one of my math lessons at the beginning of the year and gave me great feedback.” She also was willing to ask the math specialist to assist her with presenting a new math concept to her students. Lisa said, “I begged her to come into my room to reach my first regrouping lesson...it was awesome because she totally modeled for me...just to see the strategies of a specialist was really nice.” Lisa’s comments during the video club meetings and the exit interview also indicate that she was also able to learn from the other participants.

Lisa especially appreciated being able to see how the three first grade teachers who participated in the video club were teaching some of the concepts her students struggled with. She said, “I liked seeing that if my kids aren’t getting something, it allowed me to look at strategies of how to backtrack to review what they’ve learned in previous years.” She also listened to ideas the other participants had about extension activities. She thought that

there were really a lot of good suggestions. There were a lot of good ideas of how I could take it further. I felt like the group was really good about that. Like how you could differentiate to the students who need extension activities.

During the exit interview, Lisa mentioned that it would have been nice if the meetings had been more frequent so she could have implemented some of the suggestions

from people in the group. But she felt like “when we talked I was two weeks past the unit.” But she did say that she planned to use several of the suggestions in review activities and when she teaches the same units next year. This seems to indicate that Lisa did not see the knowledge she was gaining as applicable to teaching in general.

***Lesson 2: Managing materials.*** Lisa felt like she learned some valuable lessons about managing materials as a result of participating in the video club. When I visited Lisa’s room to videotape for the second time, her students were working to understand why different number sentences could result in the same sum. Groups of students had worked together to use connecting cubes and number balances to “see” that  $6 + 1 = 3 + 4$ . The next step was for the students to work with a partner to apply this idea to some practice problems. It was not until I started videotaping that Lisa realized she had made a

rookie mistake. There were so many materials; they had to have a clipboard, they had to have a pencil, they had to have a game board, they had to have so many cubes and each person had to have their own set of cubes, so they have eight or ten of each color. I just didn’t have it like they come down the line in the cafeteria.

Lisa realized that even “simple things [like distributing materials] can impact...or hinder the kids math thinking because you take time from them.”

Lisa also learned that she could “set up a game in a way that was distraction free or more concrete” for students. During the interview, Lisa recalled watching a video of the second graders in my classroom playing a game with money. She commented that it would have been helpful to have, “something to differentiate the coins on the carpet so that the kids can see them better.” She also mentioned that other teachers had used

different manipulatives to teach some of the same concepts she did and that she would like to try some of these different approaches next year.

***Lesson 3: Replaying games.*** During the interview, Lisa explained that her approach to games in her classroom was “one and done.” She typically found and taught a new math game to her students every day. As she watched other teachers’ videos and listened to them talk about their math classes, she realized that it was acceptable to play a game more than once. She said,

By the end of the video club, I started doing an activity that we had already done. I found it beneficial, and I think people in the video club kind of showed me this. They did the same game in Investigations for like weeks. And I was like, “Oh!” And so from the video, like seeing that they had sorted those buttons and it was like the third week...I took that as, “Well maybe I should do it [the game] more just a day or two.

Lisa realized, from reflecting on the times I visited to videotape and from participating in the video club, that it was actually a good thing to replay games. She realized that, “it was really difficult to explain the whole directions, model it [the game] for them, give them the materials, pair them up in partners, and put them in zones around the classroom.” When she introduced her video during the October 29, 2013 meeting, Lisa mentioned that “It’s always been a new game I’m introducing right then. And it probably needs to be something that we’ve already done so that they know how to do it.” By the last time I videotaped in her room Lisa had changed how she used math games. She asked the students to play a familiar game. This resulted in me being able to capture more student interactions and Lisa seemed more relaxed while I was in her classroom. As I was leaving, she commented that “the transitions and the flow were so much better when they kids were familiar with the game.”

***Lesson 4: Helping others.*** As the meetings progressed, Lisa realized that she could offer advice to other teachers even though she was a novice teacher herself. During the interview, she commented that it was nice to be able to “provide some suggestions for other people. Like, ‘Hey, you do have some high flyers in first grade and this is what I do in second grade.’” In the last two meetings she attended, Lisa seemed more comfortable sharing ideas she thought might increase student learning. In the fourth meeting Lisa suggested to a participant who taught first grade that she might provide her students with a number line when they were adding larger numbers because , “it was almost like they forgot the numbers because they were too big for them.” Lisa even mentioned using “exit slips” for formative assessment to the kindergarten teacher, but then realized “they’re a lot more painful when you’re five and six versus when they’re a little bit more independent.” She then suggested that perhaps they could “verbally summarize” what they did at their math stations.

Lisa’s comments suggest that as a result of participating in the video club, she learned four important lessons that changed how she approaches teaching. She saw that she could learn from and help other new teachers. She realized that she needed to manage materials more effectively. Finally, she saw that when children played a game more than once they were able to practice skills they had not yet mastered.

**Insights gained.** A final area in which Lisa’s knowledge developed during the meetings was the insights she gained from participating in a video club. I identified three insights Lisa seemed to gain.



*Insight 1: “Eye-opening.”* Lisa labeled two video clips, both occurring during the fourth meeting, as “eye-opening.” The first was of a whole group lesson in first grade where the teacher was at the front of the room explaining a new concept to the students and the students were sitting at their desks. The class was a bit off task, which prompted Lisa to comment, “whole group lessons are eye-opening. Because there are a lot of kids playing in their desks and stuff and it’s hard to engage them, especially mass quantity of 20 or 24. I wonder if my kids are that off task?” She made a connection between what was going on in this teacher’s room to what she suspected she might see if I videotaped a whole group lesson in her room.

The second clip showed a kindergarten class sorting buttons and again, they were a bit off task. Rather than completing the assignment, students were reading the nametags that were taped to the tables and having conversations. Lisa said,

Oh my gosh! That was so funny! That was eye-opening! It’s eye-opening for me especially like, “Whoa!” I need to be more patient and more realistic in my expectations. [Compared to kindergartners]... my kids are just miniscule off topic. But then again, they’re seven, it’s amazing how they’ve grown from being five!

As Lisa watched the video clips from one of the participant’s classrooms and compared it to the clips showing her own class, she recognized the growth in the students. She was able to see how students’ abilities and behaviors changed from the beginning of kindergarten to second grade. She realized that she might need to reconsider her high behavioral expectations in light of where the students started and how far they had already progressed.

***Insight 2: “Same boat.”*** As Lisa attended the meetings and listened to the other participants sharing information about their students, lessons they had taught, and how their year was going, she began to realize that they were all in the “same boat.”

During the interview, Lisa mentioned that it was nice, “to realize that we’re kind of in the same boat...to kind of see other people stumble and things didn’t go as planned, or to see Wow! That really did work. I might try that type of thing.” A discussion during the fourth meeting embodies this idea. The participants had just watched a whole group lesson from one of the participants’ first grade class and were talking about students paying attention. Lisa said, “You think things are going so well and then you look around and you’re like, oh my gosh! How many friends [students] are with me?” Following her comment, everyone laughed and shared what they tried when students were not listening.

***Insight 3: Support group.*** When Lisa reflected on the club meetings during the interview, Lisa compared the members of the video club to a support group. She appreciated that they were all first-year teachers and thought it was nice to have the opportunity to be around other beginning teachers and be able to discuss things with them. Lisa thought it was a great opportunity to, “empathize with people and to kind of be going through the same struggles and frustrations or excitements.” She thought the meetings provided a comfortable environment where everyone was encouraged to share their ideas. She thought, “different things stood out to different people, which was good...and that the discussion lent itself to different opinions and different viewpoints and different personalities.”

Lisa seemed to gain three insights from participating in the video club. She realized that watching videos can be eye-opening. She saw that novice teachers were in the same boat. Finally, Lisa began to view the other participants as a support group.

### **Lisa's "Aha" Moments**

Lisa developed in several areas. Evidence of her growth can be seen in the meeting transcripts, in Lisa's comments at the exit interview and in the artifacts I collected during the study. I believe that Lisa had three "Ahas!" during the study that made her reconsider her actions as a teacher. The first one occurred the second time I visited to videotape on October 25, 2013; the second one occurred during the November 12, 2013 videotaping; and the last one occurred at the fourth meeting on December 17, 2013.

Lisa's first "Aha!" related to distributing materials. Lisa had introduced a new lesson and had to give the students multiple materials (cubes, clipboards, game board, dice, cards, and baggies). She recognized that the way she had chosen to distribute these materials was not efficient and that a large amount of instructional time was lost. She realized that she needed to set it up like a buffet line so that students would have more time to play the game, and spend less time getting organized. During the interview, Lisa said that if I had not been waiting to videotape the students playing the game she would not have been so conscious of the lost time.

The second "Aha!" was about the use of games. Prior to attending the meetings, and even through the first few, Lisa introduced a new game to her students every day.

Because of the video club, she realized that it was all right to let students replay games and that it might even be beneficial.

The last “Aha!” related to what Lisa noticed in the videos. At the beginning of the study, her focus was on how she appeared in the videos and what others would think about her teaching. By the fourth meeting, she began to realize that she needed to focus on the students and their thinking. This shift only occurred after Lisa had experience watching video clips and using the recording sheet to focus her attention on the students.

### **Summary**

Lisa developed in several significant ways as a result of participating in the video club, beginning with what she noticed about classroom events. She realized that she needed to shift her focus from herself to her students. She recognized that in order to understand her students better she needed to “remove herself” from the situation. Lisa also realized that she needed to allow her students more time to explore math concepts. She also noticed four aspects of student thinking. She noticed how students grew in their understandings and how these understandings developed across grade levels. Finally, she noticed the strategies the students used and the misunderstandings they had. Lisa needed the experience of the video club meetings and the guidance of the researcher in order to notice these aspects of the classroom.

Lisa learned new skills that she might apply in her classroom. She learned that she could learn from other teachers, even if they were also new to the profession. She learned that she needed to manage her materials better. Lisa also learned that it was beneficial to

allow students to replay games multiple times. Finally, Lisa learned that, even though she was a first-year teacher, she had ideas that others might benefit from.

A final area in which Lisa developed is the insights she gained from participating in the video club. She realized that viewing videos from her colleagues' classrooms and discussing them in a group could be "eye-opening." She also realized that she was not alone in her struggles as a first year teacher, and that the other participants were in the "same boat." Lastly, Lisa realized that she could depend on the other teachers in the video club to be a support group as she finished her first months in the classroom. These were insights Lisa gained as a result of participating in the video club.

Despite these developments, Lisa remained a novice teacher in many ways. She continued to focus more on herself than on her students. She also concentrated on aspects of teaching that experienced teachers no longer pay attention to, such as how to distribute materials and allowing students to play games multiple times in order to build their skills. Figure 3 provides a timeline of Lisa's development in the video club. Each finding is displayed to show when I first saw evidence of it in the video club events. The findings shown in green represent Lisa's "Aha!" moments.

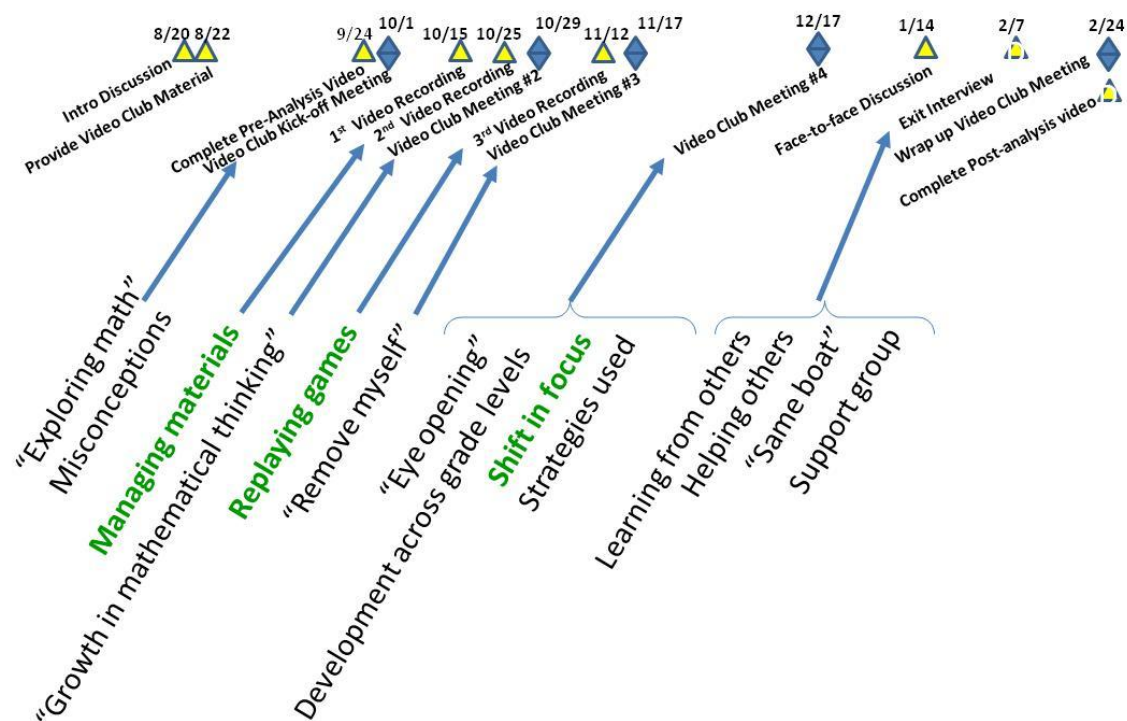


Figure 3. Timeline of Lisa's development in the video club

## EMMA

### Background

**Personal information.** Emma, a 24 year-old, completed her bachelor's degree in education in 2011 at a public mid-sized university on the east coast. She worked as a substitute teacher the year between graduating and being hired as a first grade teacher for the 2013-2014 school year. Emma said that her current job, "...fulfills what I thought I wanted to do and it fulfills what I know I want to do now."

During the study Emma was completing her first semester at a large, modern, Title I school with a population of more than 800 students. She had 21 students, nine boys and 12 girls. One student was Black, three were White, two were Asian, and 15 were Hispanic--nine who received English as a Second Language (ESL) services. Ten students were considered economically disadvantaged. The school is in a highly mobile area, with students frequently moving into and out of the boundary zones. There was some turnover at her school, but Emma was the only first-year teacher hired for the 2013-2014 school year. She did not have any paraprofessional support during her math instruction.

**Participation.** The principal at Emma's school and I were acquainted from serving on several committees together at the county level. When I mentioned my study to her, she suggested that Emma might be a good candidate to participate. I emailed

Emma on the first night of the new teacher training in August and planned to meet with her the next day. But the timing did not work out, so I arranged to meet with her during the work week at her school. When I arrived, Emma was putting nametags on her students' desks. She stopped and we sat at one of the tables to talk. I explained the purpose of the study, the expectations of participating, and the possible benefits to her. Emma agreed, saying "it will be a learning experience for me as a new teacher." Emma shared that although she had been required to teach lessons and complete reflections on them during student teaching, she had no previous experience with videotaping.

Emma attended four of the video club meetings, only missing the last one. She and Lisa were the only two at the third meeting, on November 19, 2013, so we were able to talk about the videos as well as about the video club in general. Emma wrote notes on her recording sheet, but she was usually the first to make a comment after a video ended. She seemed excited about sharing her ideas, often completing other peoples' sentences and interjecting comments while others were still speaking. Figure 4 provides a summary of Emma's participation.

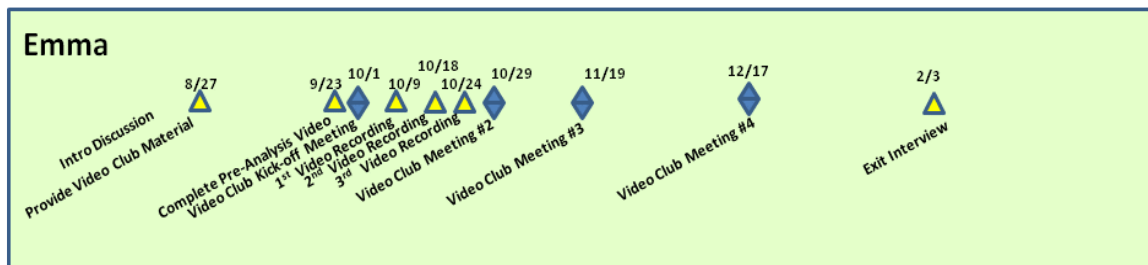


Figure 4. Emma's participation in the study



**Setting.** Emma taught in one of the newer buildings in the county with a bathroom in the classroom, a large carpeted area, and a tiled area with storage lockers for students' coats and backpacks. The desks were arranged in five groups of four with a large area at the rear of the room for group discussions and for students to work in small groups or with partners. There was a table on the tiled area for small group lessons. Materials for the math lessons were in small tubs that were placed in different areas around the classroom. Students moved from one activity to another with no set pattern. Most students tended to stay in the same groups of two or three as they changed activities.

Each time I entered the room to videotape (October 9, 2013, October 18, 2013, and October 24, 2013), Emma had already given directions to the students. They were in different areas around the room working in small groups or with a buddy on familiar tasks that they had previously learned. During my first two visits, Emma was working with students at the table and was not able to monitor and correct students as they worked at the math stations. Some of the students were working, but many were off-task. During my final visit, Emma was not working with a small group so she was able to move around the room, listening to students' conversations, and correcting misconceptions.

Emma never seemed nervous when I entered the room. She always continued with her instruction, but paused to tell me what the students were doing and to share the progress some of her students had made. She did not redirect her students very often, even when they were off task. I was not sure if she did not notice these behaviors or if she had a high tolerance for noise. During my last visit, when Emma did not have a group to

teach, the students were calmer. There were only three activities to complete and she was able to monitor their behavior.

## **Findings**

When I interviewed Emma at the end of the study to discuss the video club and how it had affected her development as a first-year teacher, she was able to identify several ways in which she believed her knowledge base had expanded by participating. As I reviewed the data sources: (a) the video club meeting transcripts; (b) the exit interview transcript; (c) Emma's recording sheets from the meetings; and (d) Emma's pre-analysis of the ten minute math lesson, I found evidence of development in the three areas that the research questions addressed. Emma: (a) noticed and interpreted classroom events; (b) learned new skills; and (c) gained insights from participating in the video club.

**Noticing and interpreting classroom events.** As I analyzed the data, I identified five aspects of classroom events that Emma noticed. The first focuses on Emma and her development. The last four focus on students' development and their thinking. Three of these relate directly to the recording sheet I provided to the participants at each meeting (Appendix F).

***Aspect 1: Adjusting lessons.*** Many of Emma's comments during the video club meetings and at the exit interview reflected her attention to the importance of adjusting lessons. Noticing how she might change her instruction to meet the needs of her students better was especially relevant to Emma's teaching, because nine of her students received

ESL services. These students needed additional support in order to access the math curriculum.

One of the videos at the first meeting showed second graders from my class playing a partner game, one where they moved clothespins on a number line to identify a secret number. After watching the video, Emma commented:

With my ESL students I could automatically think of doing a sentence frame. Because we've already started talking about greater than and less than but I need to give them a sentence frame and they just fill in the number. If that was given to them too, at least with my class that would definitely help. I could even write something on the clothespins, like an *L* or a *G* so they would know which one to move.

Emma continued to notice how she could adjust her instruction as she watched more video clips during later meetings. At the second meeting, one of the clips featured first graders attempting to fill a predefined shape with pattern blocks. The students were struggling to keep the blocks within the outlines of the shapes. Emma had a few ideas about adjusting the lesson. She said, "I was thinking about maybe cutting out the lines so the students can see 'This is your space.' And I just got Wikki-stix so I'm thinking of maybe outlining the shape with a Wikki-stix so then the pattern blocks won't go anywhere." Another clip at the same meeting showed second grade students playing a game where they rolled dice, found the sum, and then subtracted the sum from 13. Emma commented, "I was thinking of the kids who weren't getting it because of the multistep. They could just have one die. And then they could have just subtracted instead of adding and subtracting."

At the third meeting, one of the video clips showed first graders sorting paper leaves into different categories. Some of the students were able to complete the task, but

some seemed a little confused. They were placing the leaves in random piles and in one case Emma thought the child had just, “made a pretty picture with the leaves.” She said, “The teacher could have adjusted the lesson by at least starting off with headers, or maybe showing them how to make their own headers...like maybe color, size, shape.” At the same meeting, Emma watched a clip from her classroom, where students were working in pairs to draw open alligator mouths on a worksheet. She noticed another opportunity to adjust her instruction, when she realized that her students were repeatedly placing the correct symbol between the numbers but were having difficulty reading the resulting number sentence. She commented that, “the language was definitely hard for everybody.” In response to what she saw Emma realized, “They understood the alligators, but if I had two different alligators turned each way and labeled them *greater than/less than* on a big poster for them to refer to, I think it would help with the vocabulary, especially for my ESL students.”

Emma had thought more about the importance of adjusting her lessons by the time we met for the exit interview in February. As she talked about her thinking when planning lessons for students, Emma said:

I saw both kindergarten and second grade videos and what they were working on. So it was almost like I could take lessons maybe not down a level, but take a kindergarten game and put it up a level for my kiddos that needed a little extra support on the number sense and number stuff that they should have had a concrete knowledge of coming in, but didn't. And then my enrichment kids, I could maybe play a game with them, like a second grade game to take them to the next level.

***Aspect 2: Development across grade levels.*** As Emma watched the videos from different classrooms and grade levels, she noticed how the students and the curriculum developed across the grade levels. During the exit interview, Emma said,

You never see where they come from and what was being done and what they should have come in with and then what they should be leaving with and what they will be doing in the next grade and I think this (the video club) helped.

This realization about looking across grade levels to see how students develop was evident in Emma's comments during the video club meetings. As she watched second grade students playing a game where they compared numbers at the first meeting Emma commented that "in first grade we play *Get To* which is kind of starting the process of comparing numbers." A clip at the second meeting showed students from Emma's class working on combinations of 10. After watching it she commented, "So number combinations are important and you see the progress with them from kindergarten to first to second." A clip at the third meeting featured second graders playing a game where they had to determine if number sentences were equal or not equal. Emma said, "It is cool to see like from first grade, how I see what I'm teaching is building to what they will use in their next classroom." At the final meeting Emma attended one of the clips showed kindergarteners participating in a class discussion about comparing two numbers. Emma noticed that, "it shows that all our grade levels are working on the same thing-just at different levels. Now you're working on looking at numbers and seeing which one's more than the other. I'm doing the same thing in first grade and she's doing it in second grade, just different levels."

In each of the meetings Emma attended, she noticed something about how students' skills and the curriculum developed across the grade levels. When we discussed this idea at the exit interview, Emma mentioned that she had just finished the mid-year report cards and had to indicate whether or not retention was a possibility. She said that being able to see the videos showing what second graders were able to do at the beginning of the year helped her make some of her retention decisions.

*Aspect 3: Students' understandings.* As she watched the videos, Emma also seemed to notice how students' understood the math concepts. After watching a clip showing second graders from my class playing a money exchange game and a comparing game at the first meeting Emma mentioned that "the games are good even if you have boys and girls that are not necessarily understanding and following the game the way they're supposed to, they're still getting that exposure to numbers, they're getting that exposure to the math concepts."

A clip at the second meeting featured first graders, from another participant's class, practicing doubling numbers by rolling a die, placing that number of cubes on a sheet of paper with a drawing of a pot on it, and placing the same number of cubes off the sheet of paper. Emma commented that, "the pot organized the problem in their brains, which I thought was really good." During the same meeting, the clip from Emma's class showed students rolling a die and using connecting cubes to build three stacks of ten cubes. After the clip ended, Emma said:

I like how Veronica was like "We have eight." Because Holly was like, "We have five." Holly has a hard time understanding to put them together. So Veronica saying, "But WE have eight." That's good partner thinking. And then Holly counted them again and was like, "Yeah we do. OK."

Emma's attention to how students understood the math continued at the third meeting. One of the clips showed a class discussion in kindergarten about comparing numbers. Emma commented that, "She was trying to explain. She was like, 'They have the same number. No one has more.' She was communicating in a bunch of different ways." A later clip featured first graders sorting leaves. Emma noticed that, "Kyle was ordering them up and down, he was organizing the type so there were crazy ones. He was actually organizing so he understood the task. I don't think many of them did." The final clip at this meeting, showed second graders working in pairs to determine if number sentences were equal or not equal. Emma said,

The one on the right, she really understands. She was like, "So we have to change it to not equal." And then the other student, on the left, she was definitely following along, but that exposure's probably really good too. She is seeing the thought process.

At the fourth meeting, Emma noticed an example of how her students' understandings about counting on had changed. Her students were using 10s frames with different numbers of spaces filled in to practice counting on and comparing numbers. After watching her students work Emma commented:

And they did attempt (to count on). Because in the beginning of the year they would count every single dot. So they're attempting it, so it's like a step up toward counting on. And then now they are comparing and not just counting.

These comments seem to suggest that Emma recognized how students' understandings both in her class and in colleagues' classes were developing.

***Aspect 4: Strategies used.*** Emma also developed in her ability to notice strategies the students were using as they played games and completed math stations. Emma's

comments did not focus on students' strategies until the third meeting. The first video clip at that meeting showed kindergartners participating in a class discussion about comparing numbers. Emma noticed that, "It sounded like they all have good strategies to compare. Mark was the only one who said count all the pictures on the cards to find out how many." One of the other clips at the same meeting featured first graders sorting paper leaves. Emma commented that, "So this guy, he was sorting by leaf type. But you could have done color, you could have done the size of the box."

Emma also noticed students' strategies at the fourth meeting. In the first clip, first graders were working in a small group with their teacher to record number combinations that equaled five. As she watched the students Emma mentioned that, "You can see them counting with their eyes!" The clip from Emma's room featured students adding and then comparing numbers. Emma said, "I told them to use all the strategies we had learned. So it's nice to see that they were using it [counting on] in some places." Another clip from the same meeting showed a different first grade class cutting paper pattern blocks and determining if the resulting pieces were equal or not equal. Emma noticed that, "One little girl, she folded it in half and cut it on the line." The final clip in the meeting showed kindergartners sorting buttons by different attributes, such as color, size, shape, and number of holes. As the clip was playing Emma said, "One, two, three, four...she is sorting by the number of holes. And then she has an outlier with no holes." These comments show that Emma paid attention to students' strategies as she watched the video clips.



**Aspect 5: Misconceptions.** Emma also developed in her ability to notice students' misconceptions. Beginning at the first meeting Emma was able to notice when students were struggling. One of the clips showed second graders from my class playing a money exchange game. Emma commented that, "he started taking money from his own pile. So a misconception of 'Oh, I have to get more to get six, so I can get these bigger coins.' The students seemed to be misunderstanding where to collect the coins from." A clip at the second meeting showed kindergartners choosing a number card and then placing the corresponding number of pennies on a 10s frame. When one student put down eight coins but counted to nine, Emma said "it's like she was going faster than her brain could say it!" At the fourth meeting, Emma noticed second graders from another participant's class having a problem with a place value game. She commented, "There was some confusion, like the values place of the nine and the eight in that second group but they fixed it. And then they were reading the numbers wrong."

Most of the misconceptions Emma noticed occurred in her own classroom. During the exit interview she said she had noticed several instances when her students had counted on incorrectly. She said,

Some of my kids I noticed from the video would start with like four and they were supposed to count to 10. So they would look at the first card and go, "one, two, three, four." Then they would look at the second card and go, "Four, five, six, seven, eight, nine." So then they were all messed up!

Emma also noticed specific instances when her students had misconceptions. In a clip at the third meeting her students were using greater than and less than symbols to compare numbers. After watching her students work, Emma commented that, "The language was definitely hard for everybody. They got the teeth and everything but they

got the language confused. Amy kept having to be like, ‘I mean...I mean...this and this.’” One of the other clips in that meeting featured first graders naming shapes, drawing them and identifying the number of sides and corners. Emma noticed that these children seemed to understand but commented that her students had “done a similar activity with shapes and they were so confused about the sides and stuff.” In the fourth meeting, the students in the clip from Emma’s class were using ten frames cards to practice counting on. As Emma watched them, she said, “They are so used to the low numbers that they always start with those!” Emma noticed students’ misconceptions in several different clips, but she noticed more from her own classroom.

As a result of participating in the study, Emma noticed five aspects of classroom events in the video clips of math lessons. One aspect was self-focused—how she could adjust the lessons to meet the needs of her students. She also noticed four aspects of students’ developing and their thinking: (a) she noticed that students’ thinking develops across grade levels; (b) she noticed how the students understood the math concepts; (c) she noticed the strategies the students used; and (d) she noticed the students’ misconceptions.

**Learning new skills.** Another area in which Emma benefitted from participating in the video club was in learning new skills and considering how she might apply them in her classroom. I identified four lessons that Emma seemed to learn as the video club meetings progressed.

*Lesson 1: “What to look for.”* During the exit interview, I asked Emma what she thought was the most valuable thing she had learned as a result of participating in the video club. She thought for a minute and then said,

The first couple of times you don't really know what to look for. So for me it was going back and progressively I got better at saying, "Oh, he doesn't get it, because he doesn't get this concept because he's not doing this correctly." When before I was like, "Oh, well he can play the game." I couldn't connect the objective with the game and all the pieces together, just looking at the video. And at the end I was able to do it all and then be like, "Oh, so she's the one I gotta pull, he's the one." So it was like progressively, I got faster to see who needed the extra support.

When I reviewed the transcripts from the meetings, it appeared that the features in the video clips that Emma chose to comment on changed over the time-span of the study. But her interpretations of the video clips only changed after Emma listened to the other participants' comments. Emma almost always spoke first at the end of a video clip, but she usually made comments about the materials or about what the teacher had done. As the meetings progressed, she moved from commenting on what the teachers and students were doing; to making suggestions that she thought might increase the students' understanding; to trying to understand how the students were thinking about the math concepts.

At the first meeting Emma's initial comment after watching second graders from my class play a money exchange game was, "they didn't want to trade their coins up." After listening to the comments the other participants made Emma realized how something she used in her class might help the students understand the need to exchange their coins. She said,

I know for ones, tens, and hundreds...at least in my class, we've been talking about how you unlock. You unlock that tens, you unlock that 100s. Something to jog their memory. "Oh, now we can get this coin because we've unlocked it." or something like that.

Emma's first comment after seeing a clip of kindergartners working with a tens frame and pennies at the second meeting was, "She's counting, one, two, three, as she puts the pennies on." But after the other participants shared their ideas, Emma suggested that the students might be able to take the lesson a step further by, "putting down the number, putting down the penny, then writing one. Putting down two pennies, then writing two."

By the fourth meeting, Emma had progressed toward noticing what students were thinking. One of the clips showed kindergarteners sorting buttons by different attributes. Emma was the first one to comment after the clip ended. But this time, her comment was focused on one of the students and how she was thinking about the buttons. Emma said, "That one little girl, she was sorting by the holes. One, two, three, four...and then she had an outlier. She didn't seem to know what to do with that one." Emma was beginning to consider student thinking before the teacher actions and instead of making suggestions.

Emma learned what was important to notice while students were working in math stations or playing math games. She moved from a focus on the teacher's actions, to making suggestions to the teacher, to finally noticing the students and their thinking.

***Lesson 2: "Look back at my lesson."*** Another important skill teachers develop over time is being able to reflect on how a lesson went and what changes might need to be made. Emma felt like the video club gave her an opportunity to reflect on both her teaching and her students' learning. She said,

It [the video club] made me reflect on my lesson where I don't always have time to reflect on my lessons...I think that videotaping lends itself to being in the moment when you're in the moment and looking at it afterwards. I think that a lot of times you forget things when you're in the moment. I was able to look back at my lesson.

Emma also made comments that showed her growing recognition of the importance of reflection during some of the meetings. Toward the end of the first meeting, the participants talked about being first-year teachers. They mentioned that they were usually confused, always stressed, that they always felt behind, and that they never seemed to have enough time. Emma commented, "One thing that I have learned is to use your resources. Being here discussing things helps me think it through because you don't always get that time to look back at your lesson and say, 'Are they getting it?'"

One of the clips at the fourth meeting showed first graders from one participants' class working in a small group with the teacher learning about number combinations. The featured teacher explained that she had not realized until she watched the video that she had misunderstood what a student was trying to tell her. Emma recognized this as an example of needing time to reflect on what occurred. She said,

she [Molly] realized what the student was saying after the fact. And for me, it's hard because you have so many other things you want to accomplish. It was like processing time for you [Molly]. Like, "What is the student trying to tell me?" And I think that's hard sometimes.

Emma's last comment during the exit interview captures what she learned about reflection from the video club. She said the lesson, "was just right in front of me so I got to relook at it and look at it from the kids' point of view and not just what I did, but what they got out of it." She went on to say that she thinks she is a more reflective teacher because of her experiences in the video club.

***Lesson 3: “Just go back.”*** Emma reported that as she participated in the video club she learned to reflect on her lessons and recognize when her students were struggling and needed some extra instruction. During the exit interview Emma mentioned that she realized she, “needed to just go back through a little bit of a mini lesson and pull a small group. I did a lot of that just at a glimpse of what my kids’ thinking was.” At each of the meetings that Emma attended, she made a comment about needing to teach a concept again based on what she saw in the clip from her classroom.

At the second meeting, one of the video clips featured Emma’s students making stacks of 10 with connecting cubes. After she watched the clip, Emma commented that, “Becky was actually counting, just wrong!” She went on to say that seeing her students’ mistakes as they counted the cubes helped her realize that she needed to pull a small group and review the skill. Emma’s students used the greater than and less than symbols to compare two digit numbers in a clip at the third meeting. Emma commented that, “They are putting the sign correctly, but they are not using the right vocabulary. They are struggling and I want to give them a reference and teach them to use it when they are struggling.” She also noticed an opportunity to review a skill as two of her students worked together to complete a comparing numbers recording sheet. Emma said, “So, I’m not really sure if Holly knows why she changed her answer. So definitely going back and seeing what she really knows.”

At the fourth meeting, the clip from Emma’s classroom showed her students using tens frames to add and compare numbers. As she watched her students begin with the smaller number and add the higher number, Emma commented, “That is counting on, but

not what I meant. Ok, we need to review counting on!” At the exit interview, Emma said that as soon as she sees students having trouble, she pulls a small group to teach the concept a different way in hopes of reaching all her students.

***Lesson 4: “Nothing can be perfect.”*** A final lesson Emma thought participating in the video club taught her was about life in a primary grade classroom. At the exit interview she said,

You think you have a lesson, you want it to be perfect and from these videos I’ve learned that nothing can be perfect, and it’s ok. Like kids acting up, kids doing this, kids doing that. They are six years old!

Emma went on to say that she thought it was a “good and grounding thing” for everyone in the club because they all had lessons that did not go as well as they wanted them to. At the second meeting, Emma shared with the other participants about what was going on in the rest of her classroom while I was videotaping small groups. She told them that

one of my kids during the 10s game was licking the cubes and I was like ‘What are you doing?’ I told my team members and one of them said, ‘Hope she doesn’t use that one!’ I was like, ‘Hopefully she doesn’t use that one!’

Emma realized and accepted that even with careful planning, it is important to “go with the flow” when working with children.

As a result of participating in the video club, Emma seemed to learn four important lessons that changed how she thinks about her students and how she plans her teaching. She learned what she should focus on while observing and interacting with her students. She learned that she needs to reflect on her teaching in order to become an effective teacher. She learned that she can use her reflections to plan additional learning

opportunities for struggling students. Finally, she learned that life in a primary classroom never goes exactly as planned.

**Insights gained.** A final area in which Emma's knowledge developed was gaining insights from participating in the video club. I identified two insights Emma seemed to gain.

***Insight 1: "Supportive."*** During the exit interview, Emma talked about the atmosphere at the video club meetings. She said, "It was really open. I would say I just felt comfortable there. We were able to come together and talk about our lessons and maybe some other things at certain times." Emma felt like, "it was a supportive group where everybody was saying 'This is what you could do next time.' 'This is what you could add.' It was not judgmental, but constructive." For the first half of the third meeting Emma was the only one present. She took the opportunity to talk about the video club. She thought that, "there was no pressure and that they were looking at it [the videos] simply trying to learn from it." She added that by not being with her colleagues at school she felt safe in saying, "Oh that lesson wasn't very good." And she believed the group was, "supportive because then somebody else would say that they didn't have a very good lesson today either."

This sense of camaraderie was evident at the second meeting as Lisa was talking about a lesson that she saw as a failure. She revealed that while I was videotaping one group, children in another group "were braiding each other's hair." Emma responded by saying that one of her students was "licking the cubes." The feeling of kinship was also apparent in the fourth meeting as the participants watched a whole group lesson in first



grade. Elizabeth, another participant, commented “Oh the joys of whole group lessons!” Lisa said, “You think things are going so well and then you look around and you’re like, ‘Oh my gosh! How many friends (students) are with me?’” And Emma added, “Am I the only one listening to myself?”

***Insight 2: “Spark something.”*** Emma also believed that the participants were able to help each other think of ways to improve their lessons. At the exit interview she said,

It was a very easy conversation because we were all talking and expressing our feelings. And somebody would say something and it would spark something, like an improvement or something we could do. It was very easy to come up with thoughts because we were all kind of talking them through together.

As I reviewed the transcripts, I saw a few instances where this “sparking” seemed to have occurred. At the second meeting one of the clips showed kindergartners working with tens frames and pennies. When Joe, another video club member, mentioned using materials other than pennies, it sparked comments from others about different manipulatives and playing with a partner rather than alone. A clip at the fourth meeting featured second graders using a deck of cards to make three digit numbers. When Emma said that the students had sometimes misread the numbers, Joe mentioned using “straight number cards with the numeral printed on them.” This prompted Molly, another participant, to mention that “the six looks like a nine in the bottom corner and that might have confused students.” These comments reminded Emma of a math assembly at her school where “kids had to put the numbers in order and this little kindergartner had the six up there, but it was supposed to be a nine. So the man turned the kid over and said, ‘It’s a nine, guys!’”

These findings suggest that Emma gained insights into how the members of the video club could support each other. She also realized that listening to colleagues discuss a topic could spark an idea for her.

### **Emma's "Aha" Moments**

From the first video club meeting in October to the last one she attended in December, Emma developed in several areas. Evidence of her growth can be seen in the meeting transcripts, in Emma's comments at the exit interview and in the artifacts I collected during the study. I believe that Emma had three "Ahas!" during the study that made her reconsider her actions as a teacher. The first one occurred during the second video club meeting on October 29, 2013; the second one occurred during the fourth video club meeting on December 17, 2013; and the last one occurred at the exit interview on February 3, 2014.

Emma's first "Aha!" was about the reality of life in a primary classroom. She started the school year with a vision of what the "perfect first-year teacher" looked like—"one with a calm, organized classroom with students who were actively engaged in their work." Emma wanted her colleagues and administrators to see her as this teacher. But as she watched the clips from her room and the other participants' rooms, she realized that when you work with young children, there is no such thing as the perfect lesson.

The second "Aha!" related to Emma's recognition of the importance of reflecting on her actions as the teacher. She realized that if she considered how the students were reacting to her teaching, she could plan additional lessons to remediate students who were still struggling and to enrich the ones who already understood the concept. Emma also

realized that by reflecting on her teaching, she was able to identify ways she could adjust her instruction, particularly for her ESL students.

Emma's last "Aha!" related to realizing what was important to notice as she watched the video clips. Emma's first comments about many of the video clips focused on the teacher's actions or how the lesson could be adjusted. It was not until she listened to the comments of the other participants that Emma realized that she should be thinking more about what the students were doing and thinking. With their guidance, Emma was able to move from a focus on the teacher to a focus on the students and their thinking.

### **Summary**

Emma developed in several significant ways as a result of participating in the video club, beginning with what she noticed about classroom events. She realized that she could use other teachers' ideas and adjust them to meet the needs of her ESL students. She also noticed four aspects of student thinking. She noticed how students grew in their understandings and how these understandings developed across grade levels. Finally, she noticed the strategies the students used and the misunderstandings they had. Emma needed the experience of the video club meetings and the guidance of the researcher in order to notice these aspects of the classroom.

Emma also learned new skills that she might apply in her classroom. She learned what to look for when watching students working at math stations or playing a math game. Emma learned that she needs to reflect on her teaching and consider how the students are understanding her instruction. She learned that she sometimes needs to go back and revisit a lesson to ensure her students understand the math concepts. Finally,

Emma learned that, even with the best intentions, life in a primary grade classroom is never perfect.

A final area in which Emma developed is in the insights she gained from participating in the video club. She realized that meetings provided a supportive environment where the first-year teachers could talk honestly about how their year was going, and . help each other improve their lessons. Emma also realized that when one person made a comment, it often sparked an idea for another participant. These were insights Emma gained as a result of participating in the video club.

Despite these developments, Emma remained a novice teacher in many ways. She continued to focus more on herself than on her students. The majority of her comments at the video club meeting related to how she could take the ideas she was seeing and adjust them for her students. Emma also worried about how she was perceived as a teacher. She seemed to think there was a “right” way to teach and that she needed to teach that way in order to be successful. Figure 5 provides a timeline of Emma’s development in the video club. Each finding is displayed to show when I first saw evidence of it in the video club events. The findings shown in green represent Emma’s “Aha!” moments.

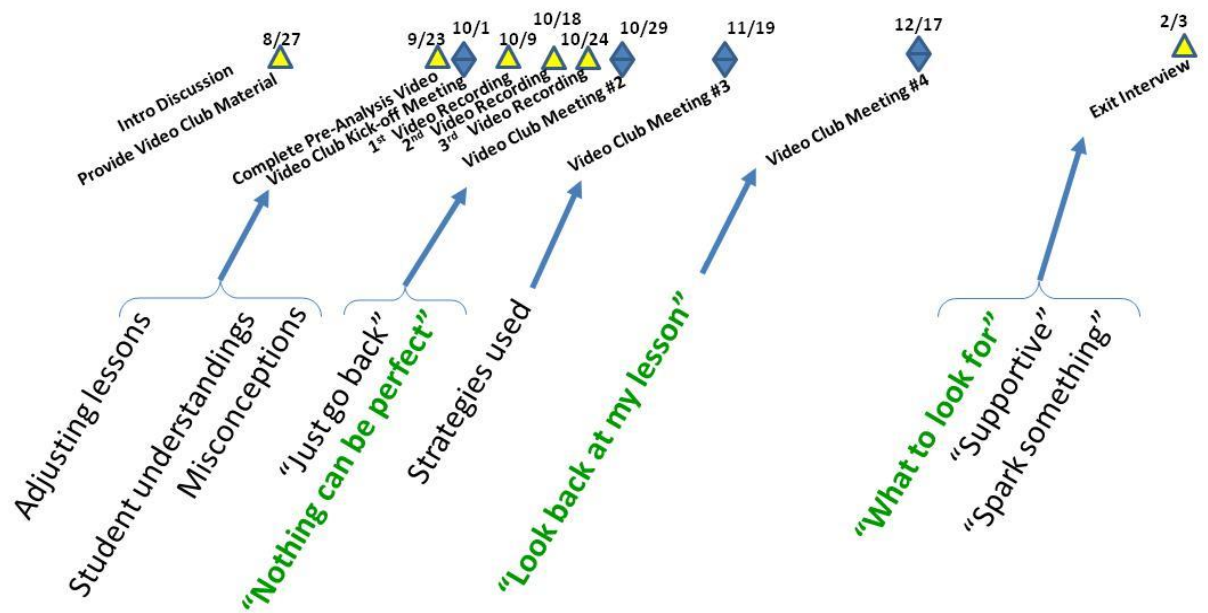


Figure 5. Timeline of Emma's development in the video club

## **ELIZABETH**

### **Background**

**Personal information.** Elizabeth, a 24 year-old kindergarten teacher, graduated in the spring of 2013 from a large public university on the east coast with a master's degree in elementary education. As part of her student teaching placement, Elizabeth was required to videotape an entire lesson, which included giving directions, assigning work, monitoring progress, and closing the lesson. Then she and her cooperating teacher watched and discussed the video together. Elizabeth thought it was very helpful to be able to review the video and reflect on her teaching. She commented that, "It is so funny to realize how lengthy I can be when giving directions, thinking in my head that I'm giving these explicit directions. And I'm going on and on!"

During the study, Elizabeth was completing her first semester of teaching in a Title I school with a population of over 800 students. Her class of 24 students included 11 girls and 13 boys. Eight students were Black, four were Hispanic, and 12 were White. Six students were considered economically disadvantaged. The school was going through a period of transition during the 2013-2014 school year, with a new administrative team, new office staff and eight new teachers, although Elizabeth was the only first-year teacher. She had a paraprofessional that assisted during reading instruction and for the first half of her math lesson.

**Participation.** I emailed the principal of Elizabeth's school asking for names of possible participants. He said that she was his only novice teacher and that he thought she might be a good fit for my study. I emailed Elizabeth and asked if I could visit and explain my study to her. She agreed and we arranged to meet one afternoon during the teacher work week. When I arrived, she and her husband were cutting out laminated nametags and other room decorations. Elizabeth left her husband to continue working and came to sit with me at one of the tables in the room. I talked with her about my reasons for doing the study, the time commitment and what she might possibly gain from participating. She seemed excited, saying that it sounded like a "wonderful opportunity to meet other teachers and learn from them." Elizabeth said that she thought "math is one of my weaker areas and anyway I can learn about math and really see how I am as a teacher of math will improve my teaching." She shared that she planned to loop to first grade next year and that she thought participating in the video club might be a good way to understand her students' math thinking better.

When I began sending out emails reminders to complete the pre-analysis video before our first meeting and asking for days that were better for participants to meet, I became concerned about Elizabeth's commitment to the study. She did not respond to any of the group or individual emails I sent during the first two weeks of September. I contacted her principal and asked if he thought participating was an additional burden that Elizabeth did not need in the first months of teaching kindergarten. He responded that he believed she was adjusting well to the classroom, but explained that it was possible she was not receiving the emails because of a computer glitch. Elizabeth's last

name changed when she got married over the summer, and because the technology department had not yet changed her name in the system she could not see her emails.

With this in mind, I called her and reminded her about the online video and determined which days were better for her to meet. She was full of apologies, commenting that when she was finally able to open her email her “inbox was flooded!”

Elizabeth attended four of the video club meetings, only missing the third meeting on November 19, 2013. She was one of the quieter ones at the meetings, listening to others and responding to their comments more often than initiating comments of her own. During our final interview, when I asked her whether it was a burden to come to the meetings, especially at the end of a school day, Elizabeth commented that sometimes:

there were days where I was sort of dragging my feet a little bit. Or maybe at the meetings I just kind of like zombied, because I was thinking of all the things that happened during the school day.

This accounts for Elizabeth contributing less to the conversations, especially at the final meeting. January is one of the busiest months for the teachers in the participating county. In addition to continuing to teach their students, these teachers were also expected to complete mid-year assessments, which consisted of meeting individually with each student to determine their progress in both reading and math. Figure 6 provides a summary of Elizabeth’s participation.



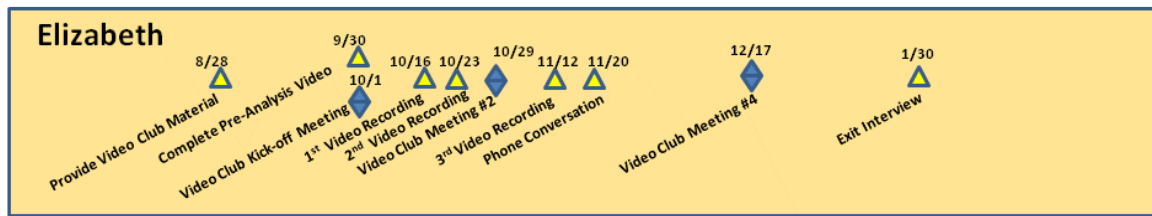


Figure 6. Elizabeth's participation in the study

**Setting.** Elizabeth’s large classroom was in a modern building. It had a bathroom, a large carpeted area, and a tiled area. Each of the students had a small locker for their coats and backpacks with space above it for additional storage. The room was equipped with a multitude of hands-on materials for student use. There were four long tables in the middle of the room with six chairs arranged around each one. A large different colored paper flower hung above each table. During math, the students moved from table to table to complete different tasks. When Elizabeth wanted them to move, she explained that the “red table will move to the yellow table, the yellow table will move to the blue table, the blue table will move to the green table, and the green table will move to the red table.” The students understood this rotation and were able to accomplish it, even in early October. There was a large area in the front of the room for group meetings and small group lessons.

Each time I visited Elizabeth’s room (October 16, 2013, October 23, 2013, and November 12, 2013) the students were in the middle of their math lesson. During my first two visits, most of the students were gathered around the tables working on familiar activities designed to build their number sense. Elizabeth was at the front of the room guiding a small group of students to complete a new math activity. The last time I visited

all the students were at stations and Elizabeth was walking around, monitoring progress and conducting formative assessments.

Elizabeth always seemed relaxed when I visited her room, even during my first visit when the assistant principal was completing an observation. Even in a classroom of busy kindergarteners she seemed calm. But she acknowledged that it was sometimes difficult to maintain order with 24 active five year-olds. Despite this, Elizabeth always took time out of her instruction to explain what the students were doing and how things were going. Her students were eager to be videotaped, but continued to work on their assigned tasks as I moved around the room. Elizabeth always thanked me for coming and acknowledged me when I left her classroom.

## **Findings**

When I interviewed Elizabeth at the end of the study to discuss the video club and how it had affected her development as a first-year teacher, she was able to identify several ways in which she believed her knowledge base had expanded by participating. As I reviewed the data sources: (a) the video club meeting transcripts; (b) the exit interview transcript; (c) Elizabeth's recording sheets from the meetings; and (d) Elizabeth's pre-analysis of the ten minute math lesson, I found evidence of development in the three areas that the research questions addressed. Elizabeth: (a) noticed and interpreted classroom events; (b) learned new skills; and (c) gained insights from participating in the video club.

**Noticing and interpreting classroom events.** As I analyzed the data, I identified five aspects of classroom events that Elizabeth noticed. The first two aspects focus on

how Elizabeth viewed the classroom and the students. The last three focus on student thinking. All three of these relate directly to the recording sheet I provided to the participants at each meeting (Appendix F).

***Aspect 1: Student behavior.*** Many of Elizabeth's comments pertained to what she noticed about student behavior. During the exit interview, she mentioned that monitoring and correcting behaviors had taken a lot of effort, "especially at the beginning there and with kindergarten. Oh my gosh! Exhausting!" The effort Elizabeth put into establishing a classroom community may be one reason she was so conscious of student behaviors in the video clips.

One video clip the group watched at the second meeting showed students from another participant's first grade class working quietly with pattern blocks. Elizabeth's initial comment was about the students' behavior, "You can tell they wanted to impress you. They were working so hard on their shapes." This trend continued into later meetings. At the third meeting Elizabeth shared some information about how math lessons worked in her room,

My biggest hurdle is their attention. Our math goes from, we get back from lunch at 11:30ish and it goes until 1:00. So I try to find ways to break it up. But when they are done with something, they are checked out completely.

Elizabeth also said that because of the way the math program expected students to play the same game for weeks, "they're learning and they get a lot out of it at first. But then they hit this point and they just get louder and louder."

Another video clip, from the fourth meeting showed first graders participating in a whole group lesson where the teacher and a few students were demonstrating how to cut

shapes into parts that were equal and not equal. Many of the students were not behaving; some were talking, several were playing in their desks and a few were playing with their scissors. Elizabeth commented, “Oh, the joys of whole group lessons.”

Many of Elizabeth’s comments seemed to focus on student behavior. Elizabeth noticed the behavior of students in her classroom and the behavior of students in the other participant’s classrooms. She complimented appropriate behaviors and identified inappropriate behaviors.

*Aspect 2: “Such different levels.”* As the only kindergarten teacher in the video club, Elizabeth sometimes viewed the students’ abilities through a different lens than the other participants. During the exit interview, she mentioned that as she watched the videos, one of the things she realized was that, “in one classroom, they’re at such different levels and they might be sitting right next to each other.” She also realized that her students’ abilities and needs were vastly different than the students in other teachers’ classes.

At the first video club meeting one of the clips showed second graders from my class rolling dice, collecting and exchanging coins in an attempt to collect \$0.25. Elizabeth jokingly said that her students might be able to play, “Collect \$0.02.” When discussing the students’ use of materials, she explained that her students were still “working on using their math words whether we’re sorting or whatever we’re doing. Because they still want to build and make towers and stuff.” In addition to noticing what they students were doing, she interpreted it in light of how her students might approach the same task.

Elizabeth continued to make connections between what her students were doing and what older students were doing as she watched the video clips during the fourth meeting. One of the clips showed first graders turning over two cards with dots on them, finding the sum, and then determining who had the greater amount. While other people made comments about how students were finding the sums, Elizabeth noticed something different. She said, “It’s funny because my brain goes straight to, ‘Oh my gosh! They’re counting correctly.’ Because mine are still at the ‘Eleven, fourteen, sixteen, twenty’ stage.” As the group continued to discuss this clip, the featured teacher mentioned that she was trying to encourage her students to use the terms “greater than and less than” when they compared numbers. Elizabeth commented, “When she [the teacher in the clip] said she was trying to get them away from the words bigger and smaller, I was like, I love those words! Those are great words.” Elizabeth realized the difference between the vocabulary her kindergartners used (*bigger* and *smaller*) and the vocabulary students in higher grades are expected to use (*greater than* and *less than*).

During the same meeting, the group watched a clip of Elizabeth’s class participating in a group discussion. The other participants commented on the fact that five and six year-olds could sit and have a class discussion. Elizabeth focused on the ability level of her students. She said, “They didn’t know any of the words. I was kind of digging for words like ‘They’re equal’ or ‘They’re the same’ even. But it’s just trying to get them to explain it when we hadn’t talked about it yet.” After the participants made a few more comments about how well kindergartners were doing with the lesson, Elizabeth sounded more positive,

Yeah, we'll get there. You know, we're there now. They're talking about what's more and what's less and all that. And what's equal or the same. But it's letting them sort of get there themselves... And it's just so funny to see how they grow and it's two years basically and it's huge!

Elizabeth watched the video clips through the lens of a kindergarten teacher whose students were not able to do many of the activities that were shown. However, she was eager to share what her students could do that would build to the later skills. Another comment she made at the fourth meeting revealed her excitement about her students' ability:

It's amazing! It really is! Especially with kindergartners. You know, when they come in some them can't count to ten. Some of them can't count to five. And for them to be sorting and we just finished up patterning, simple AB patterns but still it's really cool!

*Aspect 3: "Figure out how they think."* Elizabeth also developed in how she thought about students' thinking. During the exit interview, she discussed how looking at student thinking in the video clips helped her when she sat down later to write lesson plans and choose questions to ask her students:

It really helped watching them work through a problem and figure out how they think. Or when you would ask them questions as you were videoing. "What are you doing over here? What are you working on? And the way they would tell you really helped me, just to see how they were understanding the concepts.

While she watched the video clips, Elizabeth noticed both her students' and the other participants' students thinking. At the first meeting, one of the video clips showed second graders from my class playing a number sense game in which one person chose a number between one and 25. The second person then asked greater than and less than questions to move clothespins along a number line until the target number was "squeezed" between the two clothespins. As she watched them play, Elizabeth

commented on how they were thinking about the numbers. She said, “I noticed that they discovered that they could ask fewer questions to make those bigger jumps. And it was like after the first question there were only five numbers left.”

During the second meeting a video clip from Elizabeth’s class showed a group of students choosing a number card, taking that many pennies, and placing them on a tens frame. As she watched her students taking all the pennies off and starting with a blank board each time she commented, “And no one really breaks from that norm. No one is like, ‘Well I’m going higher this time so I’m just gonna leave these.’ I guess they didn’t think about doing that.” After watching the same video clip, another participant mentioned that when students chose the wild card, which could be any number, they usually made it a 10. Elizabeth responded, “It’s been interesting to see, I thought some of them would try to take more pennies from the bag and just go crazy with it, but they know they have 10 spots and that’s what they’re working on.”

In the final video club meeting one of the clips showed second graders taking one card at a time from a pile and putting them on a place value mat in order to make the largest number possible. When two of the boys repeatedly risked placing fives and sixes in the tens place in hopes of getting a larger number to put in the hundreds place, Elizabeth made a comment about how eight year-olds think. She said, “That probably shows their level of not thinking. Like we’re older and we think about probability and the fact that there’s not that many nines in the whole deck. But they don’t.”

Elizabeth tried to figure out how the students featured in the video clips were thinking about the math concepts. In doing this, she also noticed the strategies they used to play the games and solve the problems.

***Aspect 4: Strategies used.*** As Elizabeth watched the video clips of students completing different math activities, she noticed strategies they used. During the second meeting she made several comments about a clip featuring first grade students immersed in a geometry lesson. The students were trying to use pattern blocks to fill in different shapes that were printed on paper. Elizabeth said that she

noticed that they would take some of the shapes and just keep spinning them. And they would go around [the design] like two times. They would be like, ‘Well, it looks best right here. Maybe it doesn’t fit, but it looks better than when I started.’

A few minutes later, while watching the same video, Elizabeth noticed that “they would start on maybe this side and then work their way over trying to get them all to fit, but by the time they got all the way over here, these ones had scooted and they were off the page.” Another clip during the same meeting showed first graders playing a doubling game where they rolled a die, and placed connecting cubes on a game mat. Elizabeth noticed that, “the ones that were doing it on their paper were doing fantastic. And then the one little friend at the end who wasn’t doing it with cubes. She was having a little trouble.”

Another instance of Elizabeth noticing students using the provided manipulatives to complete their work was in a clip from her own classroom that the group watched at the fourth meeting. Her students were discussing how to compare numbers to determine greater than and less than. After she watched the clip, Elizabeth said,



I was really glad when they said, I think it was Robert or Mary of someone who said they knew which was greater than because of their cards, their playing cards. They had the number but then they have the actual object, like candy corns or cats, that they could count to see which one is more than and which one is less than.

As Elizabeth watched the videos and noticed the strategies students were using, she also noticed some misconceptions they had about the math.

***Aspect 5: Misconceptions.*** Elizabeth did not make many comments during the first meeting, but an analysis of her recording sheet revealed that she was able to identify some misconceptions the students had about math. While watching a clip that showed two boys from my class playing a money exchange game, she wrote “making five pennies into one nickel and two nickels into one dime was occasionally misunderstood.” By the second meeting, Elizabeth was willing to comment on her students’ misunderstandings. After watching a clip where her students were filling in a tens frame with pennies, she said, “one thing I noticed was that one miscounted but still put the correct amount on her tens frame.” By the last meeting (January 14, 2014), she even commented on the misconceptions of students in the other participants’ classrooms. While watching first graders count dot cards and compare the numbers she commented that, “I think they compared it wrong once or twice too. They got confused in their counting.” Elizabeth progressed from writing about mistakes students made, to discussing mistakes her students made, to discussing the mistakes other teachers’ students made as the meetings continued.

As a result of participating in the study, Elizabeth noticed five aspects of classroom events in the video clips of math lessons. She noticed two aspects that related

to the classroom and the students: (a) she noticed how students behaved as they played math games and worked in math stations; and (b) she noticed that students' ability levels varied considerably, both within the same class and across grade levels. She also noticed three aspects of student thinking: (a) she noticed how students' understood the math concepts; (b) she noticed the strategies the students used; and (c) she noticed the misconceptions the students had.

**Learning new skills.** Another area in which Elizabeth benefitted from participating in the video club was in learning new skills and considering how she might apply them in her classroom. I identified two lessons that Elizabeth seemed to learn as the video club meetings progressed.

***Lesson 1: "Who I partner kids up with."*** During the exit interview, Elizabeth mentioned that she "learned a lot as to who I partner my kids up with." She believed that she learned both from watching her own students and from seeing how other teachers grouped their students to work. She said,

I might have put a student who I knew understood the topic really well with a student who didn't know it as well. And, it was really interesting to see how a lot of times my higher student wasn't necessarily giving the answers or telling them exactly what to do. It was kind of like they were doing it and the lower student may have been watching and learning from what they were doing.

As I reviewed the transcripts, I found several examples of Elizabeth's careful attention to how students were paired, especially in other teachers' classrooms. At the first meeting Elizabeth noticed how students worked together in the money exchange game. She said,

I just thought the way that they were paired, it seemed like a really good match up because if one student didn't understand you could take five pennies and change it

to a nickel, the other one was there to say, “Oh well, you know, you can do this with your pennies or with your nickels.” So I thought that was really good.

In the second meeting, a clip from another participant’s class featured students using dice and connecting cubes to complete an addition activity. Elizabeth asked the featured teacher if she “purposely paired them [the students].” When the teacher responded that she had, Elizabeth commented that, “I try to do that too. You know, who will work well? Who will help each other?” One of the clips at the fourth meeting featured three different pairs of second graders using playing cards and place value mats to make and compare three digit numbers. Some of the other participants commented on the strategies the students were using, but Elizabeth again noticed how the students were working together. She said, “The students who were working together were helping each other. Like when he read the number as 963, she corrected him and said it was 693.” At each of the meetings, Elizabeth paid close attention to how students were paired to play the games.

A final comment Elizabeth made during the exit interview revealed how much she learned about grouping her students as a result of participating in the video club. She said, “because of the meetings I changed their tables and found different ways to group them.” She believed that she had learned enough about how her students were interacting to make decisions about grouping them.

***Lesson 2: “Talking with a group.”*** At the exit interview, I asked Elizabeth how she thought participating in the video club changed her classroom practice. She responded,

I think the one video that you recorded of me talking with the group, after we had gone through everything and we sat down and kind of talked about it to close the lesson. That was really helpful to watch because I think I could have guided the conversation a little bit better, maybe posing the question in a different way. I think that really helped me because since I feel like we've had some really good discussions.

The group watched the clip that Elizabeth was referring to at the fourth meeting.

Before we watched the clip, she mentioned that discussion time was

when it clicks for a lot of my students. I just see it, even if they're not the ones saying it, a lot of them are like, 'Oh!' Because they have to say it or hear it from someone else, or have experienced it already.

At that point she did not make any comments about how she led the students in discussing the math concepts. But after reflecting on the clip and guiding more class discussions, she realized that she could do things differently. Another comment she made at the exit interview captured why Elizabeth changed how she led class discussions, "I think a lot of it had to do with seeing how, or hearing how, I was kind of guiding it and growing from that myself, so...it was very helpful!"

As a result of participating in the video club, Elizabeth seemed to learn two important lessons that changed how she thinks about her students and how she plans her teaching. She learned to think more carefully about how she groups her students. She also learned ways she could guide students' thinking during whole group discussions.

**Insights gained.** A final area in which Elizabeth's knowledge developed during the meetings was in the insights she gained as she participated in the video club. I identified two insights Elizabeth seemed to gain.

***Insight 1: "Relate to people."*** Elizabeth was the only first-year teacher in her school and she shared that it was sometimes hard to talk with the other teachers because

they did not remember the feeling of being a first-year teacher. During the exit interview, Elizabeth said she thought that the video club meetings provided a forum to discuss these feelings and “relate to people who were having struggles but also triumphs.” Elizabeth went on to say that, “It was nice to talk about things that were going well and maybe things that we could work on or just discuss together.” She began to view the meeting as a support group, where she could talk candidly about problems she was having and look to the other teachers to understand what she was experiencing and to provide advice.

***Insight 2: “Growth as a teacher.”*** During the exit interview, as Elizabeth reflected on the meetings, she realized that they had, “helped me grow as a teacher, especially as a math teacher.” She shared that she had been nervous about the meetings at first. The prospect of being videotaped and then discussing the lessons in front of others was a little “nerve-wracking.” Elizabeth shared that, “at first I didn’t know anyone. So I wanted you to just videotape my kids. But once I got to know everyone and knew how the meetings would go, it was much more comfortable.” As the meetings progressed, she realized that the participants were building a “mutual respect” that allowed them to honestly share about their math lessons and to work together to develop their skills as math teachers.

As she participated in the meetings, Elizabeth seemed to gain insights into how the video club could be a place where the participants had commonalities and could relate to each other. She also began to see how it could help her grow as a teacher.

### **Elizabeth's "Aha" Moments**

As Elizabeth participated in the video club, she developed in several areas. Evidence of this growth can be seen in the meeting transcripts, in Elizabeth's comments at the exit interview and in the artifacts I collected during the study. I believe that Elizabeth had two "Ahas!" during the study that made her reconsider her actions as a teacher. One of these began to develop at the first meeting on October 1, 2013, and the second occurred at the exit interview on January 30, 2014.

The first "Aha!" for Elizabeth came when she began to realize that she might need to make some changes to how she grouped her students. Beginning with the first meeting and continuing until the exit interview, Elizabeth made comments about how students, both in her class and in her colleagues' classes, were grouped to work at stations and play games. Elizabeth became increasingly aware of who worked well together and who needed a new partner or a new group.

Elizabeth's second "Aha!" was the recognition that she needed to adjust how she was leading class discussions. As Elizabeth reflected on a video clip from the fourth meeting, that showed her leading a class discussion, she realized that she let her students stray too far off topic and that she needed to ask more leading questions. She believed that when if she applied this strategy, the classroom discussions would improve.

### **Summary**

Elizabeth developed in several significant ways as a result of participating in the video club, beginning with what she noticed about classroom events. She grew in her ability to notice student behaviors. She also realized that students, even in the same

classroom, might have vastly different ability levels. Elizabeth also noticed three aspects of student thinking. She noticed how students were thinking about the math concepts. She noticed the strategies the students were using to solve math problems. Finally, she noticed the misunderstandings students had about the math concepts. Elizabeth needed the experience of the video club meetings and the guidance of the researcher in order to notice these aspects of the classroom.

Elizabeth also learned new skills that she might apply in her classroom. She learned which factors to consider when she partners students to play games or places them in groups to work at math stations. Finally, Elizabeth learned that she needs to adjust how she leads class discussions.

A final area in which Elizabeth developed is in what she gained from participating in the video club. She realized that the club provided a place where the participants had similar issues and where she was able to talk honestly with people. She also realized that working in a group helped her grow as a teacher. Elizabeth made a comment at the end of the exit interview that summed up her experience, “it was about the students and how the ultimate goal is what we can do to be better teachers and help our students be better learners and grow more.” These were the insights Elizabeth gained as a result of participating in the video club.

Despite these developments, Elizabeth remained a novice teacher in many ways. Her primary focus as she watched the video clips remained the students’ behavior and how they worked together. She also concentrated on aspects of teaching that experienced teachers no longer pay attention to, such as the differences in students’ ability levels and

how to lead a class discussion. Figure 7 provides a timeline of Elizabeth's development in the video club. Each finding is displayed to show when I first saw evidence of it in the video club events. The findings shown in green represent Elizabeth's "Aha!" moments.

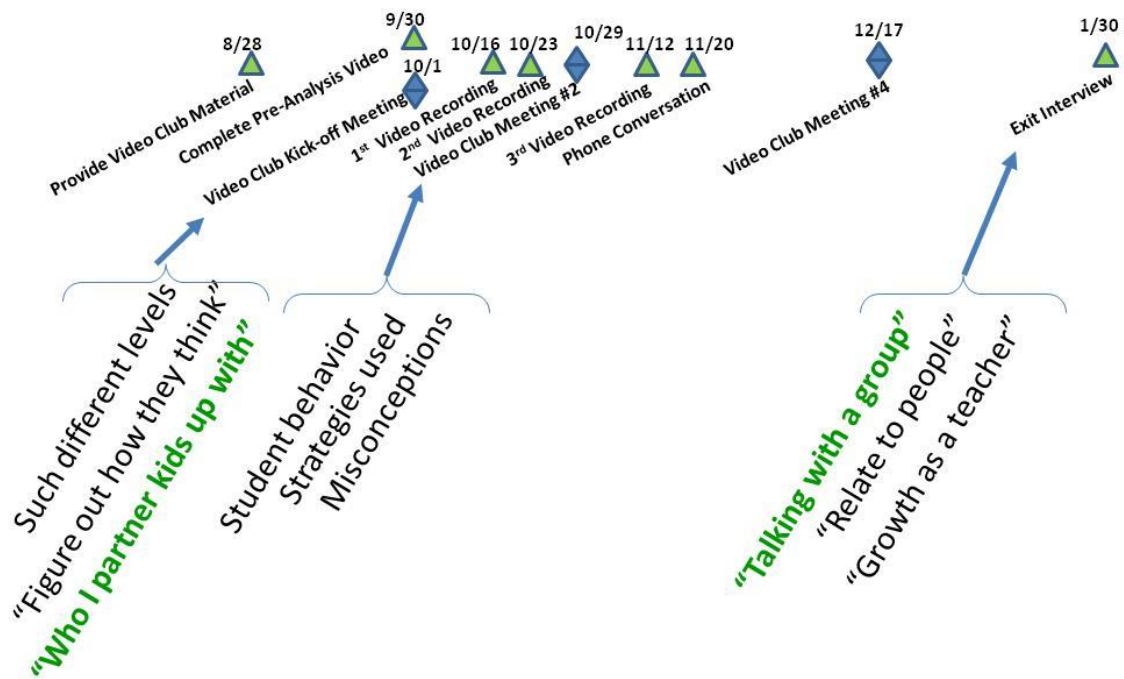


Figure 7. Timeline of Elizabeth's development in the video club



## JOE

### Background

**Personal information.** Joe's route to the classroom was longer than the other participants. The 27 year-old graduated in 2008 from a large university on the east coast with a bachelor's degree in education. He worked as a substitute teacher for five years in the area around his college. He then attended graduate school at a smaller college in the same area and received his master's degree in technology education.

During the study, Joe was completing his first semester as a full time teacher in a Title I school with a population of about 500 students. His first grade classroom had 20 students, ten boys and ten girls. Four students were Black, and 16 were White. Nine students were considered economically disadvantaged. The school was in an established neighborhood and there was not much staff turnover. Joe was the only new teacher in the building during the 2013-2014 school year. He had a paraprofessional in his room during math instruction, but on the days I videotaped she seemed to concentrate more on providing supplies and monitoring behavior than on helping with instruction.

**Participation.** I emailed the principal at Joe's school asking if he had any first-year teachers in his building and suggesting we meet to discuss my study. I visited his school one afternoon during the teacher work week. When we met, he explained that he had one novice teacher, Joe, who might be interested in participating. He went to Joe's

room and returned with him; he then left the two of us to discuss the study. Joe said that he had seen the display about the study at the New Teacher Institute and that the presenter in the first grade session had mentioned it, but he thought that he could not participate because he was not a recent graduate. He said he did not “necessarily see myself as a novice because of all my substitute experience.” I explained that the participants in the study were teachers completing their first-year of full time teaching responsibility. Joe agreed that he met this criterion and agreed to participate. He said, “I know you are looking for people and I figure it will be a way to be helpful.” Joe shared that he had no previous experience with videotaping his lessons.

Joe attended four of the video club meetings, only missing the third one on November 19, 2013. He was usually the first to arrive and the last to leave. He knew more about technology than I did and offered to help me learn to use an online audio recording program rather than a tape recorder. Joe was also quick to help me when I had technical problems with the videos or the computer during our meetings. Joe often cleared his throat or paused to think when making comments during the meetings. He mentioned that he sometimes felt like it would have been helpful to view the videos twice. He wanted to have, “one time just to kind of familiarize myself with the situation and the second time to be able to look for the details and pay close attention...to move from what they are doing to how they’re doing it.” When I looked at his recording sheets, he had written more than the other participants, especially in the section about noticing what the students were doing. Perhaps Joe’s attention to his writing caused him to miss other aspects of the video clips. Figure 8 provides a summary of Joe’s participation.

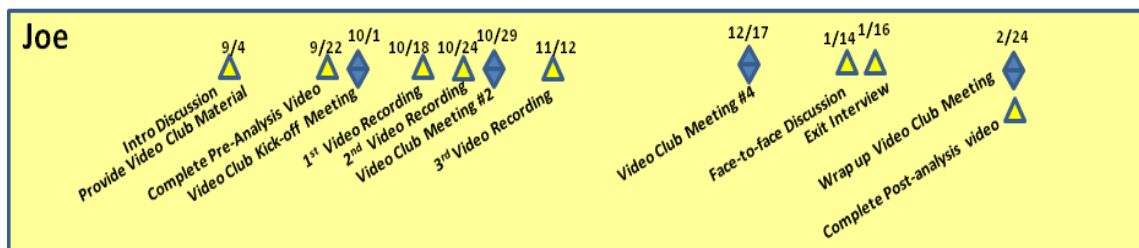


Figure 8. Joe's participation in the study

**Setting.** Joe taught in one of the oldest buildings in the county. His room was smaller than the other participants. Instead of lockers or coat hooks, it had a walk-through closet for students' coats and backpacks in the back of the room. The room was carpeted and Joe had placed carpet squares near the blackboard to designate each student's place to sit during whole group work. The desks were arranged in four rows with an aisle down the middle of the room. Each row had three desks on one side and two on the other. There was a table at the back of the room for small group work.

The math lesson was just beginning each time I arrived to videotape (October 18, 2013, October 24, 2013, and November 12, 2013). During my first two visits, Joe explained what students would be doing and enlisted students' help to distribute the necessary materials. Once students had the materials, they worked independently while Joe walked around the room, correcting misconceptions and conducting formative assessments. During my final visit, the lesson started with the whole class discussing how to cut pattern block shapes into equal and not equal pieces, followed by students working

in groups to complete a related activity. Joe sat with a group that needed additional assistance in order to successfully complete the assignment.

## **Findings**

When I interviewed Joe at the end of the study to discuss the video club and how it had affected his development as a first-year teacher, he was able to identify several ways in which he believed his knowledge base had expanded by participating. As I reviewed the data sources: (a) the video club meeting transcripts; (b) the exit interview transcript; (c) Joe's recording sheets from the meetings; and (d) Joe's pre- and post-analysis of the ten minute math lesson, I found evidence of development in the three areas that the research questions addressed. Joe: (a) noticed and interpreted classroom events; (b) learned new skills; and (c) gained insights from participating in the video club.

**Noticing and interpreting classroom events.** As I analyzed the data, I identified four aspects of classroom events that Joe noticed. The first aspect focuses directly on Joe and how he thought about his teaching. The last three focus on student thinking, all of which relate directly to the recording sheet I provided to the participants at each meeting (Appendix F).

*Aspect 1: "Preoccupied"* When I asked Joe about the video club and what he thought he gained from participating, he had a hard time identifying any direct benefits. He talked about how self-conscious he was and said, "Hey I'm a first-year teacher. I'm more preoccupied with what I'm doing than with what they are doing." He wanted the videos to focus more on him than the students so he could "see what I'm doing more. Pay

attention more to what I'm doing and what I'm not doing and what I need to be doing." Even though Joe acknowledged that the intent of the video club was to observe and discuss student thinking, he did not seem able to shift the focus from himself to the students.

Joe's preoccupation was apparent during the video club meetings, as he focused on what he and the other participants were or were not doing rather than on what the students were doing. At the second meeting, the video clip from Joe's room featured students rolling a die and then doubling the amount. After watching the clip Joe's first comment was about what he should have done rather than on what the students were doing, "If I had more time to prepare, I probably would have at least gotten some ten-sided dice." During the same meeting, Joe's only comment about a clip showing kindergartners working with a tens frame and pennies was about how the teacher might change the activity. He commented that, "it could be something as simple as just mixing up what they're putting down. Like maybe one day it's bears, maybe one day it's pennies, maybe one day it's cubes."

A clip at the fourth meeting showed kindergartners sorting buttons based on different attributes. While the other teachers focused on the students' strategies for sorting and where they were making their mistakes, Joe again thought about what the teacher could change. He said, "You can even start to sort it for them and say, "Hey, how am I sorting mine? Can you add something to my group?" Another clip at the same meeting featured second graders using three cards to make the greatest number possible. One of the other participants noticed that a few of the students were misreading the

numbers on the cards provided. Joe's comment reflects his greater attention to the materials and the teacher, rather than the students and their thinking; he said, "The only alternative would be to use straight number cards with the numeral printed on it and that's not necessarily as attractive."

There were only three participants at the last meeting on January 14, 2014, and they were the three who tended to be the quietest. Although Joe did make a few comments about students' strategies, he continued to focus on the teacher and how the lessons might be changed. In one of the clips students were practicing adding two numbers by looking at dot cards and counting on. Joe's comment was, "I think one of the next steps would be to associate those with numbers. Like put them into addition sentences." Another clip at the same meeting showed kindergartners using connecting cubes to make patterns. Joe mentioned that the teacher, "could probably work to challenge what types of patterns are being made."

Throughout the study, Joe continued to be preoccupied with his actions and those of the other teacher participants. Even with guidance from the researcher and the recording sheet, Joe seemed to be more focused on himself than on the students and their thinking.

*Aspect 2: "Understand the process."* It was not until the fourth meeting that Joe's comments began to show that he was noticing how students were making sense of the math concepts. One of the clips featured another participant working with a small group of students using connecting cubes to make combinations of five. After watching the clip, Joe said "They seemed to understand at least the process. Which is more than anything

probably the most difficult hump to get over—understanding what exactly they are trying to find out.” Later in the same meeting, another clip showed second graders playing a place value game with three number cards. Joe noticed that the students, “picked up that the hundreds was the most important one. It’s like this basically defined the round and they just went through the rest of it as a routine.” The final video at this meeting featured first graders using dot cards and counting on. Joe realized that some of the students were figuring out who had more dots on their cards quickly. He said, “By the end they’re not even counting really, they’re just saying, ‘Hey, I notice you got more.’ So they’re able to at least visually recognize some of that.”

Joe continued to be more aware of student thinking at the last video club meeting. As he watched a clip of kindergartners making patterns with connecting cubes, he commented, “They definitely understand that patterns continue forever. Nothing super complex, just simple ABC and AB patterns more than anything else.” After the clip concluded, Joe said,

I saw some students counting and restating the colors as they went through. I saw one of the girls was getting ahead. She was actually putting all of this color and all of this color to get ready. So she acknowledged, “Hey these are the things I will need in order to get that.” So she at least had a good grasp of what part will be in the pattern.

A later clip during the same meeting showed students in Joe’s class cutting and then sorting paper pattern blocks into equal and not equal shapes. One of the participants noticed that the students were finding all the equal shapes first and then working on the not equal shapes. Joe said,

A lot of them did a lot of one before they started to do the other, so they weren’t necessarily switching up their thinking and saying, “Do this first, do this second,

do this first, do this second.” And then switch between them. They pretty much went all one, all the other. For some of them it looked like they maybe cut it and then decided, “Hey, this belongs in the equal!” or “Hey, this belongs in the not equal!”

By the last meeting, Joe began to pay more attention to the students in the video clips and what they were doing. He seemed to be attempting to understand how the students were thinking about the math concepts. However, Joe needed time and guidance to move to an awareness of the students.

*Aspect 3: Strategies used.* When I analyzed the transcripts from the meetings and Joe’s exit interview I did not see many comments about student strategies until the last meeting. However, when I looked at the notes he took during each meeting, a different pattern emerged. Joe was noticing students’ strategies; he just was not making many comments about them. Some examples of his written comments were: “identified narrow space for narrow shape...experimenting to see what fits...counting on fingers to find answers...girls started in hundreds place and moved to ones place...not counting on yet or using numbers on cards...sorting by color, one person by number of holes.”

Joe did make one comment about student strategies during the first meeting. After watching a clip of second graders playing a money exchange game he said,

He was trying to take six pennies first instead of saying, “Oh, a nickel is five and then an extra cent.” And I think, if I’m correct, his partner corrected him. And then he wasn’t able to collect because there weren’t enough pennies. I don’t believe, right?

Although he listed examples of student strategies on his recording sheet at the second and fourth meetings, Joe did not comment about them again until the fifth meeting.



One clip at the final meeting showed second graders making two three digit numbers and then reading the resulting math sentence to each other. Joe noticed that no matter which number was first on the place value mat, students switched the order so they could always say, “greater than.” Joe commented,

I think they just want to say the bigger one first. It makes it easier to have to know one term. So they treat it like knowing one term. ‘This is greater than this. This is more important than this. This is a more desirable outcome than this.’

Another clip at the final meeting showed Joe’s class working on making equal and not equal shapes with paper pattern blocks. After watching the students cutting the shapes he said, “I think it’s mostly a matter of them wanting to create what they visually see as the biggest shape. Like they want the two end results to be the most recognizable thing they can create.” Although Joe moved toward making more comments about student strategies, he still did not make many.

***Aspect 4: Misconceptions.*** Another aspect of student thinking that Joe made a few comments about was misconceptions students had. At the second meeting, a video clip from Joe’s room showed students rolling a die and doubling the amount. Most students seemed to understand the assignment and were doing well. However Joe noticed that, “our gentleman at the end was going off the rails. He was practicing his adding. He just wasn’t practicing the right adding.” Joe recognized that the student was trying to complete the assignment, but had misunderstood the directions. In another clip at the same meeting, first graders were trying to fill in shapes with pattern blocks. When one little girl was having trouble getting her blocks to fit correctly, Joe realized that “she

really wanted to make those squares work” even though they were not going to fit into the outline.

A clip at the last meeting showed first graders using connecting cubes to find combinations of five. One little girl had put three blue cubes and one white cube together and then written  $3 + 2 = 5$ . At first Joe was confused about what the student was doing, “I was trying to figure out what she doing counting on her fingers. I wasn’t entirely sure what she was doing there.” As he continued to watch the video clip, he realized that she had colored in the number of cubes in her book and written the correct equation, she just did not correct her connecting cubes. Joe said, “She gets the structure of the addition sentence. That much is definitely clear. She’s just not necessarily constructing the same way that she makes her models.”

Another piece of evidence that shows Joe was beginning to notice students’ misconceptions was his post-analysis of the elementary math lesson on the website, [www.beasmartercookie.com](http://www.beasmartercookie.com). As Joe watched a class of first graders estimating how many groups of 10 they could make out of collections of different objects, Joe wrote, “Boy seemed to believe he needed a large amount [of bags], perhaps misunderstanding how much 10 is in estimating. Girl noticed the mistake and said the boy had too many bags.” Joe needed the support of the video club and the discussions to begin noticing students’ misconceptions.

As a result of participating in the study, Joe noticed four features in the video clips of math lessons. Joe’s primary focus as he watched the video clips was himself and the other participants. However, he also noticed three issues related to the students: (a) he

noticed how students understood the math concepts; (b) he noticed the strategies the students used; and (c) he noticed the students' misconceptions.

**Learning new skills.** Another area in which Joe benefitted from participating in the video club was in learning new skills and considering how he might apply them in his classroom. I identified three lessons that Joe seemed to learn as the video club meetings progressed.

*Lesson 1: "Outside the box."* At the exit interview, Joe discussed how he thought more about his lessons when he knew I was coming to videotape. He said, "since I knew I was going to see myself and other people were going to see me, it kind of did push me to think a little more outside the box." Several comments that Joe made during the meetings support the fact that knowing he was going to be videotaped did, as he said, "drive me to think of better lessons, or more hands on lessons."

As Joe introduced his clip in the second meeting he explained that, "we were introducing doubles and I started with this lesson because it was more hands on than how Envisions (the math series adopted by the county) suggested I introduce the topic." Again, Joe's attention was on himself and how he presented the lesson. He seemed to be aware of his desire to plan more engaging lessons when I was planning to videotape.

This awareness continued into the fifth meeting, when the clip from Joe's classroom showed his students working in small groups to complete an activity with paper pattern blocks. The objective of the lesson was to divide shapes into equal and not equal parts. As Joe talked about planning for this lesson he said, "part of it was strictly

looking at what Envisions wanted me to do at that point and saying, ‘I can do something else beyond this.’ And then just coming up with something.”

Joe made a comment at the exit interview that captured how being part of the video club affected his planning. He said, “I’m going to have to justify this to people. There’s going to be a physical record of this happening. I want to make it at least a little bit more professional, a little bit better.”

***Lesson 2: “Overly-critical.”*** During the exit interview, Joe commented that he realized during the study that he is, “the person who is going to be overly-critical about everything I do.” I think this was the lens Joe used when he reflected on his students’ behaviors that were captured in the video clips. In the initial meeting the participants introduced themselves and talked a little bit about their students and the first few weeks of school were going. Joe said,

It’s very difficult in my situation right now, because I have a lot of children who are emotionally still kindergarten and some who have very close to the line birthdays, so developmentally many of them are still kind of in that kindergarten range. For me, right now, my biggest difficulty is managing a lot of behavior and making sure that the behavior is under wraps so we can actually get to the activities that we need to get to. It’s proving really tricky because I do have to manage a lot of behaviors.

Many of Joe’s comments, during the meetings and at the exit interview showed that his attention was often on the classroom environment instead of the students and their thinking. This was especially true when the video club watched and discussed videos from Joe’s classroom. Although Joe said he, “didn’t feel worried that I was going to get like judged or anything,” his anxiety about being the topic of discussion showed in some of the things he noticed in the clips.

During the second meeting, the clip from Joe's room showed the first day of a lesson on doubling numbers. Instead of realizing that this was the students' first experience with this math concept and acknowledging that they needed additional practice, Joe's comment was, "Unfortunately our next step is more practice with doubles." He seemed worried that his students did not do better with the task. Although this comment reveals that he did notice his students, Joe's seemed to focus more on their behavior than on their thinking.

The clip from Joe's class during the fourth meeting showed a whole group lesson with Joe and four students at the front of the room modeling how to make equal and not equal shapes. Joe's comments focused on the students' behaviors rather than the math. When another teacher mentioned that a child was wiggly, Joe responded with "That's typical!" Later in the meeting when the kindergarten teacher mentioned how off task her students were, Joe commented, "Still better than my kid sitting in the front with the scissors whittling away at his pencil." Toward the end of the meeting the teachers were discussing the fact that it was important to have students show their work. Joe commented that, "My kids hate how much I have them record stuff. But my kids want very much to be lazy about the whole thing. But there's no other way for me to make sure they're actually paying attention right now. "

Joe's comments during the video club meetings seem to reveal that he was critical of both himself and his students. At the exit interview, Joe acknowledged that, "even with no paper trail, I'm sure I would still be the same way."

***Lesson 3: “Disconnected from the moment.”*** Even though Joe was cautious about attributing any changes directly to participating in the video club, he did share that he learned that “videotaping is a good exercise for reflection.” At the exit interview he explained how he was able to reflect on his lessons when he saw the clips in the meetings. He said,

being able to see myself disconnected from the moment. Not being in there, doing that thing and being able to see what I’m doing and how long I’m doing it. Just being able to observe myself and how the students are responding to it.

Joe believed that it was beneficial to watch himself teaching and to see how his students were thinking about the math concepts. Joe suggested that a video that showed a whole lesson, from the introduction to the closing, might be an even better tool for reflection. He commented that, “seeing a lesson done from a couple different perspectives would be nice. If you’re only getting one perspective, then that doesn’t build to a broader perspective. You get the isolated, but you don’t get the trend.”

As a result of participating in the video club, Joe learned three important lessons that changed how he thinks about his students and how he plans his teaching. He learned that it is important to plan engaging lessons. He realized that he has high expectations for himself and his students. Finally, he learned that videos are a useful tool to reflect on his teaching.

**Insights gained.** A final area in which Joe’s knowledge developed during the meetings was gaining insights from participating in the video club. I identified two insights that Joe seemed to gain.

***Insight 1: “Fresh eyes.”*** Joe was the only first-year teacher at an older school with little staff turnover. He was also one of the few male teachers in his school and the only one in the primary grades. During the exit interview Joe mentioned that these factors made him feel somewhat isolated and so he thought the video club provided an opportunity to, “talk with other people with fresh eyes.” He explained that his meetings with his grade level and his mentor were not “discussion-oriented;” that these meetings were more about curriculum maps, pacing guides, and materials. Joe believed that the video club was a valuable experience which allowed him, “to meet and discuss new teacher things and talk in a way that was a little bit better because it is a different type of environment than going and talking with experienced teachers.”

***Insight 2: “Status as a first-year teacher.”*** During the meetings, Joe’s comments often focused on helping the other teachers by giving them suggestions for next steps or ideas for changing the lesson. He tried to appear confident and knowledgeable. However, a comment Joe made on the reflection sheet at the end of the wrap-up session told a different story:

I think from an outside perspective I have gained more context to what I should be looking for when reflecting on a video, but because of my status as a first-year teacher, I don't think I can effectively bring those skills into the classroom yet. I'm still in a position of concentrating on what I'm doing and how I'm doing it, that the ultimate goal of concentrating on how students are responding is difficult.

In this written reflection, Joe acknowledged that he was a new teacher and had much to learn. But he did not share this perspective with the other participants during the meetings. Despite the fact that he did not reveal these feelings in the meetings, Joe still

seemed to think that meeting with and talking to other new teachers in a group setting was beneficial.

### **Joe's "Aha" Moments**

Joe's behavior when I visited his room to videotape was different than the other participants. He did not acknowledge my presence at all during any of my visits. Even as I moved around the room to capture the work and conversations of different students, Joe acted as if I was not there. When we talked during the exit interview, Joe referred to the taping sessions as "observations." He seemed to view them in the same context as when an administrator came in and watched him teach without any interaction occurring between them. I think this affected how he experienced the video club.

During the exit interview, Joe said, "even if I can't completely express what the specific benefits were, I still do acknowledge that being videotaped and having observations and observing other teachers is always valuable." Unlike the other four participants, I could not identify any "Ahas!" for Joe. However, I observed four things that changed in Joe's classroom as the study progressed that I believe can be directly attributed to his participation in the video club.

The first change was in how Joe organized and distributed materials. During my second visit, Joe had planned a sorting activity. Each student needed a graphic organizer and eight strips of paper with different types of leaves on them. Joe had taken the time to arrange the materials on trays and asked students to help him distribute the materials; but it still took twenty minutes for all his students to have the necessary supplies. When I visited for the last time, Joe had planned an activity using paper pattern blocks to show



equal and not equal. This time he placed the materials the students would need around the room as he was explaining the activity, which resulted in no down time for students.

When I asked Joe about this change in the exit interview, he said he, “noticed how some of the other teachers arranged their materials more quickly than I did.”

A second area in which I noticed a change in Joe’s instruction was a shift from individual work to group work. The first two times I visited, the students were seated at their desks working on activities by themselves. They were talkative, but not their conversations were not necessarily about the math concepts. I decided not to transcribe these video clips because there was so little math related conversation. Joe was not able to check on everyone’s work because they were spread out and he had to remind the class several times to work more quietly. The third time I videotaped in Joe’s room the students were working in small groups. They were talking about the shapes they were cutting, the new shapes they were making and which shapes were equal and not equal. They were also helping each other. I transcribed this video clip because there was a lot of math related talking occurring. In addition, Joe was able to check in with each group and quickly see who needed help and who understood. At the exit interview, Joe said that “it [group work] seemed to work for other teachers and I wanted to try it.”

Joe’s classroom behavior system was similar to those used in many classrooms. Students’ names were written on clothespins and these clothespins were attached to a color chart, with blue, green, yellow, orange, and red sections. Students started the day on green and then either moved their clip down for inappropriate behavior or up for appropriate behavior. When I visited to videotape for the last time, I noticed that the

students had small containers on their desks with plastic pennies inside. When I asked Joe about them at the last video club meeting he said, “They get one penny for green and they get two pennies for blue. Actually, I got that from looking at your stuff.”

A final change in Joe’s room was the seating arrangement. When I visited to complete the exit interview, he had switched the desks from four rows of five desks all facing the front of the room to a “U” shape. When I asked about it, he said it allowed him to see the students’ work more easily and allowed for more “interactions” between the students.

### **Summary**

Joe developed in several significant ways as a result of participating in the video club, beginning with what he noticed about classroom events. While he remained “preoccupied” with what he and the other participants were doing, he did begin to notice some aspects of student thinking. He began to notice how students understood the math concepts. He also noticed the strategies the students used. Finally, he noticed the students’ misunderstandings. Joe needed the experience of the video club meetings and the guidance of the researcher in order to notice these aspects of the classroom.

Joe also learned new skills that he might apply in his classroom. He learned that he was able to plan better, more engaging lessons for his students when he deviated from the curriculum guides. He also learned he was sometimes “overly-critical” of both himself and his students. Lastly, Joe learned when he took a step back and reflected on his teaching he could see what he needed to change. Joe seemed to learn from participating in the video club.

A final area in which Joe developed is in what he gained from participating in the video club. He realized that meeting with other first-year teachers who had “fresh eyes” allowed him to discuss issues in different ways than meeting with his more experienced colleagues. He also realized that he, even with his five years of substituting experience, was still a first-year teacher. These were insights Joe gained as a result of participating in the video club.

Despite these developments, Joe remained a novice teacher in many ways. He continued to be preoccupied with what he was doing in the videos and expressed a desire to see more of himself in the clips. He also concentrated on aspects of teaching that experienced teachers no longer pay attention to, such as distributing materials, cooperative learning, behavior systems, and seating arrangements. Figure 9 provides a timeline of Joe’s development in the video club. Each finding is displayed to show where I first saw evidence of it in the video club events.

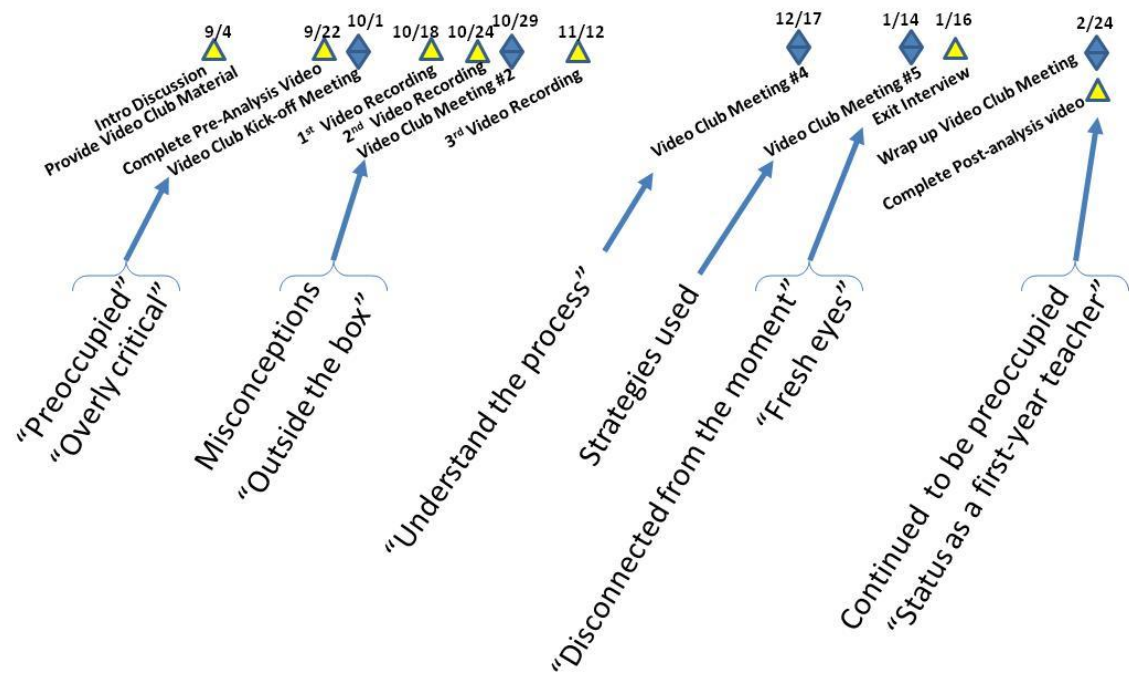


Figure 9. Timeline of Joe's development in the video club

## MOLLY

### Background

**Personal information.** Molly is 23 years old. She graduated in the spring of 2013 with her bachelor's degree in inclusive childhood education from a small, private, liberal arts college in the northeast. She applied for teaching positions closer to home, but when she was offered a job further south, she decided that she should move.

During the study, Molly was completing her first semester as a first grade in a Title I school with a population of about 550 students. She had 20 students, eight boys and 12 girls. Four students were Black, three were Hispanic, one was Asian, and 12 were White. Eight students were considered economically disadvantaged. Molly's school had seven new classroom teachers, but only two were first-year teachers. Molly's team of five teachers had undergone a major transition from the previous year. Two of the five teachers had taught at the school (one for a number of years and one for six months), but the other three teachers, including Molly, were new to the school. Molly had a paraprofessional for support two days a week during her math instruction.

**Participation.** Molly was the last to agree to participate. The math specialist at her school mentioned the video club and she thought it sounded interesting. The math specialist gave me Molly's name and I emailed her, asking if I could meet with her to discuss the study. She agreed and we arranged to meet one afternoon in early September.

When I arrived, she was getting materials ready for the next day. We sat at one of the tables in the room and I shared my reasons for doing the study, the time commitment and what she might possibly gain from participating. She said that she had “always been really interested in research-based teaching...and the different things that they find when they go into classrooms.” She thought participating in the study would be a “great opportunity to actually participate in that.” Molly also shared that she had no experience with videotaping herself teaching.

Molly attended four of the video club meetings, only missing the third meeting on November 19, 2013. She did not talk as much as some of the participants, but she wrote more on her recording sheets. However, as the meetings progressed Molly began to talk more, especially about other teacher’s videos. At the exit interview, we discussed the meetings and what Molly thought about her participation in the group. She commented,

I think I was one of the quieter people in the group and I think I just wasn’t ever really ready to express what I was thinking, because I was still trying to think, ‘Well what were the kids saying? Or what was really going on?’ So I think maybe if I had more wait time I could have had some better responses.

When I read over the transcripts, I saw that Molly often waited for others to say something about the video we watched before she voiced her opinion. The exception to this was during the final meeting, when only Molly, Elizabeth and Joe attended—the three most reserved members of the group. Figure 10 provides a summary of Molly’s participation.

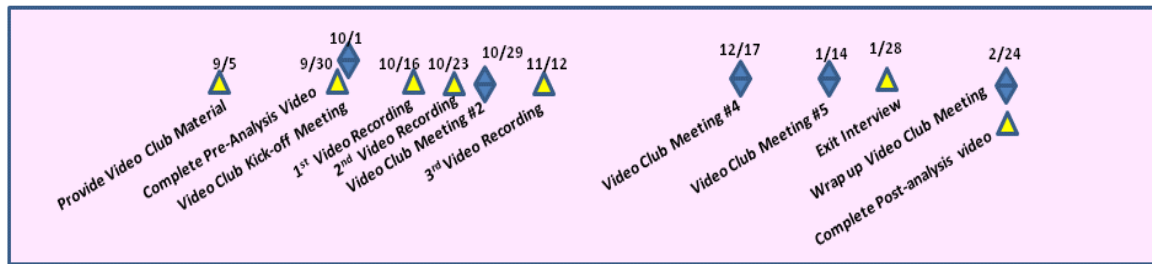


Figure 10. Molly's participation in the study.

**Setting.** Molly's classroom was in a recently renovated, but older building. It had a tiled floor with several area rugs to designate different areas of the room. The desks were arranged in two groups of six and one group of eight. There were two tables in the back of the room for small group instruction and a rug in the front of the room for large group instruction. Students usually moved from table to table to complete different math activities. On one of my visits, some students moved to a station set up on a small rug in the corner of the room. During another visit, some students worked with Molly at the front of the room.

Molly's students were already at their stations each time I arrived to videotape (October 16, 2013, October 23, 2013, and November 12, 2013). On the first two occasions Molly was moving from table to table, listening to students as they worked and guiding them to complete their assignments. On my final visit, Molly was teaching a small group of students how to use materials in a tub to practice their basic addition facts, something the first grade teachers at Molly's school call 'tubbing'. While Molly worked with the small group on the rug, the remaining students completed familiar tasks at their table groups.

Molly continued with her teaching each time I visited, but she always took time to tell me about the tasks the students were completing and several students that she was concerned about. Molly showed that she was appreciative of my visits by thanking me at the end of my visits and saying she hoped I had captured what I needed on the tape. Molly never seemed nervous about having her lessons videotaped. During the last visit, I had the opportunity to videotape Molly instructing a small group. Even when I sat right beside her, Molly did not seem to notice and her instruction did not change.

### **Findings**

When I interviewed Molly at the end of the study to discuss the video club and how it had affected her development as a first-year teacher, she was able to identify several ways in which she believed her knowledge base had expanded by participating. As I reviewed the data sources: (a) the video club meeting transcripts; (b) the exit interview transcript; (c) Molly's recording sheets from the meetings; and (d) Molly's pre- and post-analysis of the ten minute math lesson, I found evidence of development in the three areas that the research questions addressed. Molly: (a) noticed and interpreted classroom events; (b) learned new skills; and (c) gained insights from participating in the video club.

**Noticing and interpreting classroom events.** As I analyzed the data, I identified six aspects of classroom events that Molly noticed. The first two are facets of teaching that focus on Molly and her development. The last four focus on features of student thinking. Three of these relate directly to the recording sheet I provided to the participants at each meeting (Appendix F).



**Aspect 1: Listening to students.** When I visited Molly's class to videotape, I watched her moving around the room, listening in on conversations and making comments on student work. But neither of us realized that she might not be listening closely enough. As she watched the video clip of herself at the fourth meeting, that showed her working with a small group of students on number combinations, Molly noticed something startling.

I didn't realize this till I just watched myself. But I thought she was trying to tell me that the blocks in my hand were the commutative property of the  $2 + 2$  problem. But I think she really did point to the first one. But I was so focused on "No! How many blocks are here?" because I want to make sure you have four blocks that I didn't understand what she was saying. I feel kinda bad because she was right but you're just in your own little world...on the track, like this is what I'm supposed to teach you, so who cares if that's a good thing that you're noticing.

Molly seemed to realize how important it was to take the time to listen to her students in order to understand what they were doing and why they were doing it. During the final video club meeting Molly and the other participants discussed how what could be learned from taking time to listen carefully to what students say. Molly said,

Sometimes they say something that you're like, "Wow, that really tells me that they know something. Or that tells me that they're not getting it." Like it looks like they're getting it, but then they say this and it's like, "What's going on there?"

This comment indicates that Molly became more aware of listening to students and making sure she understood what they were trying to tell her. Molly also began to realize that she needed to pay attention to what her students were doing and saying.

**Aspect 2: "Doing and saying."** As the meetings progressed, Molly became more aware of the importance of paying attention to both what students are doing and saying. During the wrap up session Molly said,

I've realized it is important to pay equal attention to what the student is doing and saying because sometimes they grasp a concept but can't explain it and other times they are explaining a concept well but make mistakes.

When I reviewed the transcripts from the meetings, I could see how Molly's ability to do this improved. At the first video club meeting one of the clips showed my second grade students playing a game that required them to exchange coins. As Molly watched, she focused entirely on what the student said. One of the students in the clip claimed that he knew which numbers to add to get ten, but he was confused about how to make \$0.10 with pennies and nickels. Molly's only comment was, "that child knows that  $6 + 4 = 10$ ." She did not pay attention to the fact that he was not able to figure out how to make \$0.10.

At the fourth meeting, Molly had moved to focusing both on what the students were doing and thinking. A video clip from a first grade classroom showed students using the greater than ( $>$ ) and less than symbols ( $<$ ) to compare two digit numbers. The students were able to draw the correct symbol, but always said one number was "greater than" the other. Molly noticed that, "when you get the triangle thing and they have to eat the bigger number, it's hard for them to get what that symbol means." She was beginning to realize that it was important to observe and listen to students in order to understand their thinking completely.

During the wrap up session, she made a comment that illustrated her growing awareness of the importance of both listening to and observing students carefully. Molly explained, "I've learned that it is important to first observe what a student is doing before

going in and correcting mistakes so that you can help challenge their thinking rather than fix a problem.”

*Aspect 3: “How kids think.”* One of the questions I asked Molly during the exit interview was about how she thought her ability to notice student thinking had changed. She answered, “I ended up learning just how kids think and what they take away from the whole group lesson and how they’re applying it to individual practice.” The idea of paying close attention to how the students were thinking was a consistent theme in Molly’s data. Beginning with the second video club meeting, she focused her attention on how the students were making sense of the math concepts. As she watched a video of kindergartners choosing number cards, counting out the corresponding number of pennies and placing them on a tensframe, she said

I noticed that if they had 10 and then they pulled the 2 card, instead of just taking away all but 2, they swiped the whole card and one, two. They’re not at the point where they can just take away two.

One of the clips at the January meeting showed second grade students turning over three cards and placing them in the ones, tens, and hundreds place in an attempt to make the largest possible number. As she watched two boys playing, Molly said,

I think they were taking more risks than they needed to sometimes. Because the one time he laid down a five in the ones, a six in the tens, and it was like do you really think you’re going to get a higher number for the hundreds? Those are pretty high!

Another video clip from the same meeting showed students cutting paper pattern blocks into equal and not equal parts. When Molly noticed that the students were finding more equal than not equal shapes, she thought it might be because, “it was harder for

them to see the not equal but easier for them to see the equal because they could see that they looked the same.”

Molly’s comments on her post-analysis of the math lesson on the website, [www.beasmartercookie.com](http://www.beasmartercookie.com) also demonstrated that she was noticing student thinking. As she watched a class of first graders working with making groups of 10 from collections of different objects, Molly wrote, “The student made a connection of grouping tens to making groups of tens during calendar time. This shows the student has some background knowledge about place value.” Molly also wrote, “One boy was grouping his groups of 10 by putting two groups of 10 in a bag. I wonder what he was thinking at that point?” During the wrap up session, I asked Molly how she thought her ability to notice changed from her pre-analysis to her post-analysis. Molly answered, “The first time I watched the video I was focused more on the teacher and the activity. The second time I was focused more on student understanding.” These comments show that after participating in the video club and with guidance, Molly’s began to notice student thinking. During the exit interview, Molly said, “I think the videos really showed me that if kids don’t understand why they’re doing the math, then they’re not going to get the higher level stuff.” These comments show that Molly realized the importance of how students think and that she was able to notice their thinking in the video clips.

***Aspect 4: Strategies used.*** Although Molly was one of the quieter participants, she made several comments at the second meeting about strategies she saw students using. After she watched a clip of first graders in another participant’s class finding number combinations that equaled ten, she said, “I had a lot of kids doing this chunk of

red, plus this chunk of blue, plus this chunk of red equals 10.” When she watched a video clip of her own students trying to fill in shapes with pattern blocks, she commented, “It’s interesting to see how they’re filling them in. I had a lot of people leaving gaps, but then a lot of them caught on. ...It took a couple of days before they realized the squares just weren’t ever going to fit into these outlines.” Molly continued to notice student strategies at the final meeting.

Molly was one of only three teachers who attended the fifth meeting, and they were the three who tended to talk the least. During this meeting, Molly made several comments about the strategies students were using. While watching students in another participant’s first grade class attempt to create equal pieces from different shapes, she noticed several strategies they were using: “one student realized that if you fold it [the shape] exactly in half that’s going to be equal parts....They all kind of found one way to make them equal and stuck with that way. ...They were kind of seeing the other shapes that were inside the shape.”

***Aspect 5: Misconceptions.*** As Molly watched the video clips during meetings, she was also able to identify when students had misconceptions about math concepts. A video clip at the second meeting showed first graders rolling a die and doubling the amount shown. Molly commented that, “I think that one girl wrote  $3 + 6 = 6$ , so I think she got a little confused. I think she was doing it too quickly in her head....She got a little ahead of herself and wrote the answer in the wrong place.”

In the fifth video club meeting on January 14, 2014, a video from Molly's class showed students working independently to find number combinations that equaled five.

Molly noticed that one her students seemed confused,

The first girl was making a combination and she did  $3 + 1$ , but I think she was working on combinations of five. And then when she colored it in, she colored in  $3 + 2$ . She colored in three white and then...she goes straight to coloring the two. She just doesn't bother to fix the cubes.

These comments show Molly was able to identify when students were making mistakes in their mathematical thinking. This ability seemed to develop as Molly gained experience watching and analyzing the video clips.

*Aspect 6: Development across grade levels.* Molly also noticed that the students develop in predictable patterns across the grade levels. During the exit interview, she mentioned that she thought it was nice that the video club included teachers from three different grade levels. She also thought it was helpful that we viewed the videos in sequential order (either kindergarten, first, second; or second, first, kindergarten). She thought it was important, "just to see how the foundational skill of counting in kindergarten really builds on what they have to do in first grade and then what they have to do in second grade."

As a result of participating in the study, Molly noticed six features in the video clips of math lessons. She noticed two aspects that focused on her own development: (a) she noticed that she needed to listen more carefully to her students; and (b) she noticed that she needed to pay attention both to what students say and what they do. Molly also noticed four aspects of student thinking: (a) she noticed how students were thinking about the math concepts; (b) she noticed the strategies the students used; (c) she noticed the

misconceptions the students had; and (d) she noticed a predictable pattern of growth in skills across grade levels.

**Learning new skills.** Another area in which Molly benefitted from participating in the video club was in learning new skills and considering how she might apply them in her classroom. I identified three lessons that Molly seemed to learn as the video club meetings progressed.

*Lesson 1: “Stop and think”.* During the exit interview, Molly reflected on a video clip the group watched at the fourth meeting in which one of her students was trying to tell her something about the commutative property of addition and she had not listened carefully. She explained that,

I was trying to explain something to the students and I kind of was on a certain track and one of the girls interjected. I can't remember the specifics, but she was saying something completely different. It was correct, but it was completely different from the track that I was headed down. And so I kind of disregarded her comment. And just kind of kept going down the path that I was trying to show them. But her comment really made sense and I guess, for me, it showed me that when you're teaching kids you really need to stop and think about what they're saying too.

Molly realized the importance of stopping and listening to her students instead of continuing with a lesson. When she thought about how she might apply this lesson to her instruction, Molly said, “I guess I need to train myself to be able to understand better or receive information in different ways.” She went on to say that given the demands of the pacing guides and amount of material that she is supposed to teach her students, it might not always be possible to “stop and think.” She was realistic about time constraints and explained that being aware of the importance of really listening and trying to understand

what her students are saying, “doesn’t mean that I can always stop, but at least I know that it happens.”

***Lesson 2: “More engaging.”*** Another aspect of her teaching that Molly believed she changed as a result of participating in the video club was trying to promote more interactions between the students and trying to be more engaging when she moved around the room. During the second meeting, the group watched a video clip from Molly’s classroom that showed the students trying to fill in predefined shapes with pattern blocks. The other participants commented on how quiet and well-behaved Molly’s students were, but she realized that they were not learning as much as they could be because they were not interacting with each other. She said that she noticed as I was videotaping the class that they were too quiet, so she changed her directions for the following day,

One thing I did have them do the next day because I noticed that they were so quiet...I told them that when they put a shape on to say the name of the shape. So that they were using those words. I think that helped build up their vocabulary a little bit.

After the group watched the video, Molly shared that in the days that followed her class was more engaged with the shapes. This was evident in a video from the third meeting, where Molly’s students were working with large shapes—naming them, tracing them, and labeling them. The students were discussing the shapes as they worked and explaining how many sides and corners each shape had. One student even explained that a trapezoid has slanted sides.



Molly also believed that the way she interacted with students working in groups changed as a result of participating in the video club. During the exit interview she explained that,

I feel like before I started watching I was monitoring more for, “Are you on task” and less for “Are you understanding what's going on in the game?” And so since being part of the video club, I've tried to be more engaging when I'm monitoring instead of just being like, “Whose turn is it? Who's going next? Make sure you're not throwing the dice across the room!” Like trying to ask them, “Ok, what kind of a combination is this?” Or just asking them questions about the math that they're doing so I can better understand their thinking.

The last time I videotaped in Molly's room she was working with a small group teaching them how to use connecting cubes to show different number combinations that equaled five. The following is a conversation she had with a student who had five red cubes in front of him (M-Molly and S-student).

M: So what did you do?

S: I got five red cubes.

M: It's all red. So what's your number sentence going to be?

S: Ummmm,  $5 + 0 = 5$ .

M: Why?

S: Because I have five of one color and no others.

Instead of simply ensuring that student was following directions, Molly took the time to talk with him about what he was doing and to check on his understanding of the math concepts.

***Lesson 3: Learning from others.*** Molly wanted to improve her math instruction and in order to do so she used resources in her building, including teachers on her grade level, the math specialist and a math consultant hired by her school. She hoped that by using these resources and participating in the video club, she would “learn more effective ways to give instruction and get some tips on how to run a math workshop.” When we

talked during the exit interview, Molly expressed her belief that she had learned from the others in the group. She made comments such as, “There were a lot of good ideas...it helped me to push the kids thinking further...it was good to see the different games that the teachers were playing.”

Molly believed she learned the most from watching the two other participants who also taught first grade. She said,

the things that I saw Joe doing, I think I'm definitely going to apply. I think that [equal/not equal lesson] would be a good activity for me to use and I plan on borrowing it. The other first grade teacher...just seeing the way that she facilitated some of the games. I won't be able to change anything this year, but hopefully next year I'll be able to use some of the things I learned from her.

As a result of participating in the video club, Molly seemed to learn three important lessons that changed how she thinks about her students and how she plans her teaching. She learned that she needs to take time to stop and think about what her students are saying. She also learned that she needs to engage her students in conversations about their math understandings. Finally, she realized that she can learn from others, including her colleagues in the video club.

***Insights gained.*** A final area in which Molly's knowledge developed during the meetings was the insights she gained from participating in the video club. I identified two insights that Molly seemed to gain.

***Insight 1: “Same issues.”*** Molly was one of only two first-year teachers in her school, although three of the teachers on her grade level were new to the team. Despite the fact that she was able to talk with them about pacing guides and lessons, she did not feel like they were experiencing the same issues she was. But, as she participated in the

video club meetings, Molly realized all five of the participants were in similar situations. When we talked about what it was like to attend the meetings Molly said, “I went there and I was around other people who were experiencing the same issues in teaching as I was and we were able to discuss them in a positive way.” Molly thought it was important that they were able to “recognize that they all had similar struggles and similar successes.”

***Insight 2: Worthwhile.*** Molly shared that she felt like there is always another meeting she has to attend, such as: new teacher meetings, grade level meetings, instructional meetings, Response to Intervention meetings, and extended planning meetings. She understood that they were necessary, but sometimes did not see the value in them. This was not the case with the video club meetings. When we talked about the time commitment during the exit interview, Molly said

I think the time was minimal for what it actually gave me. Sometimes I feel like, "Oh, I go to this meeting and that was just a waste of time." But I didn't really feel that way about this. It was a good use of my time.

Molly believed that the time she spent with the other participants taught her things that will help her as she continues in her career as a teacher. Molly gained insights into how being part of a video club can be worthwhile. She also realized that novice teachers face many of the same issues.

### **Molly’s “Aha” Moments**

From the first video club meeting in October to the last one in January, Molly developed in several areas. Evidence of this growth can be seen in the meeting transcripts, in Molly’s comments at the exit interview and in the artifacts I collected

during the study. I believe that Molly had two “Ahas!” during the study that made her reconsider her actions as a teacher. One of those moments occurred during the fourth meeting on December 17, 2013; and the other during the exit interview on January 28, 2014.

Molly’s first “Aha!” was the realization that she needed to listen more closely to students in order to understand their thinking. In a video clip from her classroom shown at the fourth meeting, Molly was teaching a lesson on creating multiple number sentences that equaled the same sum. While she was talking, a student tried to share a discovery with her and because it did not relate to what she was saying, Molly ignored the comment. When she saw the video during the meeting, she realized that the student was making a good point and that she should have taken the time to listen. When Molly had time to reflect on the incident, she seemed to recognize that if she was not listening carefully to her students, she was not able to notice their thinking.

The second “Aha!” occurred when Molly realized she needed to engage her students in more conversation as she monitored their work during math. During the exit interview, Molly shared that the way she thought about monitoring her classroom had changed. Before participating in the video club, she had worried about watching for behaviors; but after participating she realized that she should be asking students more questions about their math thinking as she circulated around the room.

### **Summary**

Molly developed in several significant ways as a result of participating in the video club, beginning with what she noticed about classroom events. She noticed that she

needed to listen more closely to her students. She also noticed that in addition to listening to them, she needed to pay close attention to what her students were doing. Molly also noticed four aspects of student thinking. She noticed how students think about math concepts and how these understandings developed across grade levels. She noticed the strategies the students used when playing math games. Finally, she noticed the misunderstandings students had about the math concepts. Molly needed the experience of the video club meetings and the guidance of the researcher in order to notice these aspects of the classroom.

Molly also learned new skills that she might apply in her classroom. She learned that she needs to take the time to stop and think about what her students are saying. She also learned that she needs to engage her students in more conversations about their math thinking as she monitors their work. Finally, she learned that even though they were all first-year teachers the participants were able to learn from each other.

A final area in which Molly developed is in what she gained from participating in the video club. She realized that as fellow first-year teachers, most of the participants had the same issues in their classrooms and with their students as she did. She also realized that meetings could be a valuable use of her time. These were insights Molly gained as a result of participating in the video club.

Despite these developments, Molly remained a novice teacher in some ways. She continued to focus more on aspects of her teaching that she could change rather than on her students' thinking. She also concentrated on aspects of teaching that experienced teachers no longer pay attention to, such as how to monitor a classroom and how valuable

colleagues can be as resources. Figure 11 provides a timeline of Molly's development in the video club. Each finding is displayed to show when I first saw evidence of it in the video club events. The findings shown in green represent Molly's "Aha!" moments.

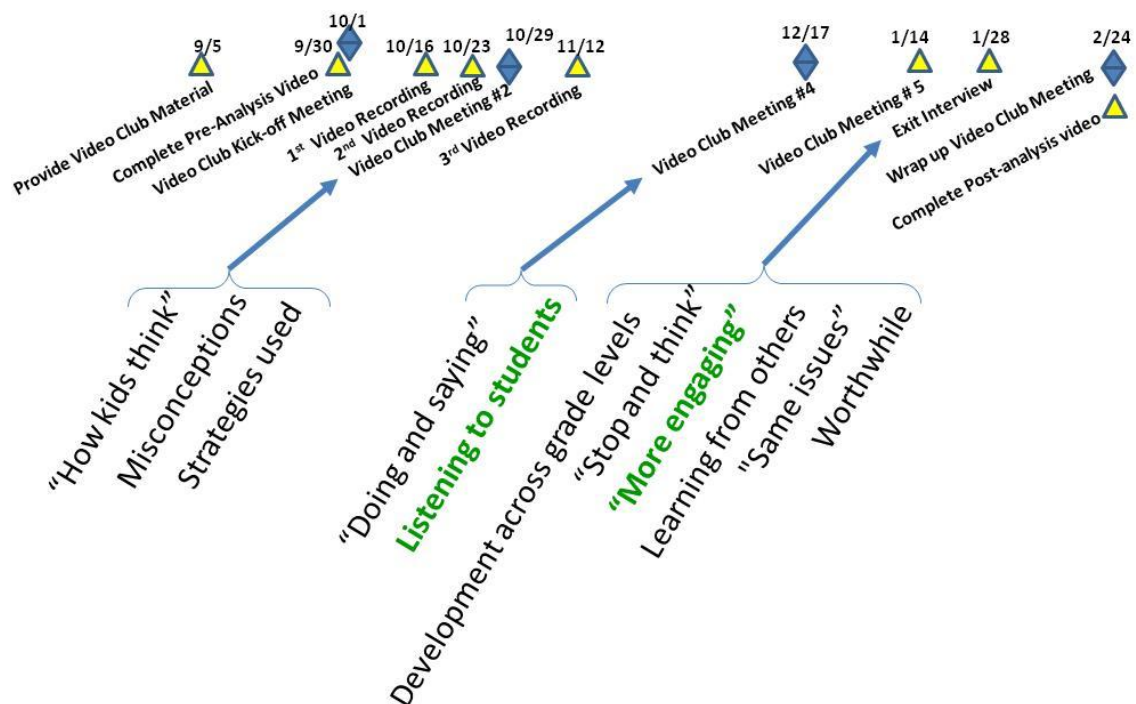


Figure 11. Timeline of Molly's development in the video club

### Summary across all participants

Each teacher developed as a result of participating in the video club. However, what they noticed and what they learned varied depending on their backgrounds and their current teaching contexts. Because of their different situations, each teacher interpreted the videos through their own lens.

Lisa, the inclusion teacher, noticed what she as the teacher could do to make sure she was reaching all her students. Emma, the teacher with a large ESL population, paid attention to ways she could adjust her lessons to meet the needs of her Spanish speaking students. Elizabeth, the kindergarten teacher, noticed how what she saw in the video clips might change how she managed her early childhood classroom. Joe, the novice with five years of experience as a substitute teacher, noticed himself and the other teachers more than he noticed his students. Molly, the quiet one, noticed how listening to and learning from her students and the other participants could improve her teaching.

Despite their development in other areas, these novice teachers remained focused on themselves more than on their students and their thinking. Even with careful guidance, student thinking was a small portion of what they noticed. My original research questions were written in hopes that participating in a video club would help these novice teachers improve in noticing student thinking, in line with the work of van Es and Sherin (2010). They conducted several studies to investigate how participating in video clubs affected experienced teachers' thinking and practice. However, the findings from this study seem to indicate that these novice teachers need time to be novices. They need time to concentrate on themselves and their teaching before they are ready to focus on students. The video club seemed to accelerate these teachers development in other areas, but not in noticing student thinking.

## CROSS-CASE ANALYSIS

The cross case analysis is organized into three sections. Each section focuses on one of the three research questions. The first part of each section discusses the similarities across the cases and the second part considers the differences.

### **1. What did these teachers notice in the video clips of math lessons and how did they interpret it?**

**Similarities.** There were three areas that all five participants noticed and discussed during the meetings: (a) how students thought during math activities; (b) strategies the students used to help them make sense of the math; and (c) misconceptions the students had about the math concepts, which were listed on the recording sheet (Appendix F) as aspects of the video clips to focus on. However, the participants did not begin making comments about these topics at the same time. Each teacher followed a slightly different developmental path. Table 3 provides the date on which each teacher first mentioned noticing how students thought during math activities.

Table 3

*Participants' initial comment about student thinking*

	Lisa	Emma	Elizabeth	Joe	Molly
Meeting Date	10/29/2013	10/1/2013	10/1/2013	12/17/2013	10/29/2013



***How students thought during math activities.*** Emma and Elizabeth began to notice and comment on student thinking at the first meeting. One of the clips showed second graders using greater than ( $>$ ) and less than ( $<$ ) to guess a secret number. Emma noticed that the students were not following the game exactly the way it was intended. She said, “They’re still getting that exposure to numbers.” As Elizabeth watched the same clip she noticed, “that they discovered that they could ask fewer questions to make those bigger jumps.” Both Lisa and Molly noticed and commented on student thinking for the first time at the second meeting. As Lisa watched the clip of her students playing a subtraction game she said, “It was good to see Mary saying ‘I want a three and a four.’ She had already pre-thought what number she wanted in order to get the space that she wanted. As she watched a clip that featured kindergarteners playing a game in which they chose a number card and placed a corresponding number of pennies on a tens frame, Molly noticed that, “if they had 10 then pulled the two card, instead of just taking away all but two, they swiped the whole card. They’re not at the point where they can just take away two.” It was not until the fourth meeting that Joe began to comment on students’ thinking. One of the clips showed first graders using connecting cubes to make combinations of five. Joe said, “They seemed to understand at least the process. Which is more than anything the most difficult hump to get over-understanding what exactly they are trying to find out.”

***Students’ strategies.*** All the participants also noticed student strategies during the video club meetings, but again they followed different developmental timelines. Table 4 provides the date on which each teacher first mentioned students’ strategies.

Table 4

*Participants' initial comment about student strategies*

	Lisa	Emma	Elizabeth	Joe	Molly
Meeting Date	12/17/2013	11/17/2013	10/29/2013	1/14/14	10/29/2013

Molly and Elizabeth's first comments about strategies occurred at the second meeting. One of the clips showed Molly's first graders trying to fill in a designated shape with pattern blocks. Molly commented that, "It's interesting to see how they're filling them in. I had a lot of people leaving gaps, but then a lot of them caught on." As Elizabeth watched the same clip, she noticed that, "they would take some of the shapes and just keep spinning them. They would go around like two times." Emma did not comment on students' strategies until the third meeting, when one of the clips showed kindergartners participating in a whole group discussion about comparing numbers. Emma said, "It sounded like they all had good strategies to compare. Mark was the only one who said count all the pictures on the cards to find out how many." Lisa's first comment about students' strategies occurred at the fourth meeting. One of clips featured first graders playing an addition game in which they were supposed to count on. Lisa noticed that, "they started with the smaller numbers because that's what they know." Although Joe wrote about student strategies on his recording sheet, he did not begin to comment on students' strategies until the last meeting. As Joe watched a clip featuring

second graders playing a money exchange game, he said, “He was trying to take six pennies first instead of saying, ‘Oh, a nickel is five and then an extra cent.’”

***Students’ misconceptions.*** A final aspect of noticing that was common across all the participants, but that occurred at different times, was identifying misconceptions students had about the math concepts. Table 5 provides the date on which each participant first mentioned students’ misconceptions.

Table 5

*Participants’ initial comment about students’ misconceptions*

	Lisa	Emma	Elizabeth	Joe	Molly
Meeting Date	10/1/2013	10/1/2013	10/29/2013	10/29/2013	10/29/2013

Emma and Lisa first commented on students’ misconceptions at the initial meeting. After watching a clip showing second graders playing a money exchange game Emma said, “he started taking money from his own pile. The students seemed to be misunderstanding where to collect the coins from.” As Lisa watched the same video, she noticed that, “that next step of putting the nickels to dimes and then the dimes and nickels to quarters” was hard for the students. The other three participants first commented on students’ misconceptions at the second meeting. As he watched one of his students playing a game in which he was supposed to roll a die and then double the value Joe commented that, “he was going off the rails. He was practicing his adding. He just wasn’t practicing the right adding.” As Molly watched the same clip, she noticed that, “one little

girl wrote  $3 + 6 = 6$ , so I think she got a little confused.” Also during the second meeting, Elizabeth noticed that one of her kindergartners “miscounted but still put the correct amount [of pennies] on her tens frame.”

Three of the participants, Lisa, Emma, and Molly, also noticed that students thinking developed across the grade levels. Emma first noticed this at the end of the second meeting. Four of the video clips had featured students working on an activity involving some form of number combinations and computation. She said, “So number combinations are important and you see the progress with them from kindergarten to first to second.” Lisa and Molly both talked about how students develop across grade levels during the exit interview. Lisa said that it had been nice to “see the progression...seeing where they’ve come from and where they are now.” Molly made a similar comment about students’ development. She said she thought it was helpful, “just to see how the foundation skill of counting in kindergarten builds on what they have to do in first grade and then what they have to do in second grade.”

There were a few similarities in what the participants noticed across the five cases. They all noticed, at their pace, (a) students’ thinking; (b) students’ strategies, and (c) students’ misconceptions.. A similarity that occurred across three of the cases was noticing that students develop in a predictable pattern across grade levels.

**Differences.** In addition to the similarities each of the participants noticed other things as they watched the video clips and participated in the group discussions. However, what captured the teachers’ attention varied depending on the lens through which they viewed and interpreted the videos.

Lisa, who focused on ways she could change to meet the needs of her students, noticed three unique issues as a result of her participation in the video club. She noticed that her focus shifted from herself to her students and their thinking. During the exit interview Lisa admitted it was not until the fourth meeting that she realized “it was about the students and their thinking and that changed my focus off of me and onto the kids.” A closely related theme that was evident in Lisa’s case was the realization that when she removed herself from situations, she was, “able to just talk about their [the students] math thinking which was nice because you didn’t have all the distractions.” Lisa also noticed that other teachers’ students seemed to be exploring math more than her students were. During the exit interview, she said, “I realize the importance of encouraging them to problem solve and explore math versus just doing math.” Lisa’s focus was clearly on what she could change about how she taught her students.

Emma’s focus during the meetings was how to make sure she included her ESL students in her instruction. She only noticed one unique aspect in the meetings-how she might adjust her lessons to better meet her students’ needs. In each of the meetings and the exit interview, Emma mentioned something that related to adapting a lesson to use in her room. At the first meeting, she said, “With my ESL students I could automatically think of doing a sentence frame.” After watching first graders sorting leaves at the third meeting, Emma commented that, “The teacher could have adjusted the lesson by at least starting off with headers. That would help my ESLs.” At the exit interview Emma discussed how seeing video clips from kindergarten and second grade had helped her

with ideas about adjusting her lessons up or down to meet students' needs. Emma wanted to reach her ESL students and much of what she noticed in the video clips reflected this.

As the only kindergarten teacher in the group, Elizabeth's focus was on the early childhood classroom. Two unique themes, both related to young children, emerged from her data. Elizabeth noticed the behavior of students in the clips more than the other teachers. She noticed that first graders were working quietly with pattern blocks in a clip at the second meeting. She said, "You can tell they wanted to impress you. They were working so hard on their shapes." She also noticed when a different group of first graders were having a difficult time paying attention during a whole group lesson in a clip from the fourth meeting. As the students wiggled, talked to each other, and played in their desks, Elizabeth said, "Oh, the joys of whole group lessons." Her perspective on student's abilities was also a bit different. A clip at the fourth meeting featured first graders using the counting on strategy. As she listened to the other participants' comments that focused on how the students were struggling with counting on, Elizabeth realized her perspective was different. She said, "It's funny because my brain goes straight to-oh my gosh! They are counting correctly!" The lens through which Elizabeth viewed and interpreted the clips reflected her focus on the fundamental skills of working with math tools and counting correctly.

Joe was the oldest participant and the only male in the study. He viewed the videos through a self-centered lens. He was concerned with how he and his students appeared in the videos and it was hard for him to move beyond this viewpoint. During the meetings and at the exit interview, Joe made several comments about his own actions.

After watching a video clip from his classroom at the second meeting, Joe focused on the fact that he did not have 10-sided dice for students to use rather than on what the students understood about doubling numbers. At the exit interview, Joe talked about being, “more preoccupied with what I’m doing than with what they are doing.” Joe’s focus was on himself and how he was performing as a first-year teacher.

The youngest participant, Molly, was also the quietest. She often listened to others before making a comment. There were two unique themes in her data, both relating to listening to her students and trying to understand them better. Molly mentioned during the exit interview that she had noticed that she needs to pay attention to both what a child is saying and doing because, “sometimes they grasp a concept but can’t explain and other times they are explaining a concept well but make mistakes when they do the math.” She also realized how important it was to listen carefully to students as she watched a clip at the fourth meeting. It showed Molly leading a small group discussion about number combinations. One of the students made a comment that did not exactly relate to what Molly was saying and she ignored it. When she watched the clip, Molly realized that the student was making an important point and that she should have acknowledged it. Molly’s focus during the meetings was on listening to others, both her students and her fellow participants.

Because of their unique experiences and their various interests, each participant noticed different features of the videos. These differences were even more apparent in the data about what each teacher learned from their participation in the video club.

## **2. What did these novice teachers learn from participating in the video club?**

**Similarities.** There was not a single theme that was common across all five cases. When I analyzed the data, only two similarities emerged; and these only appeared in two cases. Lisa and Molly said that being able to learn from the other participants was a benefit of participating in the video club. In the exit interview, Lisa discussed how she had learned from her mentors, her colleagues, specialists in her building and her administrators. She also said that she was able to learn from the other participants in the video club. She said, “it allowed me to backtrack to review what they’ve learned in previous years. ...There were a lot of good ideas of how I could take students further in their thinking.” Molly also believed that she had learned from the other teachers in the group. She said, “it helped me push the kids thinking further...it was good see the different games that the teachers were playing.”

The second commonality, which also appeared in two cases, was the recognition of the benefits of reflection. Emma and Joe both mentioned the power of reflection during the exit interview. Emma commented on how important it is to reflect on a lesson to see whether or not students gained what they were supposed to from it. She said that videos helped with reflection because she was able to “relook at it and look at from the kids’ point of view and not just what I did, but what they got out of it.” Joe also thought reflection, especially using video, was a valuable tool because it allowed him to “see what I doing. I was able to observe myself and how the students were responding to it.”

**Differences.** Most of the themes relating to what the participants learned and how they applied their new knowledge were unique to the individual cases. This is consistent



with the fact that these five teachers followed different paths to teaching and they each worked in a different environment. Despite the fact that these participants learned different things, a consistent theme was a focus on themselves. All the participants described their learning in the context of what they learned, rather than in the context of their students.

Lisa believed she learned two important lessons from the video club. She realized that if she did not have materials efficiently organized it could affect her students' learning. She said if she was not prepared it might "hinder the kids' math thinking because I took time from them." She also learned that she did not have to teach her students a new math game every day. Hearing the other participants explain that their students played the same game several times helped Lisa see that she did not have to constantly create new games. In the exit interview Lisa shared that "seeing the kindergarten video where they had sorted those buttons for three weeks made me see that maybe I should do a game more than just a day or two." Lisa was able to apply two things she learned in the video club directly to her teaching.

Emma gained knowledge in three areas as she participated in the video club. She learned what was important to notice as she watched students working in math stations. She explained that she moved from noticing whether students were playing a game correctly to focusing on how they understood the math involved in the game. Emma also learned to recognize when she needed to review a concept with her students. At both the third and fourth meetings, she saw instances where her students almost understood the math concept but needed some additional instruction. The final lesson Emma learned was

that no matter how hard you try, life in a primary grade classroom never goes as planned. During the exit interview she said, “I’ve learned that nothing can be perfect and that it’s ok.” Emma learned three lessons that she could apply to her teaching.

The two lessons Elizabeth learned in the video club were also unique to her classroom. As she watched her students in the video clips and listened to the other participants talk about how they partnered their students to play math games, Elizabeth learned better ways to group her students. At the exit interview, she explained that, “because of the meetings I changed their tables and found different ways to group them.” Elizabeth also realized that she needed to change the way she led classroom discussions. At the exit interview, she attributed this recognition to “hearing how I was guided it [the discussion] and growing from that myself.”

Joe also learned two lessons from his participation in the video club that he could apply to his teaching. He explained that when he knew I was going to visit to videotape a lesson, he tried harder to, “think of better lessons, or more hands-on lessons.” He said that knowing that others were going to see what he was doing pushed him to do a better job planning. He also realized that he was overly-critical of both himself and his students. He sometimes focused on the negatives in his classroom, rather than acknowledging the positives. During the fourth meeting, Joe commented on, “my kid sitting in the front with the scissors whittling away at his pencil,” rather than noticing the math thinking of the students at the board. Joe learned the value of planning engaging lessons and realized that he needs to be cautious of being overly-critical of himself and his students.

Molly also learned two distinctive lessons as she participated in the video club. She learned that even when she is in the midst of teaching she needs to “stop and think about what the students are saying.” She realized that she might be missing important information if she just continues “down a certain track.” The second lesson Molly learned was that she needed to change how she interacted with her students as they worked at math stations. At the beginning of the year, she concentrated on monitoring and correcting their behavior. After watching the videos she realized she could use that time to interact with students and ask them, “questions about the math they’re doing so I can better understand their thinking.”

All five participants learned from their activities and interactions in the video club. The whole group did not have any common themes in their learning, but two people discussed learning from others and seeing the value of reflection. Most of the themes about learning were unique to each teacher, perhaps because they were all individuals with different experiences and different expectations about the video club.

### **3. What insights did these novice teachers gain from participating in the video club?**

**Similarities.** All five participants were first-year teachers. This was apparent in the close alignment of one theme across the five cases; the idea of being in a supportive group with teachers similar to themselves. Lisa mentioned the fact that they were all in the “same boat.” Emma explained that the group was “really open and I just felt comfortable there.” Elizabeth appreciated being able to, “relate to people who were having the same struggles but also triumphs.” Even Joe admitted that it was nice to talk with “other people with fresh eyes.” Finally, Molly said it was nice to be “around other

people who were experiencing the same issues in teaching as I was and we were able to discuss them in a positive way.”

**Differences.** Each of the participants seemed to appreciate the support the video club meetings provided. However, they each had unique insights based on their interpretations of the video clips. Lisa explained that the experience was “eye-opening.” She shared that watching a class of first graders who were off task made her more aware of what might be occurring in her own classroom. She also realized that she needed to be more patient with her students’ lack of abilities after seeing where they started in kindergarten. Emma shared that participating in the club made her aware of how other teachers’ comments could “spark” an idea for her. Elizabeth realized that the meetings had, “helped her grow as a teacher, especially as a math teacher.” Joe gained insight into how, “as a first-year teacher” he could not do everything perfectly yet. Molly realized that meetings could be “worthwhile.” She explained that many of the meetings she had to attend were not useful, but that these meetings were different.

**Summary.** There were similarities and differences in how the participants developed as a result of participating in the video club. There were several similarities in what they noticed about student thinking. There were more differences than similarities in what each participant learned from the video club. All the participants had the same insights about how the video club functioned as a support group.

### **Summary of Participants’ Development**

Each of the five participants followed a different path in his or her development during this study. This was based partially on their experiences in the video club and

partially on their previous experiences in preparation programs and in their individual teaching contexts. They each grow in their ability to notice classroom events and learned things they could use in their classrooms. Four of the participants also had “Ahas!” when they were able to articulate how something they saw on a video or heard during a meeting made an impact on them. The individual case studies provide both an overview of this development and evidence to support it. These findings seem to indicate that these teachers did develop as a result of participating in the video club.

## **CHAPTER FIVE: DISCUSSION AND IMPLICATIONS**

The purpose of this study was to examine how one intervention, a video club, would affect five novice teachers' development, specifically: (a) what these novice teachers noticed in video clips of math lessons and how they interpreted what they noticed; (b) what these novice teachers learned from participating in the video club; and (c) what insights these novice teachers gained from participating in the video club. This chapter includes five sections: conclusions; discussion; limitations; implications; and suggestions for future research.

### **Conclusions**

This study accomplished my goal of accelerating novice teachers' development. All five of the participants made comments that reveal they grew professionally as a result of participating in the video club. The findings from the study lead to five conclusions that show how they developed: (a) these novice teachers developed in both expected and unexpected ways; (b) while these novice teachers began to notice and interpret student thinking, they continued to focus on themselves and the other video club participants; (c) these novice teachers formed into a community of practice; (d) these novice teachers began to understand the benefits of videotaping themselves and reflecting on their practice; (e) the findings indicate that more research is needed. Each conclusion is discussed below.

**Conclusion 1: These novice teachers developed in both expected and unexpected ways.** Each of these five novice teachers developed in multiple ways as a result of participating in the video club. This development is evident in the comments they made during video club meetings and at their exit interviews. After reviewing the existing literature and designing the study, I expected the participants to develop in their ability to notice and interpret student thinking, which they did, but not more than they focused on themselves and one another. The findings indicate that over time and with guidance these teachers were able to direct some of their attention to what students were doing in the video clips. Each of the participants made comments at the meetings about strategies the students used. They also attempted to draw conclusions about what the students in the clips understood or misunderstood about the math concepts. However, these five novice teachers also developed in ways I did not expect, which led me to revise my research questions.

At the outset of my study, I was hopeful that a video club with novice teachers would result in conclusions similar to those reached by van Es and Sherin (2010) in their work with experienced teachers. I modeled my original research questions on their work and set out to investigate: (a) what do these novice teachers notice in relation to student thinking when they watch videos of classroom teaching and how do they interpret what they notice; and (b) how does their ability to notice and interpret change as a result of participating in a video club, and why?

As I collected and analyzed the data, I realized that these novice teachers were not ready to focus exclusively on their students' thinking. They were still adjusting to the

classroom and needed time to be novices. With this in mind, I agreed with Maxwell's (2012) perspective that writing "research questions should be an iterative, ongoing process" (p. 88). and rewrote my questions to reflect better what the data were showing. These revised questions were: (a) what did these novice teachers notice in video clips of math classes and how did they interpret what they noticed; (b) what did these novice teachers learn from participating in the video club; and (c) what insights did these novice teachers gain from participating in the video club?

***Expected Development.*** At the first meeting on October 1, 2013, one of the video clips showed second graders in my class playing a money exchange game. Several of the participants' comments after they saw this clip seemed to be a literal report of what they saw on the screen. For example, Emma commented, "he started taking them [the pennies] from his own pile." One of Lisa's comments about the clip was, "I thought the pattern on the rug was a little busy for them." They were both looking at the video and describing what they saw rather than interpreting what they saw. By the fourth meeting on December 17, 2013 (the last one all the participants attended), each of the teachers made comments that indicated they had progressed toward noticing and interpreting student thinking. For example, after watching a clip showing second graders from Lisa's class playing a place value game, Joe said, "they picked up that the hundreds was the most important one." As she watched first graders from Emma's class play an addition game where they were supposed to start with the larger number and add the smaller number, Lisa noticed, "it was almost like they started with the smaller numbers because that's what they know." These comments show that the teachers were beginning to notice and



interpret student thinking. However, these first-year teachers' classroom experience was limited. This resulted in the participants' basing their interpretations on their theoretical knowledge about children's mathematical thinking and how it develops in the primary grades, rather than on experiential knowledge, therefore many of these explanations were still conjecture for them.

***Unexpected Development.*** In addition to developing their ability to notice and interpret student thinking, these novice teachers also developed in other ways. Lisa learned about the importance of managing materials efficiently and the benefits of allowing students to play the same game multiple times. Emma learned about the value of reflection for guiding her instruction and that life in a primary classroom never goes exactly as expected. Elizabeth learned that she needed to change how she led discussions and that putting students with appropriate partners required careful thought. Joe learned that he planned more engaging lessons when he was being observed and that he was critical of himself and his students. Molly learned that she needed to listen to her students more closely and that she needed to engage with them more as she moved around the classroom. These novice teachers learned more than I expected them to when I began the study. In addition to learning to notice, they also learned about teaching.

The video club helped these novice teachers develop their ability to notice and interpret student thinking by providing them with an opportunity to view and discuss video clips in a group setting. It allowed them time to reflect on both their own and their colleagues' teaching, something that first-year teachers do not often have. The video club also gave the teachers a chance to share lessons they had learned during their brief time in

the classroom. By providing an opportunity for these things to occur, the video club accelerated these novice teachers' development by increasing their awareness of student thinking and encouraging them to grow as professionals.

**Conclusion 2: While these novice teachers began to notice and interpret student thinking, they continued to focus on themselves and the other video club participants.** To varying degrees, these novice teachers continued to notice themselves and the other participants more than they noticed the students and their thinking. Joe was preoccupied throughout the study with what he and the other teachers were doing and how they might change their instruction. An example of this is a comment he made at the fourth meeting on December 14, 2013. After watching a video clip showing Elizabeth's students creating patterns with connecting cubes, "You can even start to sort it for them and say, 'Hey, how am I sorting? Can you add something to my group?'" Joe's attention was on the teacher, not on the students. This was also true of Emma, who made many comments about how she could adjust ideas from other classrooms to use with her students. After watching another video clip at the fourth meeting that showed Molly introducing her class to an activity about number combinations, Emma's initial comment was "I think it was good that you did that in small group. Because I introduced it whole group and it was kind of chaotic."

These teachers' continued focus on themselves was also revealed in some of their comments at the exit interviews. At some point during the interviews, all the teachers mentioned that they thought they would be the subject of the video clips. Emma said, "She's [the researcher and video club leader] going to be watching us! She's going to be

watching what we're doing! And we can't do anything wrong!" Two of the participants, Joe and Lisa both expressed an interest in seeing more of themselves in the video clips. Lisa said, "I would love to film me a little bit more." Joe summed up the participants' focus on themselves when he said, "Hey, I'm a first-year teacher. I'm more preoccupied with what I'm doing than what they [the students] are doing." Despite the study's intent to guide the participants toward a greater awareness of their students' mathematical thinking, much of these teachers' attention was still focused on themselves.

Previous research indicates that novice teachers focus on themselves before they consider other aspects of the classroom (Conway & Clark, 2003). The video club attempted to accelerate these novice teachers' shift from themselves to the students by allowing the teachers to see what was happening in their classrooms. The video clips that were shown at the meetings showed students participating in math stations and playing math games, and the participants were asked to watch the students. They were also given a recording sheet to help them focus their attention on what the students were doing and thinking. Even with these scaffolds in place, these novice teachers were not ready to focus on students. They watched themselves and each other more than they watched the students.

### **Conclusion 3: These novice teachers formed into a community of practice.**

LeFevre (2004) wrote, "Video may provide a shared common experience of practice through which teachers, for whom practice is usually an isolated affair, can learn in a more collaborative manner, examining the uncertainties of actual teaching." (p. 239). This phenomenon was evident with these participants during the video club meetings.

They talked honestly about what went well and what did not go well in their lessons. An example of this willingness to share occurred at the second meeting, on October 29, 2013, when Lisa introduced a video clip featuring her students playing a math game. She began her description of the lesson with, “It was a fail!” Another example of this openness was Molly’s comment at the fourth meeting, on December 17, 2013. The group was discussing a video clip from a first grade classroom where students had not been paying close attention. Molly said, “I’m glad I’m not the only one who has to take a few breaths until they are all paying attention again.”

In some ways, these teachers formed into what Lave and Wenger (1991) called a community of practice, which they defined as a group of people with a shared interest who interact regularly to develop their skills. As the study progressed and the participants interacted at the meetings, I began to see characteristics of a community of practice. Lave and Wenger explained how people may move from the periphery of a group toward the center as they gain more knowledge and experience. This occurred in the video club as the participants became increasingly more willing to share their observations and their interpretations as the meetings progressed.

At the first meeting on October 1, 2013, I did most of the talking and had to prompt the teachers to talk about what they noticed. At the end of the first video, which showed some of my second graders playing a money exchange game, I asked, “What did you notice about what they were thinking—what they understood and what they had misconceptions about.” After one minute and 18 seconds of silence, Joe asked, “Was that one or two groups of students?” I responded and after another minute and 10 seconds of

silence, I prompted them again, “maybe if we describe what we saw it might jog some thoughts in other people.” Joe finally talked about what he noticed. Following his comments, I again had to prompt the participants to share their thoughts. For the rest of the meeting I usually had to make a comment after each participant talked in order to maintain the conversation. They did not talk to each other very much.

By the fourth meeting on December 17, 2013, I played a smaller role in the discussion. There was usually only a few seconds of silence after a clip ended and I was never the first person to comment. I also did not have to work to keep the conversation going; the participants listened to each other and based their comments on what the others said. These teachers seemed to have moved from the periphery of the conversation to the center as they participated in meetings and gained experience with analyzing the videos.

At the exit interview, each of the participants commented on their feelings about participating in the video club. Lisa said, “just being around other first year teachers was nice. To empathize with people and to kind of be going through similar struggles or frustrations or excitements.” Emma mentioned that the atmosphere at the meetings, “was really open. I would say I just felt comfortable there.” Elizabeth thought “it was nice to get to talk about things that were going well and maybe things that we could work on and just discuss together.” Joe recognized the value of, “being able to discuss things with people with fresh eyes.” Molly likened the club to a “fellowship” and discussed how beneficial it was to spend time with other beginning teachers who had “similar struggles and similar successes.” At different times, each of the female participants expressed an interest in continuing to meet even after the study concluded. During the exit interview,

Molly said, “It was a really good atmosphere and I would like to meet up with those teachers again.” These comments seem to indicate that the participants formed a community of practice.

One benefit of these novice teachers forming into a community of practice was that they were able to reduce the feeling of isolation that many teachers, especially novice teachers feel. These teachers were able to openly discuss their concerns, their frustrations, and their successes with the other members of the video club. Joe shared that as the only new teacher in his building, he sometimes felt isolated. He believed the video club meetings allowed him to “talk in a way that was a little bit better because it was a different type of environment than going and talking with experienced teachers.”

Elizabeth thought it was hard to talk with the teachers in her building about issues she was having because they did not remember what it was like to be a first-year teacher. She appreciated being able to “relate to people who were having struggles but also triumphs. Molly noted that because the other new teachers in her building were not first-year teachers they did not have the same issues that she did. At the video club meetings, Molly “was around people who were experiencing the same issues in teaching.” These comments show that for these teachers, the community of practice that they formed helped them feel less isolated.

The video club provided an environment that encouraged these novice teachers to form into a community of practice. They seemed comfortable with each other and were able to talk openly about their triumphs and struggles. Their comments also indicate that they were willing to help and support each other by suggesting alternative manipulatives

to use and different strategies to try. These conversations would not have been possible without the video club, which allowed the participants to share the experience of viewing and discussing the videos.

**Conclusion 4: These novice teachers began to understand the benefits of videotaping themselves and reflecting on their practice.** At the initial meeting, I shared that one of the reasons I was interested in using video clubs with novice teachers was because of my experience with National Board Certification. I asked the participants if they had any experience taping themselves teaching and watching the resulting tape. The teachers had varying levels of experience; both Lisa and Elizabeth had videotaped themselves and discussed it with their cooperating teachers; Emma, Molly and Joe had no previous experience videotaping themselves teaching.

When I asked these teachers at their exit interviews what they thought they had gained from participating in the study, a common theme appeared in all five conversations. Each of the participants mentioned the value of videotaping themselves teaching and then reflecting on their practice. Some made brief comments about it, such as Joe who said, “videotaping is a good exercise for reflection.” While others, like Emma, had more to say about what she thought the benefits of videotaping were:

I do think that videotaping lends itself to being in the moment when you’re in the moment and then looking at it afterward. I think that a lot of times you forget things when you’re in the moment...it was just right in front of me so I got to relook at it and look at from the kids’ point of view and not just what I did, but what they got out of it.

Emma realized that by videotaping her lessons and reflecting on them she could improve her teaching. Another participant who appreciated the value of videotaping herself was Lisa. She said:

as a teacher you are going 100 miles an hour, all the time...you can't get away from the questions, so it was nice to just remove all of that and just to be able to pretend that I was there, listening to them [the students].

None of these teachers planned to continue to videotape themselves after the study was over, but they all acknowledged that it was a worthwhile endeavor.

The video club allowed the teachers to see themselves teach and to see how their students reacted to it. Several of the participants made comments about appreciating the opportunity to view their classrooms from an outside perspective. Joe mentioned being able to disconnect from the chaos of the classroom and consider what the students were doing and thinking. Molly mentioned that it was almost like she “could sit down and really listen to them [the students] without the distractions.” These teachers would not have had these opportunities without the video club.

**Conclusion 5: More research is needed.** This was a small-scale qualitative study conducted in one county with five participants. The findings suggest that using video clubs as a form of professional development with novice teachers has the potential to accelerate their development. However, more research is needed. Suggestions for additional research are included at the end of this chapter.

**Summary.** Based on these five conclusions, video clubs are one way to accelerate first-year teachers' development. These teachers benefitted in several ways from their participation. With time and guidance, they were able to begin noticing and interpreting



student thinking. They formed into a community of practice and were able to learn from their colleagues. They saw the power of videotaping themselves and reflecting on both their teaching and their students' learning. As the individual case studies in the previous chapter revealed, each participant developed in some significant way as a result of participating in the video club. However, the conclusions also indicate that it might not be possible to accelerate novice teachers' ability to notice student thinking. These first-year teachers needed time to be novices and were not ready to view the video clips in the context of what they revealed about student thinking.

## **Discussion**

The rationale for this study was built on the extant literature in three areas: (a) teaching expertise; (b) professional vision; and (c) video in education. This section discusses how the major findings align with previous research, beginning with the identified features of teaching expertise.

**Teaching expertise.** Berliner (1988) suggested a five-stage continuum through which teachers progress and outlined the characteristics of each: (a) novices—focus on survival and the basics of teaching; (b) advanced beginners—experiences begin to create change in their teaching, but no sense of what is important to notice; (c) competent teachers—make conscious decisions and can recognize what to attend to in the classroom; (d) proficient teachers—use intuition in their daily decisions and teaching; and (e) expert teachers—recognize patterns, pay attention to the unusual, evaluate and interpret situations, and reflect on their teaching. Berliner (2004) believed teachers built these skills after years of deliberate practice in a context-specific situation. Other

researchers added to Berliner's work by investigating more closely how expert and novice teachers differed in: (a) processing information; (b) their actions in the classroom; and (c) noticing in the classroom.

***Processing information.*** Expert teachers seem to be able to process more information than novice teachers. Some research (Dunn & Shriner, 1999; Feldon 2007; Leinhardt & Greeno, 1986) suggests that this is because expert teachers have learned what to pay attention to, a skill that novices are still developing. This difference was apparent in the participants in this study. They seemed to focus more on materials and student behavior than on what the students were doing. At the second meeting, several of the participants talked about the tools students were using to do the math instead of focusing on the students' thinking. Elizabeth commented on the recording sheet another participant's first graders were using to practice doubles facts, "I liked the visual with the paper." At the fourth meeting one of the clips showed second graders playing a place value game. Molly suggested that the teacher might want to "use different cards because it seemed confusing...the six looked like a nine in the bottom corner."

These participants also paid attention to student behaviors as they watched the video clips. A clip at the second meeting showed first graders using pattern blocks to fill in a shape. Elizabeth's first comments centered on the students' behaviors, "You can tell they wanted to impress you, they were working so hard on their shapes. They were so sweet!" This attention on student behavior continued until the fourth meeting. The clip from Joe's class featured a whole group lesson. The participants made several comments related to student behavior. Emma said, "Mr. Wigglebottoms! Oh my gosh! Harold B.

Wigglebottoms over there!” as the clip showed a boy constantly shifting in his seat. Later in the meeting, Joe referred back to his students’ behavior when he said, “Still better than my kid sitting in the front with the scissors whittling away at his pencil.” These comments indicate that the teachers in this study reacted like the novices in previous studies by noticing other aspects of the classroom instead of focusing on students and their thinking.

*Actions in the classroom.* Existing research that discusses novice teachers’ lack of efficiency (Leinhardt, 1989; Sternberg & Horvath, 1995), difficulty improvising (Borko & Livingston, 1989), and reliance on simple, recall questions (Qiong & Yujing, 2009) rang true with the novice teachers in this study. Two of the participants, Joe and Lisa, had trouble with efficiently distributing materials. A video clip from the third meeting featured Joe’s class completing a sorting activity with paper leaves. Although Joe did not acknowledge the fact that it took 20 minutes to distribute the necessary materials, he did eventually change how he provided supplies to his students. At the exit interview Joe explained that he, “noticed how some of the other teachers arranged their materials more quickly than I did.” In a clip at the same meeting, Lisa also had the problem of taking too much time to distribute materials. However, Lisa realized that she was taking too much time. She said, “There are so many materials and it’s all about organization.”

These novice teachers had carefully planned the lessons they wanted me to videotape for our meetings. But when something unexpected happened or a student asked an unexpected question, they had a difficult time improvising as the research indicates

novices often do (Borko & Livingston, 1989). When I had to change the day I visited Lisa's room, she rushed to find a lesson and felt like she had not chosen wisely. She explained, "I think you were going to come earlier in the week and we had a game ready to play, but I had to change. So I found another game on the website, [www.teacherspayteachers.com](http://www.teacherspayteachers.com) and I was just like, "Ok, this one looks good." During my last visit to videotape in Molly's classroom, one of her students had a different idea about the number combinations the group was working on. Molly was focused on what she was doing and was not able to attend to the students' thinking. When we talked about the clip in the exit interview, Molly said, "it was a completely different track than what I was kind of headed down. And so I kind of disregarded her comment."

The lessons I videotaped in these teachers' classrooms were hands-on and active. However, the questions they posed to their students were in line with the tendency of novices to ask for basic recall (Qiong & Yujing, 2009). On my second visit to Emma's room, I videotaped 20 minutes of her students working in stations with different manipulatives to practice basic addition facts. At the conclusion of the lesson, she gathered the students and asked them to record the answers to five addition problems on their white boards. She did not ask them to explain their thinking; she was only interested in the answer. A similar event occurred in Elizabeth's room during my third visit to videotape. The students were using unifix cubes to build patterns. As Elizabeth moved around the room, she asked students to use letters to name their pattern (ABAB or ABCABC). She did not ask them questions to extend their thinking. These teachers' lack

of efficiency, inability to improvise, and reliance on recall questions are behaviors that are prevalent in research on novice teachers.

*Noticing in the classroom.* Several studies considered the differences between what expert teachers and novice teachers notice in a classroom. Swanson, O'Connor, & Cooney (1990) concluded that novices focus on surface details. Krull, Oras, and Sisask (2007) concluded that novices were unaware of students' strategies. The findings from this study indicate that these novice teachers did focus on surface details, but that with guidance they became able to notice students' strategies. At the first meeting, one of the clips showed my second graders playing a money exchange game. Lisa noticed that the carpet, "looked busy," and Molly noticed that, "there was only one quarter in the pot." But, after I directed their attention to how the students were counting the money, their comments shifted to student strategies. Joe said, "he was trying to take six pennies first, instead of taking a nickel and then an extra cent." This trend of noticing superficial details continued into later meetings. A clip at the fourth meeting showed first graders from Joe's class cutting shapes into equal and not equal pieces. Joe's comments centered on who seemed to understand and why, "Well she is higher so she gets it." After I asked the group to think about how the students were finding pieces that were equal, Emma added, "One little girl, she had a good strategy, she folded it before she cut it."

Their comments showed that in many ways these teachers were still novices. They focused on the materials and student behavior. However, some of their comments indicated that, with guidance, the participants were moving toward the advanced beginner stage, characterized by Berliner (1988) as teachers who are building their strategic

knowledge. These teachers became more aware of what they should notice in the classroom and began to recognize areas that needed improvement, such as time management and questioning skills.

**Professional vision.** Goodwin (1994) defined professional vision as the way members of an established social group view and interpret events. Mason (2002) extended this idea to education in his work. Mason used the term “teacher noticing” to explain what teachers do in the complex world of the classroom. He believed that discussing what you see with others who have shared the experience is the key to developing the ability to notice student thinking. Later studies about professional noticing have built on Goodwin and Mason’s work by considering: (a) shift in focus; and (b) guidance needed by teachers to develop the ability to notice.

***Shift in focus.*** Several previous studies have considered how a teacher’s focus shifts as he or she gains classroom experience. Conway and Clark’s (2003) work outlined the progression of noticing from self, to the curriculum, and finally to the student. In reviewing the transcripts from the exit interview, it seemed that most of these teachers’ attention remained on themselves. Joe spoke about, “my own self-consciousness, wanting to see what I’m doing.” Lisa mentioned that she would have liked the videos to “film me a little bit more.” Elizabeth said, “I wanted more of the whole group stuff with me leading it.” These comments indicate that these teachers’ had not yet shifted their focus to their students.

Ross and Gibson (2010) considered whether teachers noticed isolated events in the classroom or thought about the big picture. Their research indicated that teachers

needed to build their ability to see the curriculum as a whole. This was consistent with the findings from this study, especially in the cases of Lisa and Joe. Lisa seemed to treat each unit as an entirely new topic and did not seem to understand the connections to the skills students need to build. During the exit interview, Lisa said, “I think while I’m still [teaching] the unit I feel like I could have applied a lot of the things. But I felt like when we talked I was two weeks past that unit.” Joe made a similar comment about applying what he learned later:

it [the video club] got me to think about what I would do for those lessons next year. I don’t think it has a lot of direct impact within this year because at the beginning of the year we were doing number awareness and we were doing fractions. And now, we’re focusing on number families and more computational math. And soon coming up will be measurement.

Lisa and Joe’s comments indicate that they saw each math unit as an isolated topic with no connection to other units they taught. The findings from this study are in line with the conclusions of previous research about where teachers focus their attention—first on themselves, then on the curriculum, and lastly on the students.

***Guidance needed by teachers.*** Previous research indicates that teachers need guidance in order to develop their ability to notice student thinking (Brunvand & Fishman, 2006; Edwards & Protheroe, 2003; Jacob, Lamb, & Philipp, 2010; van Es, 2012). Although the existing literature focuses on experienced teachers, the need for structured guidance was also apparent in this study with first-year teachers. I attempted to guide the participants in two ways, I provided a recording sheet (Appendix G) and I was purposeful in my facilitation of the discussions.

I created the recording sheet in an attempt to guide the participants to notice and comment on three things: (a) strategies the students used; (b) misconceptions the students had; and (c) suggest next steps for the teacher. During the exit interviews, three of the teachers commented on how the recording sheets helped focus their attention while they watched the video clips. Molly shared that, “I think if we didn’t have the study guide to fill out and kind of walk through, we might not have had as deep as discussions.” Emma saw the recording sheet as “a guideline for going through the videos. ...I was jotting down notes and then if I would forget something my notes were there.” Lisa made a similar comment when she said, “even though I’m more of a talker than writer, it was nice that the sheet was in front of us and lent itself to conversation.” Their comments indicate that these teachers believed the recording sheet helped guide the discussions during the video club meetings. However, it is interesting to note that even though these teachers made these comments and had the recording sheets to refer to, many of their comments related to other aspects of the video clips.

I also attempted to guide the participants’ ability to notice as I facilitated the meetings using van Es’s (2011) guidelines for leading discussions: (a) open the discussion; (b) focus the discussion; and (c) probe inferences. As each video ended, if none of the participants started talking, I asked, “What did you notice?” When I noticed that some participants were quieter than others, I asked, “What did you think, Elizabeth? What did you see that was interesting Molly?” When the discussion veered off topic, I made comments that refocused the group, such as “Besides using other materials, what else could the teacher do to help move along her students’ thinking?” When the



participants made comments without evidence to support it, I would ask them to explain their thinking, “Tell us more about what made you say that.” The findings from this study seem to agree with previous research that teachers need careful guidance in order to develop their ability to notice student thinking. One strategy that has been suggested to help build this skill is the use of video.

**Video in education.** Brophy (2004) identified several benefits of using videos in education: they show the complexity of classrooms; they provide a richer, more immediate experience than reading a case study; and they provide an opportunity for situated learning because videos are the nearest approximation for being present in the classroom. Research has suggested that using videos can help teachers improve by: (a) slowing down the process and allowing teachers time to reflect; (b) showing teachers’ their own classrooms; and (c) providing a forum for discussion.

*Slowing down the process and allowing teachers time to reflect.* Several studies have considered how using videos allows teachers time to reflect on their teaching (Santagata, Zannoni, & Stigler, 2007; Welsch & Devlin, 2007; Wright, 2008). The findings from these studies indicate that when given time to reflect on classroom events, teachers are more likely to analyze their teaching rather than just describe it. Although the participants in this study continued to describe and analyze their teaching, they did recognize the benefits of being able to reflect on the teaching process. During the exit interviews, all of the participants mentioned the opportunity the video club gave them to reflect on either aspects of their teaching or on their students’ thinking. Emma and Elizabeth seemed to think that having time to reflect made them more aware of their

classrooms. Emma said, “it [the video club] made me reflect on my lesson, where you don’t always have time to reflect on your lessons.” Elizabeth credited “hearing how I was guiding [a group discussion]” with helping her reflect on and change her approach to discussions. Lisa and Joe saw watching the videos as an opportunity to confirm what they thought they already knew about their students. Lisa said, “it [the video club] helped me know where I’m at and where I need to take them. And it was just like a reinforcer to me.” Joe believed that, “a lot of the things that I saw in the videos were things I was already at least a bit aware of or noticing myself.” The teachers in this study seem to agree with participants from previous studies that videotapes gave them an opportunity to reflect on their teaching and their students.

***Showing teachers their own classrooms.*** Previous research on using videos in the classroom has used both commercially produced and teacher-made videos. The findings from most of the studies indicate that teachers gain the most from watching videos from their own classrooms (Harford, MacRuairc, & McCarten, 2010; Seidel, Sturmer, Blomberg, Kobarg, & Schwindt, 2011; Sherin, Linsenmeier, & van Es, 2009; Zhang, Lundeberg, Koehler, & Eberhardt, 2011), and that sometimes they even change their practice after watching themselves on videotape (Czaplicki, 2012; Tripp, 2010).

As part of this study, a clip from each participating teachers’ classroom was shown at each video club meeting. The participants seemed to learn several things from watching videos featuring the other teachers—that replaying games could be beneficial, that students developed in predictable ways across grade levels, and that they had similar struggles and triumphs. However, most of these teachers’ comments at the exit interviews

were about what they saw in the videos from their own classrooms. Some of the teachers talked about changing their behavior based on what they saw in their own videos. Molly realized that she needed to “stop and think about what they [the students] are saying.” Emma mentioned needing to go “back through a little bit of a mini-lesson and pulling a small group. I did a lot of that just at a glimpse of what I was seeing my kids thinking was.” Elizabeth said that, “because of the video and watching them at our meetings, I changed their tables around and found different ways to group them.” These comments seem to support Czaplicki’s (2012) and Tripp’s (2010) findings that teachers are more willing to change their behavior when they are given the chance to see themselves.

***Providing a forum for discussion.*** The findings from several studies seem to indicate that teachers gain more from viewing and discussing videos in groups (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Copeland & Decker, 1996; van Es & Sherin, 2010), or to use Sherin and Han’s (2004) term, video clubs. The participants in this study seemed to appreciate and learn from the opportunity to meet and share their video clips with each other. When I asked these teachers what they thought was the most valuable aspect of participating in the video club, several of them mentioned being able to talk with and learn from the other teachers during the video club meetings. Lisa said, “I liked the diversity in the group. The discussion lent itself to different opinions and different viewpoints and different personalities. We obviously all have different teaching styles.” Emma realized that the teachers “all seemed to notice different things in the same videos,” which led to richer discussions. Molly thought, “that the conversation [in the meetings] built off each other. I think it was a good dialogue.” The comments these

teachers made seem to agree with previous research that suggests meeting in groups to discuss videos is worthwhile.

**Summary.** This study deviated from previous research in that the focus was novice teachers' development. Despite this adjustment, the findings seem to align with previous work in the areas of teacher expertise, professional vision, and using video in education. The way these five teachers processed information, acted in their classrooms and what they noticed is consistent with research on the differences between novice and expert teachers. These teachers' slow shift in focus and their need for guidance to develop their ability to notice, aligns with the work done on professional noticing. Finally, the way these teachers reacted to the videos which, (a) slowed down the teaching process; (b) allowed them to reflect; (c) showed them their own classrooms; and (d) provided a forum for discussion, was similar to the findings from previous studies. This study is grounded in previous research, but extends it with an exclusive focus on first-year teachers.

### **Limitations**

This study had several limitations, some stemming from decisions I made and some which were unavoidable. The first limitation involved participant selection. There were only five participants, four females and one male. They were all between the ages of 22 and 27. Although this sample is representative of the teaching population in the primary grades (National Center for Education Statistics, 2008), it does not allow for generalizations beyond this study. All the teachers taught in the same county. They used the same curriculum materials and had similar class sizes. Two of the participants did the

majority of the talking at the meetings, while the other three usually responded to others' comments. More participants would likely have made the discussions richer.

A second limitation is the possible influence of factors outside the video club, such as these beginning teachers' preparation programs, support from mentors, and time in the classroom. They graduated from different teacher education programs that had different requirements and expectations. They took different classes, participated in different student teaching placements, and were expected to complete different assignments. Although these differences are typical and are seen across the teaching field, these factors might have had an effect on how these five teachers developed during the study. A second factor, that was outside the scope of the study, but that needs to be acknowledged, was the role that mentors played in helping these new teachers acclimate to the classroom. Each novice teacher is assigned a mentor, usually a colleague teaching the same grade level. The role of these mentors is to familiarize the new teacher with school policies and the curriculum and provide moral support. The nature of this mentor-mentee relationship for each teacher is unknown and may have influenced what any one of the participants noticed and said during this study. A final outside factor was the effect of time on these novice teachers. As the participants grew more familiar with their students and the curriculum; their teaching inevitably changed. The video clips I used were filmed during a one month period from mid-October to mid-November. This might not have been enough time to see how the participants were growing as teachers, which suggests that studying novices either needs more time, or should begin later in their first year as teachers.

I addressed these outside factors by asking the participants about them during their exit interviews. Lisa, Emma, and Molly all commented on how they appreciated having mentors. Lisa said, "I can go to my previous mentor and ask her for resources or ideas." Emma mentioned that, "My mentor teacher is an awesome resource. And my math specialist is also a wonderful resource!" Molly talked about a math consultant who, "would sometimes come in and watch my lessons and give me feedback." Elizabeth shared how beneficial her preparation programs had been. She said, "the videos I had done as a student teacher and being able to watch those back. They were so helpful to me." Joe talked about the combined effect of his preparation program and his substituting experience. He said, "I brought my college experience into my subbing experience and then I brought my subbing experience and college experience into this [his current classroom]." Each of these teachers acknowledged that there were influences on their development, beyond their participation in the video club.

A final limitation was the short time span of the study. The purpose of this study was to see how participating in a video affected new teachers' development. However, each participant only attended four meetings over a four month period. Realistically, this was probably not enough time to see substantial development in these teachers. However, it did seem to be enough time to begin to see what they were noticing, what they were learning, and what they were gaining from their participation in the video club.

## **Implications**

The findings from this study have several implications for teacher education, including: (a) differentiated professional development; (b) establishing video clubs for novice teachers; and (c) including a video component in classroom observations.

**Providing differentiated professional development.** The findings from this study seem to indicate that teachers need different types of professional development based on their backgrounds and teaching contexts. Although this study had a small sample size, the five teachers each viewed teaching through a different lens that affected what he or she noticed in the video clips. Lisa focused on how to reach all students, especially the ones with special needs. Emma concentrated on making the curriculum more accessible to the ESL students. Elizabeth's attention was centered on how students behaved and how to help them concentrate on their work. Joe focused on what the teachers were doing and what they might do differently. Molly concentrated on learning, both from the other participants and from her students. While I believe these teachers all gained from their participation in the video club, it might have been more effective if the group had included only inclusion teachers, or only ESL teachers, or only kindergarten teachers. Teachers are like students; they have different needs and goals. Professional development should try to meet those needs.

**Establishing video clubs for novice teachers.** Thousands of new teachers enter the profession each year. Some of them have had experience with videotaping and reflecting on lessons while others have not. Considering the high expectations placed on all teachers, it would be worthwhile to establish video clubs for novice teachers. The

findings from this study indicate that the teachers grew in their ability to notice student thinking, learned things they could use in their classroom, and benefitted from being a participant in the video club. They were able to watch themselves teach and reflect on their teaching. Their comments indicated that they both wanted and needed a way to see what they looked like as teachers. Several of the participants made comments that suggested they believed there is a “right way to teach.” Having the opportunity to see themselves and others teaching on tape would show them that there are countless ways to teach. The positive comments the participants made indicate that some aspects of the video club resonated with them. The professional life lessons these first-year teachers learned as participants in the video club suggest that other novices might benefit from similar opportunities.

**Including a video component in classroom observations.** Video allows teachers to reflect on their teaching and in some cases make changes. When administrators observe teachers, they usually complete a form and then discuss it with the teacher. These observations would be more meaningful to the teacher if he or she could see what their administrator was talking about rather than just hear it. In the exit interview, Joe mentioned that he had been observed and had not had a post-conference until a week later. He said, “By that time, I did not even remember the lesson he had observed. It would have helped me to see what he meant.” Videotaping observations would also allow the teacher to view the lesson multiple times, perhaps focusing on a different aspect of the classroom each time. Teachers, especially those just entering the profession, would benefit from adding a video component to classroom observations.



The findings from this study provide some ideas about changes that should be made in school systems. Redesigning professional development to better meet the needs of all teachers, both beginning and experienced teachers, might lead to more productive conversations and better learning opportunities. Establishing video clubs for first-year teachers might accelerate their development in several areas. Revamping classroom observations to include a video component might provide a better basis for post-observation discussions and could prompt teachers to change their approach to instruction.

### **Suggestions for Future Research**

The findings from this study revealed several related areas that warrant additional research. The first three suggestions relate to participant selection. The first is to repeat the study with a larger sample size. The five participants in this study provided enough data for this dissertation, but it would be interesting to see whether the same themes appear in a study with a larger group. A second area that might be explored in future research involves participant selection. This study included only one male and his development was markedly different from the four women. It is not clear whether these differences were because he was the only male, but it is something that warrants further investigation. This study only included primary grade teachers (kindergarten-second grade). It would be interesting to see whether the results would change if the participants taught upper elementary (third-fifth grades), middle school, or high school.

Another suggestion for future research is expanding the focus of the video clips to other curriculum areas. This study followed previous research (Sherin & Han, 2004;

Sherin & van Es, 2005; Sherin & van Es, 2009; van Es & Sherin, 2010) in using video clips from math lessons. Beginning teachers might develop in different ways if the video clips featured literacy lessons, science lessons, or social studies lessons. It might be interesting to conduct a study using clips showing the same participants working in different curriculum areas with their students to see whether there are differences in teachers' development by content area.

This was a semester long study with only five video club meetings. In order to understand better how beginning teachers develop as a result of participating in a video club, future researchers should conduct longer studies. These studies could last for the entire first year or they could continue until the end of the new teachers' third year in the classroom. This would be in line with research that defines a novice as a teacher in his or her first three years of teaching (Kardos & Johnson, 2007).

This researcher did not return to the participants' classrooms to videotape after the conclusion of the video club meetings. All the video clips that were used in the meetings were recorded during October or early November. Future research could include a post-meeting videotape that might reveal how the participants were applying what they learned in the video club to their classroom practice. It would be interesting to see whether the teachers: (a) noticed more about student thinking; (b) if they took the time to interpret what they noticed; and (c) if they changed their instruction based on what they noticed.

A final suggestion for future research involves the facilitator. I provided a recording sheet (Appendix G) that guided the participants' thinking as they watched the

video. It also provided prompts for the subsequent discussions. Future research might take a less structured approach to the meetings to see whether this affects the conversation or what the participants notice. The facilitator would still need to guide the discussion, but it would be interesting to see what teachers would notice without the support of a recording sheet. These suggestions provide ideas for future researchers to extend the work presented here.

### **Summary**

These findings indicate that this study accelerated the development of these novice teachers in several ways, specifically: (a) with time and careful guidance they began to notice and interpret student thinking; (b) they learned new skills, such as how to manage materials, how to reflect on a lesson, how to group students, and how to be more engaging with students; and (c) they realized the benefits of participating in the video club. The results also suggest that individuals develop in different ways and along different paths depending on their previous experiences and the contexts in which they currently work.

This study pointed to three implications for school systems. These are: providing differentiated professional development; establishing video clubs for novice teachers; and including a video component in classroom observations. If teachers are going to be prepared to help students reach the high expectations set forth by No Child Left Behind, they need to change how they are teaching. Seeing what they are doing and being able to discuss it with others is one approach to achieving this goal.

Finally, the findings from this study revealed that there is more research to be done. These future studies include: (a) repeating the study with a larger sample size; (b) repeating the study with more male participants; (c) repeating the study with different grade levels, and (d) repeating the study focusing on different curriculum areas. Further research is also needed that includes having video club meetings over a longer time frame, and incorporates visiting participants' classrooms to see how they are applying what they learned in the video club. A final area that warrants additional study is how the use of a recording sheet affects what participants notice and how the discussion unfolds in meetings.

In the current high-stakes environment in schools with standardized testing and high expectations for student growth, beginning teachers will continue to feel pressured to perform like experienced teachers from day one. One way to help these new teachers build their skills is to provide them with an opportunity to participate in a video club. These video clubs are a forum where they can view and discuss videos from their classroom with other first-year teachers. These experiences will help these teachers develop the skills they need to help their students succeed.

## **APPENDIX A**

### **PARTICIPANTS NEEDED:**

**WHO:** Novice teachers about to begin their first year of full time teaching in  
Nomini County Public Schools

**WHAT:**      \*Take part in a study that will investigate how participation in a  
video club affects novice teachers' ability to notice student  
thinking  
  
\*Allow the researcher to videotape at least three math lessons in  
your classroom and be willing to share the recordings in video club  
meetings

**WHEN:**      \*September to December 2013  
  
\*September: 30 minute viewing and analysis of a videotaped math  
lesson & 1 one-hour video club meeting  
  
\*October: 2 one-hour video club meetings  
  
\*November: 1 one-hour video club meeting & 30 minute viewing  
and analysis of a videotaped math lesson  
  
\*December: 30 minute exit interview with researcher

**INCENTIVES:**      \*network with other novice teachers  
  
\*opportunity to reflect on your teaching  
  
\*opportunity to “visit” other classrooms

\*earn Recertification points

\*opportunity to take part in a research study

If you are interested in participating, please complete the bottom of this form and leave it with your instructor at the end of today's session. Thank you.

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Name & Contact Number

---

email address

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Where will you be teaching? Grade level?

## **APPENDIX B**

### **Information Letter**

Dear \_\_\_\_\_,

Thank you so much for agreeing to participate in my study! I know that your time is valuable and really appreciate your willingness to make the time to come to the meetings. I wanted to clarify a few things about what you should expect and what I need you to do.

#### **Before the first meeting:**

- Please try to obtain a signed consent form from each student. I will need these before I can videotape in your room.
- Please log on to [www.beasmartercookie.com](http://www.beasmartercookie.com). You will view the video I sent to you and make comments on whatever you notice.
- Please consider which days and times might work for me to visit to videotape.

#### **At the first meeting:**

- Please bring the signed permission slips to the meeting.
- We will meet for one hour, beginning with an introduction and then viewing two video clips from my classroom. I will ask you to complete a recording sheet and then participate in a discussion about the videos.
- I will provide snacks and drinks.

#### **October/November**

- Arrange dates and times for me to visit three times to videotape your math class. I would like to capture students working together in stations or playing games.

#### **Three more meetings (October, November & December)**

- We will watch videos from your classrooms, complete the recording sheets and discuss them.

#### **January**

- Please log on to [www.beasmartercookie.com](http://www.beasmartercookie.com) again to view and comment on the video.
- Arrange a time for an individual interview with me to discuss what you thought of the video club.

That's about it! Please call me (xxx-xxx-xxxx) if you have questions or concerns.  
Again, thanks so much for agreeing to participate!

Sincerely,

Michele R. Repass



## **APPENDIX C**

### ***An Investigation into the Effects of Participating in a Video Club on Novice***

#### ***Teachers' Ability to Notice Student Thinking***

#### **INFORMED CONSENT FORM**

##### **RESEARCH PROCEDURES**

This research is being conducted to determine how participating in a video club affects novice teachers' ability to notice student thinking. If you agree to participate, you will be asked to complete an analysis a video of a math lesson, allow me to videotape several math lessons in your classroom, participate in four video club meetings, and complete an exit interview. The study will take place from September to December 2014 and will require about six hours of your time.

##### **RISKS**

There are no foreseeable risks for participating in this research.

##### **BENEFITS**

The potential benefits to you include: establishing relationships with other novice teachers, having time to reflect on your teaching, the opportunity to "observe" in other novice teacher's classrooms, and obtaining professional development points. In addition, the benefits to Nomini County include: piloting a new type of professional development and adding to the knowledge base about how new teachers gain expertise.

##### **CONFIDENTIALITY**

The data in this study will be confidential. Your name will not be used in any way. I will use pseudonyms in my discussions with my committee and in my dissertation. I will keep all copies of the videotapes and transcripts in a locked desk drawer in my home office for three years and then destroy them.

##### **PARTICIPATION**

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you as a participant. You will receive 10 hours of recertification points/professional development hours through Nomini County’s Professional Learning Office.

**CONTACT**

This research is being conducted by Michele Repass. She may be reached at xxx-xxx-xxx for questions or to report a research-related problem. Her faculty advisor at George Mason University is Dr. Gary Galluzzo. He may be reached at xxx-xxx-xxxx. You may contact the George Mason University Office of Research Integrity & Assurance at xxx-xxx-xxxx if you have questions or comments regarding your rights as a participant in the research. This research has been reviewed according to George Mason University procedures governing your participation in this research.

**CONSENT**

I have read this form and agree to participate in this study.

\_\_\_\_\_

Name

\_\_\_\_\_

Date of Signature

Version date:8/01/13

## APPENDIX D

### Classroom Video Permission

Dear Parent/Guardian,

My name is Michele Repass and I teach 2<sup>nd</sup> grade at Dixon Elementary School. I am also working on my doctorate at George Mason University. My dissertation is going to investigate how participating in a video club affects novice teachers' ability to notice study thinking.

Your child's teacher has agreed to participate in my study. Part of the data collection will require me to visit your child's classroom about three times between September and December of 2014 to videotape math lessons.

These videos will only be used in the context of the video club. Your child's image and name will not be used outside of the meetings in any way. If I need to discuss the specifics of a video with my committee or in my dissertation, I will use a pseudonym for your child and not include any identifying features.

Allowing your child to participate is voluntary, and you may withdraw your child from the study at any time and for any reason.

If you have any questions or want to discuss my use of the videos please contact me at xxx-xxx-xxxx. Thank you in advance for allowing your child to participate. Please sign below the line and return this letter to your child's teacher by 9/11/13.

Sincerely,

☐ I **do** give permission for my child, \_\_\_\_\_, to appear in videos of classroom math lessons as part of Michele Repass' dissertation research.

---

Parent/Guardian's Signature & Date

☐ I **do not** give permission for my child, \_\_\_\_\_, to appear in videos of classroom math lessons as part of Michele Repass' dissertation research.

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Parent/Guardian's Signature & Date

## APPENDIX E

### PRINCIPAL PERMISSION FOR TEACHER PARTICIPATION

Dear \_\_\_\_\_,

My name is Michele Repass and I teach 2<sup>nd</sup> grade at Dixon Elementary School. I am also working on my doctorate at George Mason University. My dissertation is going to investigate how participating in a video club affects novice teachers' ability to notice student thinking.

One of your teachers, \_\_\_\_\_, has agreed to participate in my study. Part of the data collection will require me to visit her classroom at least three times between September and December of 2013 to videotape math lessons.

These videos will only be used in the context of the video club.

\_\_\_\_\_’s image and name will not be used outside of the meetings in any way. If I need to discuss the specifics of a video with my committee or in my dissertation, I will use a pseudonym for the teacher and not include any identifying features.

If you have any questions or want to discuss my use of the videos, please contact me at xxx-xxx-xxxx. Thank you in advance for allowing \_\_\_\_\_ to participate.

Please sign below the line and return this letter to me by September 11, 2013.  
Sincerely,

\_\_\_\_ I **do** give permission for \_\_\_\_\_ to participate in Michele Repass’ dissertation research.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_ I **do not** give permission for \_\_\_\_\_ to participate in Michele Repass’ dissertation research.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## APPENDIX F

## Video Club Recording Sheet

- 1. Describe, in detail, what you noticed in this video clip.**
- 2. Explain what you learned about these students' understandings and misunderstandings.**
- 3. Pretend you are these students' teacher. What is your next step?**

## **APPENDIX G**

### **Interview Guide**

\*Demographic Info: Age, school size, class size, student demographics, para support, Title I

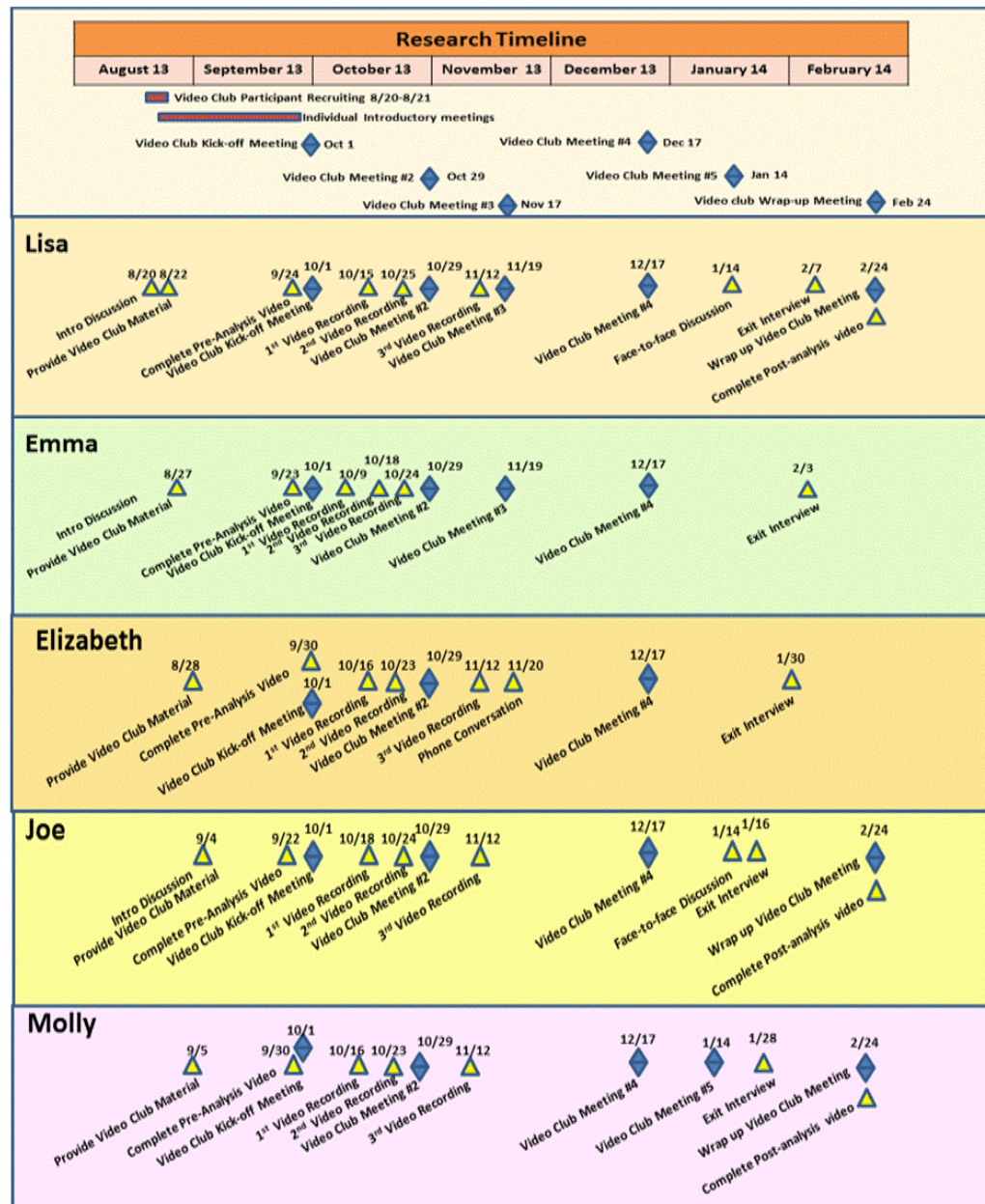
1. Why did you volunteer to participate in this study?
2. What did you expect to learn from participating?
3. What did you actually learn as a result of participating?
4. What were your initial impressions of the research topic?
5. What were your initial impressions of the video club?
6. What were your feelings about participating (positive and negative)?
7. How do you think your understanding of your students' thinking has changed as a result of participating?
8. Can you give me a specific example that illustrates how your understanding has changed?
9. How do you think what you noticed changed?
10. How do you think your ability to notice changed?
11. How do you think the way you discussed the videos changed?
12. How do you think your classroom practice has changed as a result of participating?

13. Can you give me a specific example that illustrates how your practice has changed?
14. What was the most valuable aspect of participating in the video club?
15. What could I have changed to make the club more valuable to you?
16. How do you think you were influenced by the comments made by the other participants in the video club?
17. What other factors do you think might have contributed to your growing ability to notice student thinking (teacher preparation program? Mentor? school culture?)
18. Is there anything else you would like to share about how you think participating in the club affected you or your classroom practice?



## APPENDIX H

### Summary of the first-year teachers' participation in the video club



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## **BIOGRAPHY**

Michele R. Repass graduated from Osbourn High School, Manassas, Virginia, in 1988. She received her Bachelor of Arts from Mary Washington College in 1992. She is currently employed as a second grade teacher in Stafford County, Virginia. Prior to this, she worked as an Assistant Editor at The Education Center and taught in Fredericksburg City Schools. Michele is a National Board Certified teacher.