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The Use of Video Clubs to Support the Reflective Practice of Early Childhood Pre-Service Teachers in Their Mathematics Instruction

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THE USE OF VIDEO CLUBS TO SUPPORT THE REFLECTIVE PRACTICE OF EARLY CHILDHOOD PRE-SERVICE TEACHERS IN THEIR MATHEMATICS INSTRUCTION

By

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ABSTRACT

The purpose of this study was to investigate what pre-service teachers focus on when reflecting on their mathematics instruction with the use of video clubs. Video clubs are groups where teachers meet and watch videos of their lessons and provide feedback to one another. The participants were pre-service teachers enrolled in an early childhood education program. The study was conducted during the fall semester within a mathematics methods course. Twenty-five students chose to participate in the study. The participants were grouped based on the grade level they were placed in for their field placements. There was a total of five groups who participated in the research. Only one of the groups was used in this study. The video club group used in this research included six pre-service teachers who volunteered to participate in this semester-long study. All the participants were placed in kindergarten classes for their field placements. Using qualitative research methods, the researcher investigated what pre-service teachers focused on when reflecting on their instruction as well as that of their peers, the quality of those reflections, as well as the perceived benefits of video club sessions. The data collected consisted of one micro teaching written reflection, two videotaped lessons, two written reflections, two revised reflections after video club session, and two transcribed video club sessions. The findings indicate that pre-service teachers focus on three main categories of teaching and learning classroom management, instruction, and understanding of students. Within each of these categories, themes emerged that illustrated how these participants viewed each category. When pre-service teachers reflected on classroom management their reflections included child blame, logistics and transitions, student engagement, and positive affirmations. First, pre-service teachers often make excuses or blame students for issues during a lesson. They also focus on
logistics, mobility, and transition during their instruction and note these items in group discussions. Finally, they look at student engagement as a form of classroom management. When the focus of their conversation shifts to instruction the discussion is often surface-level, they focus on questioning as a tool to help themselves as teachers, not to help clarify student understanding. There is considerable conversation around assessment, but not to drive instruction, only as confirmation they have effectively taught a lesson. When looking at instruction they try to make connections with mathematics but these connections are surface-level and provide little insight into math practices. The final areas that pre-service teachers focus on is the focus understating their students which included discussion on student prior knowledge and misconceptions of students and pre-service teachers. The quality of written reflections were descriptive and evaluative in nature. The video club conversation was analyzed for the substance of the conversation. However, the findings suggest that the conversation remains surface-level and often off task. The video clubs’ discussion evolved over the two sessions from logistical concerns to a greater focus on instruction. All the participants reported positive feedback on the video club process and watching their own instruction.
CHAPTER 1

INTRODUCTION

Reflection is not a new term in the field of education. In fact, John Dewey (1933) first theorized the importance of reflective practice in *How We Think*. He stated that reflective thinking was a better way of thinking in which one is able to give careful consideration to a subject (1933). Donald Schön (1983) built on Dewey’s theories of reflection and further explained specific types of reflection. Since then, reflection has become a key component of teacher education programs as well as institutions that guide the practice of educational arenas such as National Council of Teacher of Mathematics (NCTM) and the National Council for Accreditation of Teacher Education (NCATE). Many teacher education programs require reflective activities in their programs and course work (Davis, 2006; Hatton & Smith, 1995), but little is known about the content of these written reflections. In addition, Davis (2006) claims that opportunities to reflect are not enough to elicit productive reflection. These skills need to be fostered. There is no doubt reflection is being emphasized in teacher training programs (Zeichner & Liston, 1996) but this study aims to investigate what pre-service teachers reflect on with the use of video technology and peer collaboration (Christensen, 1996). Peer collaboration has been used as a professional development tool for in-service teachers for several years (Joyce & Showers, 1996). Research on the impact of these tools on pre-service teachers has emerged over the recent years and continues to evolve with additional technological advances (Grossman, 2005).

**Background**

There has been an increased interest in the ability of pre-service teachers to make pedagogical decisions during instructional practice since the National Council of Teachers of
Mathematics (NCTM) included them in their standards (2000). Allowing pre-service teachers to video their lessons gives them the opportunity to notice things they may have missed during instruction. According to Star and Strickland (2008), video can be used to improve pre-service teachers’ ability to notice elements of their instruction. In addition, working with peers within the same grade level can provide support and feedback from those at a similar stage of learning (Jenkins, Garn, & Jenkins, 2005). This study explored what pre-service teachers reflect on with the support of their peers and video technology.

Van Es and Sherin (2002) argue that teacher education programs often focus on teaching students how to act rather than how to notice and interpret what is happening in the classroom (Berliner, 2000; Day, 1999; Huling, Reista, & Rainwater, 2001; Niess, 2001). Welsh and Devlin (2007) discuss the use of video as an important tool to promote reflection in pre-service teachers. The authors explain that pre-service teachers need to be involved in observing and constructing meaning out of their teaching and this can effectively be done with the use of video-taping lessons. Furthermore, research suggests that pre-service teachers benefit from support and are more willing and able to reflect on their practice, which translates into increased understanding of their needs and those of their students (Kurtts & Levin, 2000). This supportive atmosphere has a variety of names such as video clubs, peer collaborative groups, and lesson study groups to name a few. Van Es and Sherin (2002, 2006, 2008) found the combination of video and peer collaboration enhanced the teacher’s ability to notice what was happening in the classroom in terms of mathematics. They have identified this combination as a video club, and have studied its effectiveness to notice elements of math lessons in both in-service teacher professional development and pre-service teacher preparation programs (Sherin & Han, 2004, Van Es, 2012; Van Es & Sherin, 2004, 2006, 2008). This study employed the use of video clubs which are
defined as a “group of teachers who meet to watch and discuss one another’s teaching” (Van Es & Sherin, 2006, p. 125).

**Problem Statement**

As a classroom teacher, I mentored many pre-service and beginning teachers. This, coupled with my own experiences as a new teacher, led me to recognize the variety of challenges that one faces during their first few years in the classroom. In addition, mathematics instruction carries another set of challenges for new teachers who may struggle with the content themselves or have feelings of incompetence (Brady & Bowd, 2005; Bramald, Hardman, & Leat, 1995; Scarpello, 2007). As an instructor for the mathematics methods course, I have seen these fears impact the confidence of many pre-service teachers. I feel, as a teacher educator, that it is important to identify what pre-service teachers focus on when reflecting on their instruction as well as those of their peers, in order to recognize issues within teaching and provide them with the tools needed to improve their practice.

Often the many challenges new teachers face can feel insurmountable and as a result, teachers become disenfranchised with the profession and leave too soon (Kurtts & Levin, 2000). Reform measures are increasing the pressures for novice teachers to meet demands that they are not prepared to face. As the demands on teachers increase, so do the pressures for teacher educators to prepare teachers for all of these requirements. New teachers must be able to engage all children in the development of complex skills and are expected to prepare each student, regardless of their socioeconomic status, English proficiency, or disability for higher-order thinking skills (Bransford, Darling-Hammond, LePage, 2005). In order to prepare teachers for these challenges, teacher education programs must go beyond the current curriculum and equip student teachers with the skills to help all their students reach their greatest potential.
Reflection has been used as a tool to support pre-service teachers in meeting these expectations (Kurtts & Levin, 2000; Ward & McCotter, 2004). Developing reflective skills is an objective stated repeatedly in the National Council for Accreditation of Teacher Education (NCATE, 2008) standards regarding teacher knowledge, skills, and professional dispositions.

While reflection is highlighted in many mission statements for teacher education programs, pre-service teachers are expected to know how to reflect on their teaching and often instructors are “disappointed with the results” (Russell, 2005; Ward & McCotter, 2004, p. 255). Russell (1993, 2005) found pre-service teachers who struggle to learn from their field experience or identify areas that can be improved upon, are the same students who fail their field placement assignments. These issues can contribute to unproductive or descriptive reflections where pre-service teachers have trouble evaluating a lesson beyond the fact that a lesson went well (Parsons & Stephens, 2005). In addition, research suggests that reflection is a “social process” (Copeland et al., 1993; Convery, 2001; Parsons & Stephens, 2005; Richert, 1992; Ruddock, 1992; Russell, 1993; Zeichner & Tabachnick, 1991). However, various teacher education programs view reflection as an isolated practice that should be done alone (Parsons & Stephens, 2005). These issues make the use of reflection a challenge for many teacher education programs.

The National Council of Teachers of Mathematics (2000) has identified the ability for teachers to remain flexible by making pedagogical decisions during instruction as a main priority. In order for these rigorous requirements to be met, pre-service teachers must show they have pedagogical, content, and curricular knowledge in action. Often, pre-service teachers in early childhood and elementary teacher education programs have math anxiety and low academic performance (Bush, 1989; Hembree, 1990). These pre-service teachers have a plethora of
concerns when it comes to teaching mathematics including lack of content knowledge, lack of teaching methods, and lack of confidence (Bates, Latham, & Kim, 2013). Van Es and Sherin (2002) suggest that the use of video technology can enhance a teacher’s ability to notice and react to the complex mathematical situations that occur in the classroom. Unfortunately, few teacher education programs implement the use of video-taping as a means for self-reflection and peer discussion (Brophy, 2004; Goldsmith & Schifter, 1997; Rosenholtz, 1989). Instead, the use of video is used frequently to illustrate expert teaching (Ethell & McMeniman, 2000). Student teachers need to be exposed to expert teachers and identify their ability to react in action, but they also need to engage in analysis of their own teaching in order to become aware of their interactions with students and content. It is not common for teachers to come together to discuss issues with teaching and student learning and examine ways to improve and support each other in a way that will impact future practice (Skerrett, 2010).

In order to address these issues in pre-service teacher education, this study focused on how video clubs can support the reflective practice of pre-service teachers. This research aims to extend the current research on video clubs to identify what pre-service teachers focus on when reflecting on their instruction in video clubs, the quality of their reflection, and the perceptions of these experiences. The use of video clubs allowed pre-service teachers to analyze their practice as well as those of their peers in small group settings. Peer collaboration and video technology are not new to elementary education research. However, the combination of these tools within an early-childhood mathematics course is not common. This research can provide insight into what early childhood pre-service teachers think about when analyzing their mathematics instruction. In addition to the video club sessions, this research analyzed the written reflections of each pre-service teacher. These data sources provided an additional dimension to the current research on
video clubs. Evaluating the levels of reflection as well as the focus of both the video club conversation and written reflections as it relates to mathematics instruction provided insight into what pre-service teachers focus on or notice when watching mathematics lessons.

**Purpose of Study**

The purpose of this qualitative case study was to explore pre-service teachers’ use of reflective practice during their mathematics instruction with the use of personal video-taped lessons and peer collaboration at a southeastern university. At this stage in the research, reflection is defined as “deliberate thinking about action with a view to its improvement” (Hatton & Smith, 1995, p. 40). This study seeks to identify what and how pre-service teachers engage in reflection during their senior practicum experience.

In order to prepare pre-service teachers for the challenges that lay ahead, we must give them the tools to evaluate their own practice as well as their peers. According to Llinares and Valls (2009), teaching mathematics is a difficult task in which many variables factor into the process. The development of these teaching skills can be facilitated by providing pre-service teachers with the opportunity to learn from their practice (Llinares & Krainer, 2006). This study explored how video clubs influence pre-service teachers’ reflective practices as it relates to their mathematics instruction. While there is extensive research on peer collaboration, video technology in the classroom, mathematics instruction in pre-service teacher education, mathematical knowledge, and reflective practice, there is little research exploring the combinations of these elements in an early childhood setting.

This study provided insight into the thoughts of pre-service teachers as they begin to form knowledge regarding mathematics and classroom practices. The researcher was able to analyze how they reflect and begin to organize their new knowledge. There is conflicting evidence on the
ability of pre-service teachers to critically reflect upon their practice at these early stages of practicum experiences (Berliner, 1988; Cochran-Smith, 1991; Dinkleman, 2000; Hatton & Smith, 1995). This study seeks to add to the existing body of evidence that suggests pre-service teachers have the ability to reflect on their practice and provide additional resources to facilitate the reflection process (Scott, Kucan, Correnti, & Miller, 2013).

Hammerness and colleagues (2005) describe a key characteristic of powerful teacher education programs as their ability to teach candidates to apply what they are learning in their courses to the applications, planning, and assessment connected to standards, then analyzing these actions by reflecting on them, receiving feedback, and re-teaching the lessons. This new knowledge about how pre-service teachers engage in reflective practice will help teacher education programs organize their courses to provide student teachers the opportunity to participate in video reflection as well as utilize peer collaboration in video clubs, as a means to better understand their practice. Critical reflection can be facilitated by providing teacher candidates a variety of opportunities to engage in reflective practice through course work, expert teacher observation, personal videos, and peer collaboration (Bean & Stevens, 2002). While the use of technology and peer collaboration are not new, they are underutilized in the field (Britton & Anderson, 2010) and this research contributes to the empirical knowledge base that suggests these tools are effective in helping pre-service teachers notice what is happening in the classroom as well as improve and learn from what they see (Artzt, 1999; Sherin & Van Es, 2005; Star & Strickland, 2008; Van Es & Sherin, 2002, 2008; Welsh & Devlin, 2007).

The theoretical framework of this study is based on Dewey’s (1933) theory of reflection. He describes reflection as a process in which an event occurs that challenges norms, therefore, creates a problem. This problem needs to be resolved by the individual, who links a series of
ideas together in an attempt to fix the issue. These thoughts are said to be active and deliberate, and they make up the reflective process. Dewey’s focus was on how an individual acted after the problematic event (1933). How did they interpret the event and what did they do to make changes in order to avoid the issue? Schön (1983, 1987) focused on the timeframe in which one acted. He refers to this as reflection-in-action and reflection-on-action. The ability to act-in-action refers to the teacher’s ability to take note of the situation and make adjustments in the moment, while reflection-on-action refers to their ability to reflect after a lesson and make changes in the future. Ball, Lubienski, and Mewborn (2001) discuss the importance of a teacher’s ability to deal with the moment-to-moment issues within a mathematics lesson. They argue this can only be done with a solid understanding of mathematics that comes from practice. Brookfield (1995) discussed the difference between reflection and critical reflection. He describes critical reflection as the ability to understand the educational process and “question assumptions and practices that make our teaching lives easier but work against the long-term interests” (p. 8). All three of these theories focus on the ability of an individual to identify an issue in their teaching, step back and evaluate the issue based on what they know about teaching and themselves, and make a change to their practice that solves the original problem at hand.

In addition to the work of Dewey, Schön, and Brookfield, Van Manen (1977) built a model of reflective practice. He stated that there were three levels of reflection. Level one was considered technical reflection and referred to the application of pedagogy in the classroom. Level two is practical reflection, which encompasses the interpretation of pedagogy as it is related to an individual teaching element. Level three is critical reflection and examines the constraints of the situation as well as the dichotomy of one’s personal beliefs and practices. This model is illustrated in Table 1 in Appendix A (Etschedit, Curran, Sawyer, 2012). This study went
one step further and use Van Es and Sherin’s framework that includes three dimensions of reflection: description, evaluation, and interpreting (2006). The video club conversation was also analyzed for the substance of the conversation (Van Es & Sherin, 2012). These stages allowed researchers to classify the types of reflections pre-service teachers used in the early stages of their practicum experience, before they began their internship. The ultimate goal of many teacher education programs is to facilitate pre-service teacher’s ability to reflect-in-action (Ball, Lubienski, & Mewborn, 2001; NCATE, 2008; NCTM, 2000). However, Mewborn (1999) found that while pre-service teachers have the ability to reflect they need encouragement to make assumptions and internalize events. Welsh and Devlin (2007) used video to enhance the reflection of pre-service teachers in a special-education program. Using a memory-based reflection group and a video based reflection group, the researcher compared the results of a reflection questionnaire administered after teaching a lesson. Pre-service teachers that participated in the video-based reflection had greater levels of reflection than their memory-based counterparts. This study modeled the video-based reflection methods of Welsh and Delvin (2007) in order to afford these students the opportunity to reflect on their practice after a lesson, while scaffolding their reflective process through the use of peer collaboration.

The use of video and written reflections provided an additional dimension to the reflection process. Student teachers are often so focused on the pedagogy in teaching that they miss the big picture that is the reflective process (Van Es & Sherin, 2008). The video is a medium which can be used to focus on a variety of classroom interactions and events. Video clubs were used in this study, and consist of a group of pre-service teacher who met and discussed videotapes of their lessons (Van Es & Sherin, 2008). Van Es and Sherin (2008) speculate that these opportunities may allow teachers to see themselves in a different way. They
suggest by providing teachers with a variety of methods of reflection they will be able to notice what they do in action. The purpose of this study is to explore how the use of video clubs facilitates reflection in pre-service teachers as it relates to their mathematics instruction.

Nature of Study

This study is concerned with what pre-service teacher’s reflect on when analyzing their own mathematics lessons as well as the lessons of their peers, while participating in video clubs. Ball, Lubienski, and Mewborn (2001) believe that what teachers and students are able to do together in the classroom is essential to improving mathematics education. In order to uncover these classroom practices, teachers must evaluate what they know about mathematics, how students learn, and then interpret this into their instructional practices. The constructivist theory relies on the assumption that “knowledge is constructed by learners as they attempt to make sense of their experiences (Driscoll, 2005, p.387)”. This constructivist approach allowed the researcher to gain insight into the reflective practices of pre-service teachers as they are constructing their pedagogical and mathematical content knowledge, and then reflecting on this knowledge. As the standards for mathematics educators evolve so does the level of understanding they must possess in order to be effective instructors. Utilizing reflection as a means to better understand what teachers think about when analyzing their instruction as well as that of their peers is the central thread of this research.

The research questions guiding this study are as follows:

1) What aspects of teaching do pre-service teachers reflect on through the use of video clubs?

2) What is the quality of pre-service teacher written and oral reflections?

3) How do the use of video clubs support the reflective practice of pre-service teachers?
This study employed a qualitative case study research design. These methods were chosen because they allowed the researcher to investigate the reflective practices of pre-service teachers as they progress through their mathematics methods course. The researcher is interested in what pre-service teachers reflect on, the quality of those reflections, and the perceived impact of video clubs. In order to gain this insight into what these pre-service teachers focus on, qualitative methods were chosen. The participants were selected using purposive sampling techniques (Patton, 2002). Purposive sampling was used to select participants that would provide insight into what pre-service teachers reflect upon during video club sessions as well as personal written reflections. The researcher was interested in the experiences of a select group of students during a specific time in their teacher education program. Therefore, only students taking an early-childhood mathematics methods course during the fall of their senior year were asked to participate.

The data consisted of written reflections from two videotaped lessons, written reflections from one micro-teaching lesson, transcripts from two video club sessions, and two revised written reflections after the video club session. Pre-service teachers wrote a reflection after watching each of their videotaped lessons as well as their micro-teaching lesson. They also revised these reflections after participating in the video club sessions which allowed them to express how their views may have been altered after each video club session. Video club sessions were taped and transcribed. These group interactions provided insight into what pre-service teachers reflect on and what they learn from their peers. These data sources were used to triangulate what pre-service teachers talked about in their group, what they wrote about in their reflections, and how those reflections were impacted by the use of video clubs. The data sources are illustrated in Table 2 (Appendix B).
Operational Definitions

Education, like all specialized fields, uses a vernacular that can be cumbersome and confusing for those not familiar with the terminology. In order to avoid confusion the key vocabulary is defined in this section.

**Reflection**: Dewey (1910) states, “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it tends” (p.6).

**Practicum experience**: is the time students spend in their field placements prior to their full internship.

**Cohort**: is a group of students enrolled in a set block of classes for the duration of their undergraduate program.

The terms **per-service teacher**, **student teacher**, and **teacher candidate** will be used interchangeably throughout this study, referring to students who are in a teacher education program but have not begun their full-time internship.

**Peer collaboration**: will be referred to as groups of students that are members of the same cohort and work together on projects and assignments.

**Pedagogical Content Knowledge (PCK)**: is defined by Schulman (1986) as the “particular form of content knowledge that embodies the aspects of content most germane to its teachability” (p.9).

**Video Club**: group of peers who tape their mathematics lessons and then watch them together and provide feedback on another.

**Micro-teaching**: teaching a lesson intended for young children to peers in a university setting.
Significance of Research

Early-childhood educators make a significant impact on children in the beginning stages of mathematics education (NAEYC & NCTM, 2002). According to a joint position statement made by the National Association for the Education of Young Children (NAEYC) and National Council of Teachers of Mathematics (NCTM), providing young children with quality, stimulating mathematics education is vital to their foundation and future mathematics knowledge (2002). Providing children with these experiences requires knowledgeable teachers. These teachers build the foundation of learning in young children. In order to ensure that foundation is solid, teachers of young children must be reflective and knowledgeable in all subject areas, but mathematics is critical at this stage in their development (NAEYC & NCTM, 2002).

Pre-service teachers must enter the field of education with a variety of skills but the ability to understand the dynamics of a classroom, make in-the-moment instructional decisions, as well as delineate student thinking is key to their success as a mathematics educator. As teacher education programs begin to foster these skills, we need to identify activities that facilitate pre-service teacher's capacity to activate these skills. While reflection and reflective practice are the key to many mission statements and visions for education programs (Davis, 2006; Freese, 2006; Harland & Wondra, 2011; Zeichner & Liston, 1987), little is known about the types of reflections these pre-service teachers engage in (Davis, 2006) or how they analyze their new-found content knowledge. This study explores the reflective practices of pre-service teachers as it relates to their mathematics instruction via personal reflections of their lessons, video clubs, and revised reflections.

Current reform measures are increasingly focusing on pre-service teachers and their teacher education programs. New teachers are being required to reflect on their instruction
during lessons and analyze student thinking. This pedagogical content knowledge and ability to notice and react to instructional issues are not an innate skill, but rather one that needs to be fostered. This study explored the reflective practice of pre-service teachers as they participate in activities that are designed to scaffold their learning and knowledge. The next section will include assumptions of the researcher and the limitations of the study.

Assumptions

The data collected in this study assumes that pre-service teachers are accurately and genuinely thinking about their practice. The assumption is that all participants want to be teachers and want to improve their mathematical instruction. It is assumed that the video will give students the opportunity to step back and reflect on their lessons and become more confident in their practice. Furthermore, the pre-service teachers will want to provide feedback to their peers that will increase their effectiveness in the classroom. The researcher assumes that pre-service teachers can put aside personal feelings and provide insight into peer practice.

Limitations

This qualitative case study contains a limitation based on generalizability because the study only focused on a select group of students in a set time in their teacher education program. Therefore, the results cannot be generalized to a larger population. The participants are generally a homogenous population which also makes generalization an issue. The quality of the videos posed a problem in the pilot study. Since there are many concerns for the privacy of the children in the videos, it can be a challenge to tape the pre-service teacher without getting children in the frame. This often requires teachers to place cameras in places that do not allow for good viewing of the class or lessons. An additional issue is the cohort model these pre-service teachers have
participated in for a year. They have formed bonds and friendships with their peers which may make the ability to give constructive feedback difficult for some participants.

Many school placement sites rely heavily on scripted curriculum. This does not give pre-service teachers the flexibility to teach lessons that exhibit their pedagogical content knowledge. In addition, some mentor teachers and schools focus on reading skills and not as much on mathematics. Student teachers are also in their field placements the entire day on Tuesday and half the day on Thursday. Most teachers teach reading in the morning and math in the afternoon. Therefore, pre-service teachers only observe mathematics one day a week assuming there are no interruptions (e.g., assessments, field trips, assemblies, or other activities) that take away from instruction.

Summary

In this chapter, an overview of the study exploring the reflective practices of pre-service teachers was provided. The importance of pre-service teachers engaging in reflective practice was addressed along with the continued reform measures requiring pre-service teachers to reflect on their instruction in-action. The theoretical framework of Dewey, Schön, Brookfield, and Ward and McCotter guided the research of this study. The research also builds on the work of Van Es and Shein in their use of video clubs to enhance reflection. Finally, a brief overview of the study was discussed, which will be further elaborated on in chapter three as well as the assumptions and limitations.
CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to examine the existing research on the role of reflective practice in pre-service teacher education. Within this literature review, the following topics will be addressed: the theoretical framework for reflection, types of reflection, current issues in teacher education that relate to reflection, reflection and mathematics teacher education, and sources that facilitate reflection. This chapter will frame the current research on reflection and provide insight into additional areas that have not yet been thoroughly explored. The use of data bases such as Eric were used to search for relevant data. The key terms used were “pre-service teacher education”, “mathematics,” and “reflection.”

Theoretical Framework

In order to examine the current literature, one must first review the foundations of reflection, which began with John Dewey’s (1933) book How We Think. According to Dewey (1933), “Thinking enables us to direct our activities with foresight and plan according to ends-in-view, or purposes of which we are aware” (p.17). Since the turn of the century reflection has been defined in several ways. In fact, the lack of a cohesive definition has been a concern for many researchers (Davis, 2006; Dieker & Monda-Amaya, 1995; Hatton & Smith, 1995; Lee, 2005; Rodgers, 2002). They fear that a lack of consensus on the topic projects a vague depiction of what is expected (Rodgers, 2002). Reflection is included in the descriptions of many teacher education programs, but there is no clear way to identify reflection or its effective implementation (Hatton & Smith, 1995). There is little consensus regarding a definition, what reflection looks like, or what must be done to meet these goals (Davis, 2006; Dieker & Monda-Amaya, 1995; Fendler, 2003; Hatton & Smith, 1995; Rodgers, 2002; Stevenson & Cain, 2013).
A consistent definition for reflection may remain elusive; however, there are three commonalities in the variations that are constant according to Mewborn (1999). First, reflection is recognizing that teaching is problematic (Grimmett, 1988). This distinguishes it from recollection and rationalization because there are problems that need to be addressed. Next, reflection cannot take place without action. Reflection without action nor action without reflection does not consist of reflective thinking. Finally, reflection is an individual as well as a shared experience. Reflection needs to be taught, prompted, and probed to be effective (Mewborn, 1999). The following section will provide a theoretical framework for reflection.

**John Dewey**

Dewey (1933) defined reflection as a process that involves “active, persistent, and careful consideration of any belief” (p. 9) or practices as they relate to further actions or events. It is his view that reflection is a holistic practice of dealing with issues and problems that arise in the classroom. He also explains that reflection only begins when a teacher experiences some imbalance in their daily experiences that cannot be quickly resolved. At this point, teachers step back and analyze the situation or experience in order to find the necessary balance to move forward. Dewey approached reflection scientifically, creating five phases of reflective thought: suggestions, intellectualization, guiding idea or hypothesis, reasoning, and testing the hypothesis. While these five phases help to construct reflective thought, Dewey is quick to point out that they do not occur in this fixed order. He argues that each phase has an impact on another and helps clarify previous notions; therefore, they work towards a viable solution in individual ways (Dewey, 1933).

Dewey’s (1933) theories regarding reflection stem from his belief that there are two forms of action, routine action and reflective action. Routine action is what happens within the
classroom or school structure, those daily idiosyncrasies that are not questioned or challenged. He believed that this form of routine action was a given, and barring a disruption, these norms would continue without being challenged. However, reflective action involves emotions and intuition and is described as “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it” (Dewey, 1933, p.9).

Dewey identified three attitudes that are key to reflective action: open-mindedness, responsibility, and whole heartedness (Dewey, 1933). An analysis of Dewey’s work by Rodgers (2002) uncovered what he believes are the criteria of four characteristics of reflection: (a) reflection is a meaning-making process, (b) reflection is a rigorous way of thinking with its roots in scientific inquiry, (c) reflection happens in a community, and (d) reflection requires a set of attitudes that value growth (p. 845). He describes these elements as tools that convert experiences into meaningful interaction which lead to growth (Rodgers, 2002).

**Donald Schön**

Donald Schön added new dimensions to the concept of reflection. Schön (1983, 1987) built on Dewey’s theories of reflective practice by introducing the concept of reflection-in-action, reflection-on-action, and reflection-for-action. Reflection-in-action refers to a teachers’ ability to make decisions while teaching, that allows them to adjust their lessons. Reflection-on-action refers to reflection that occurs after instruction (Bayat, 2010; Schön, 1983, 1987; Zeichner &Liston, 1996). Reflection-for-action refers to reflection that takes place before the lesson is taught. This is used as a guide for planning and teaching (Bayat, 2010; Collier, 1999; Peel & Shortland, 2004). Schön believed that teachers used reflection-in-action intuitively and did not value the importance of theory in good teaching (Fendler, 2003). He argued that applying external research into the classroom is not an effective tool to help practitioners deal with issues
faced in the field (Zeichner & Liston, 1996). Rather, he believed that practitioners had knowledge embedded in their practice that allowed them to make instructional decisions while teaching a lesson.

Schön’s work was also influenced by Michael Polanyi (1967) and his work on tacit knowledge. This is the ability of an individual to know more than they can say. Schön believed that by observing and reflecting on one’s actions allows us to see the things we do not realize we are doing. He describes the need for technical knowledge before tacit knowledge can be accessed, but explains that most of the elements of practice take place in the indeterminate zone of practice (Schön, 1987, p.6). These zones are beyond that of technical rationality and require individuals to use alternative approaches to problem solving. This is where Schön believes artistry becomes evident. When practitioners deal with these unique situations, they are displaying an artistry that is not easily explained or understood by the teacher (Kinsella, 2007; Schön, 1987). He also refers to this as knowing-in-action, which is the skillful implementation of an act that we are unable to describe. Doing and thinking are a continual process in which one does not stop an action in order to reflect, but is thinking and doing simultaneously and only ends when a suitable consequence has been met (Kinsella, 2007; Schön, 1987).

These two influences on reflection share similarities in their views and purposes, but they differ as well. Dewey’s theories are embedded in a scientific approach to reflection while Schön has a more artistic stance. Schön focused on the practitioners’ knowledge as it relates to the reflective process, and rejects any systematic methods to reflective practices in the classroom (Fendler, 2003; Zeichner & Liston, 1996). Kinsella (2007) suggests the idea of an embodied mode of reflection, which integrates the mind and the body. Her analysis of Schön’s work has led her to theorize that the mind (reflecting) and body (doing) are connected and work together,
rather than the current understanding that emphasizes cognitive understanding without action. While these two scholars may differ in the implementation of reflection, they are seen as the two leading figures in the field, and many researchers have used their frameworks and principles to guide their studies.

**Stephen Brookfield**

In addition to Dewey and Schön, Brookfield has added to the literature on reflective practice by introducing the idea of critical reflection (1995). Rodgers (2002) and Zeicher (1994) argue that reflection has become an overused term that is meaningless if used to describe any teaching event (Brookfield, 1995). He identifies two distinctive purposes that make reflection critical. First, is to understand how power impacts the educational process and notice the “oppressive dimensions of practice” that have become norms in the field (Brookfield, 1995, p. 9). Second, to question our practice and what makes teaching easier may be counterproductive to our goals. He suggests that assumptions such as “the perfect ten syndrome” and “meeting everyone’s needs” are ideas that set teachers up for failure. The idea that one teacher can meet all the needs of every student all the time or be perfect all the time creates a “burden of guilt in their ability to live up to impossible tasks” (Brookfield, 1995, p. 21).

In order to become a critically reflective practitioner Brookfield (1995) suggests that we stand outside ourselves and examine what we do through different lenses. He identifies four lenses that will help to view teaching as well as highlight the various elements of practice: (a) our autobiographies as learners and teachers, (b) our students’ views, (c) our colleagues’ experiences, and (d) theoretical literature. Analyzing our own autobiographies as learners allow teachers to explain and understand why they do things a certain way, and become aware of how they work. Brookfield (1995) suggests that we publicly engage in this reflection in order to
question our assumptions and see ourselves clearly. For instance, those facing a variety of challenges join support groups to share their experiences and find solace in the fact that individual crisis are often collective issues. Second, the ability to see ourselves through the eyes of our students allows us to evaluate if students are interpreting our actions in the same ways we intended. This can be difficult to gauge because students are not often honest with their teachers. Brookfield (1995) suggests anonymity is the best way to elicit this kind of critical analysis from students. Next, engaging in critical conversation with colleagues allows us to open up about the events that take place within our classrooms. Teaching can be a very isolated profession and asking for advice and input on instructional practices helps us identify our assumptions and facilitate change, if necessary. Finally, viewing our practice through the use of theoretical literature provides additional perspective to our own practice, demystifies myths, and provides insight into what works in the field of education (Brookfield, 1995).

The theories of Dewey (1933), Schön (1983, 1987), and Brookfield (1995) have provided a framework for the reflective practice that takes place in teacher education programs today. Dewey’s (1933) views of reflection state, that an unusual event is a catalyst for change, in which an alternative outcome must be reached. Schön’s (1983, 1987) research focused on the artistry of reflection as something that happens often times without the individual knowing. He discusses tacit knowledge as what one uses when a new situation occurs and traditional technical knowledge cannot be utilized. Finally, Brookfield address how to critically reflect on teaching. He focuses on facing our assumptions and utilizing a variety of lenses to evaluate our practice. Essentially, triangulating reflection provides a deep understanding of why we do what we do and how to ignite change when necessary. While reflection is often done in solitude, Brookfield
suggest that practitioners use groups, student feedback, colleagues’ opinions, and literature to reflect on their practice.

Teacher Education and Reflective Practice

Teacher educators have spent the past thirty years examining the reflective practices of in-service and pre-service teachers (Zeichner & Liu, 2010). During this time, educational practices have shifted to include standards and high-stakes testing that are outcome oriented (Ward & McCotter, 2004). The National Council for the Accreditation of Teacher Education (NCATE) updated their goals in accordance with these changes. They now include the demonstration of a positive impact on student learning as a standard for pre-service teachers (NCATE, 2008). This shift has raised the question about the types of experiences pre-service teachers need in order to be considered effective, and demonstrate a positive impact on their students. Conney (1994) asks the question, “What does it take to develop teachers who can move the field toward realizing these standards?”

In the text, Preparing Teachers for a Changing World, Bransford and colleagues (2005), discuss the importance of reflection for new teachers. They explain that personal learning experiences are key to unlocking pre-service teacher’s individual views of teaching and learning. Darling-Hammond, Hammerness, Grossman, Rust, and Shulman (2005) examined teacher education programs and identified four key pedagogical practices that support the development of pre-service teachers: (a) clinical experiences, (b) analyses of teaching and learning, (c) the autobiography, and (d) practitioner inquiry. Considering how to present concepts in an effective manner is a challenging process, but they suggest, “Bringing practice in theory and theory in practice” (Darling-Hammond et al., 2005, p.399). When pre-service teachers have the opportunity to reflect on their teaching experiences and make connections to research and
theories discussed in class, they are better equipped to handle issues that arise during teaching as well as consider alternate approaches to solving these dilemmas (Darling-Hammond et al., 2005; Freese, 2006; Laboskey, 1993; Mewborn, 1999).

Reflection is currently embedded in reform measures which means it can no longer be ignored. These policies push teachers to be flexible and make instructional decisions based on student thinking in the moment (NCMT, 2000). Teacher education programs are faced with the challenge of preparing student teachers to successfully meet these new standards. The Florida Educator Accomplished Practices (FEAPs) as well as the Interstate Teacher Assessment and Support Consortium (InTASC) both include the use of reflective practices in their standards. These practices are in place in order to ensure teachers have the skills needed to prepare students in K-12 education for college or the work force (InTASC, 2011). Many teacher education programs advocate for reflective practices in their methods courses. Zeichner & Liston (1996), refer to this focus as the “reflective movement.” This movement involves teachers being active in the curriculum development and reform process, as well as examining their own values and assumptions, while actively creating goals and standards for their students. While these goals are essential to facilitate reflection, teacher educators argue that we cannot expect pre-service teachers to possess the necessary tools to be reflective. McDuffie (2004) studied two pre-service elementary education students ability to reflect-in-action. She divided the reflections into two components, immediate and delayed reflection. She found that pre-service teachers might not have the ability to reflect-in-action, as they are preoccupied with the demands of new teaching experiences. However, she found that they do have the ability to delay reflection. Pre-service teachers have the ability to reflect when given the opportunity and tools. Therefore, we must scaffold their development throughout their course work, and provide a variety of opportunities

Even though there is a significant push for the use of reflective practice in teacher education programs, there is little consensus on what constitutes quality reflection. Simply giving pre-service teachers the opportunity to reflect does not promote productive reflection (Davis, 2006; Hatton & Smith, 1995). Korthagen et al. (2001) explains the importance of understanding the principles of writing a reflection paper in order for pre-service teachers to learn how to monitor their own thinking. Bean and Stevens (2002) used scaffolding to explore the layers of reflective discourse with pre-service teachers. Using a discourse analysis, they found that pre-service teachers discussed given prompts in the specific context of their field placement, but shied away from references to specific events or people, and focused on general statements that reflect “societal discourse about teaching, learning, and thinking” (Bean & Stevens, 2002, p. 215). Ryan (2013) argues that while reflection is touted as a major component of higher-education practices, it needs to be taught in order for students to benefit from these practices.

Several different models illustrate variations of reflective processes in teacher education and higher-education settings. Many of the models advocate for multiple formats of reflection, implying that there is no one size fits all model to promote reflective practice within education programs. Providing a variety of opportunities for pre-service teachers to engage in reflection, such as peer coaching, video reflection, journaling, concept maps, or the use of online tools can help to develop their reflective practices (Bean & Stevens, 2010; Etscheidt, Curran, Sawyer, 2012; Harford & MacRuaire, 2008; Newwell, 1996; Ryan, 2013). Ryan (2013) used the five R’s (reporting, responding, relating, reasoning, and restructuring) adapted from Bain, Ballantine, Mills, & Lester (2002), to create a framework for reflection. He found that prompts supported
students as they moved through the four levels of the reflective scale, which Ryan argues is the only way academics are going to be able to achieve the high level of reflection that they desire from their students. Scaffolded approaches to reflection have proven to be successful in several case studies regarding reading and literacy instruction, secondary education, and teacher education programs (Bean & Stevens, 2002; Colton & Sparks-Langer, 1993; Etscheidt, Curran, Sawyer, 2012; Harford & MacRuairc, 2008,). Building on this scaffolded approach to reflection, Artzt (1999) created a framework that provides a structure for the reflective practices of pre-service teachers during their field placement. She has found that pre-lesson reflections, post-lesson reflections, self-assessment, supervisor feedback, and post-lesson thoughts help to make pre-service teachers aware of the need to monitor student thinking before, during, and after a lesson. There are a variety of ways to engage pre-service teachers in reflection. However, the types of reflection they engage in vary, and will be explored in the next section.

Types of Reflection

Since Dewey first outlined his ideals about reflection, many scholars have refined his work and added new components to reflective practices and types of reflection. Today there are several different models, levels, and phases of reflection and the reflective process. Dewey (1933) discussed a chain of reflection that included ideas that occurred in such a way that they determined the next outcome, while still referring back to the previous event (p.4). These ideas grow out of one another, they do not stand alone, but work to a common end by moving back and forth until a desired outcome is reached. Van Manen (1977) identified three levels of reflection used frequently by teacher educators, including technical, practical, and critical reflection (Bayat, 2010; Davis, 2006; Hatton & Smith, 1995; Targgart, 2005). Technical reflection is defined as meeting the objectives for a lesson, means to an end. The next stage is
practical reflection, which involves the questioning of methods and goals. The last stage is critical reflection, at this stage the larger context is addressed within the context of morals and ethics. This model is generally framed as a hierarchal model of reflection that moves from technical to critical. Schön (1983) broke down reflection into time frames such as reflection-on-action and reflection-in-action.

Davis (2006) focused on productive versus unproductive reflection. Unproductive reflection is defined as descriptive writing not consisting of connections between ideas or evidence supporting thinking, but rather listing ideas without judgment or focus. Productive reflection analyzes one’s teaching through making connections and integrating knowledge and practice. Giovannelli (2003) went one step further when she looked for a link between reflective dispositions and effective teaching. Using six reflective dispositions and five effective teaching components, she could link the two together on three of the effective teaching components: instructional behavior, classroom organizations, and teacher expectations. These levels, time frames, production forms, and reflective dispositions are used in a variety of ways to identify the benefits of reflective practices in pre-service teacher education programs.

**Mathematical Thinking and Reflection**

Ball, Lubienski, and Mewborn (2001), ask an important question, “Why does formal schooling help so many people learn how to read and write but fail to teach them the same proficiencies in mathematics?” (p. 433). They believe it has to do with teachers’ understanding of mathematical content knowledge (MCK). According to the National Center for Education Statistics (1999), elementary school students in the United States are not making acceptable gains in math competency levels. Consequently, the National Research Council (NRC, 2001),
states that teachers lack the mathematical understanding and the beliefs that foster the depth needed to help students become proficient (Philipp, 2008).

Shulman (1986), began the conversation about the importance of content knowledge three decades ago, which he describes as going beyond facts and truly understanding the structures of the subject matter (Schwab, 1978). He did not believe that knowledge should stop at understanding the content being taught, but teachers should be able to go beyond the subject matter and possess the knowledge to teach it. He called this pedagogical content knowledge. This sentiment is echoed by Philipp (2008), as he highlights the four main issues in math teacher education: “It is problematic to teach students to manipulate symbols without having the conceptual understanding of what the symbols mean, learning concepts is more powerful than learning procedures, students’ reasoning is complex and different from that of adults, and elementary mathematics is not elementary” (p. 12). Philipp (2008) uses videos of student learning to inform his pre-service teachers about how children think. These videos provide opportunities for pre-service teachers to analyze student thinking in a safe environment, and discuss their thoughts with their peers (Philipps, Thanheiser, Clement, 2002).

The National Council of Teachers of Mathematics (2000) advocate that mathematics be taught in a way that allows students to develop “mathematical power.” Mathematical power as defined by Dunn (2006) includes the ability to solve problems and an attitude to engage in mathematical problems. This mathematical power extends to a teacher's ability to engage students in the art of problem solving. A teacher’s ability to understand and interpret student thinking is essential to teaching math (Sherin & Han, 2004).

Mewborn (1999) and Stump (2010) both used reflection to help pre-service teachers question children on their mathematical thinking. In both cases, pre-service teachers struggled
with the questioning techniques, and used lower level cognitive skills when working with students. Each of these teacher education programs worked with local schools or tutoring programs to pair pre-service teachers up with students not proficient in mathematics, based on standardized assessments. Stump and Mewborn studied third and fourth-grade students respectively during one-on-one sessions with pre-service teachers. Responses from participants in both studies showed pre-service teachers had trouble probing students about their thinking. These pre-service teachers lacked the Mathematical Content Knowledge (MCK) necessary to question students on how they found the answer. Instead, they were concerned with right or wrong answers.

Brown and Borko (as cited in Conney, 1994, p. 612), completed a literature review on becoming a mathematics teacher. Their research stresses the importance of teacher cognition and reflection. They state that to understand how pre-service teachers learn to teach; we must study how the schema, cognitive skills, decision making, and observable teaching behaviors work together, develop, and change with experiences, as well as identify the catalyst of change in this process (Brown & Borko, 1992). The works of Dewey and Schön provided a framework for these reflective practices.

As NCATE standards have moved toward new assessment requirements for pre-service teachers, the literature surrounding effective ways to assess students in their mathematics methods courses have followed. Programs are using peer assessment and portfolios to assess a pre-service teacher’s ability to reflect on their teaching practices (NCATE, 2008; Chamoso & Caceres, 2009; Sluijsmans, Brand-Gruwel, Van Merrienboer, & Bastiaens, 2002). Chamoso and Caceres (2009) created a rubric to evaluate student reflection. This three-point scale begins with surface level reflections and ends with students being able to make their own contributions to
improve their teaching. The authors believe that if reflection is a vital component of pre-service teacher's mathematics education, then these students need to be afforded the opportunity to analyze their reflections as well as their peers work. The same sentiment was shared by Sluijsmans and colleagues in a study (2002) where participants began learning a criteria for reflections in the first of their three math courses. The literature regarding mathematics and teacher education clearly value reflection, the next section will explore ways to facilitate reflection in these courses.

**Facilitating Reflection**

Dewey (1933), Schön (1983,1986), and Brookfield (1995) discussed the importance of stepping back to see what is actually happening as a means of reflection, and the use of peers to facilitate the ability to reflect on one’s teaching. The section will bring the theories into practice by examining tools that can support reflective practice in pre-service teacher education. The literature surrounding reflection describes a variety of ways in which teacher educators can promote these practices in their classes. The use of journals, video-cases, peer groups, portfolios, microteaching, autobiography, and action research projects are just a few activities that pre-service teachers engage in throughout their teacher preparation program (Darling-Hammond et al., 2005). For the purposes of this study, the literature regarding the use of peer collaboration, video clubs, and written reflections was analyzed in order to gain insight into the effectiveness of these tools to promote reflective practice in pre-service teachers. The use of these techniques are not new to teacher education programs. However, the way they are used vary between programs; therefore, their usefulness and effectiveness vary greatly. The goal of this section is to provide a framework for the use of these tools in conjunction with one another during a mathematics methods course. Researchers have looked to peers and video assessment as powerful tools that
support teachers in the evolution from novice to expert educator (Sluijsmans, Brand-Gruwel, van Merrienboer, & Bastiaens 2002; Sluijsmans & Prins, 2006; and Gwyn-Pacquette, 2001). The following section will review the literature surrounding peer collaboration and video as tools to support reflection in pre-service teachers.

**Peer Collaboration**

There are several ways pre-service teachers can collaborate in order to engage in reflection, such as peer coaching, learning groups, and communities of practice. The research suggests that pre-service teachers benefit from collaboration with peers (Britton & Anderson, 2010; Jenkins, Garn, & Jenkins, 2005; Marble, 2006; Sims & Walsh, 2009). Brookfield (1995) discussed the importance of sharing critical events in one’s practice as a way of coping and understanding that you are not alone in these experiences. These roots for peer coaching were planted in the 1980’s (Joyce & Showers, 1980, Lu, 2010) and since then, there have been several studies that have implemented these practices within their teacher education programs (Gwen-Paquette, 2001; Gwen-Paquette & Touchton, 2002; Newell, 1996; Parks, 2009; Parsons & Stephenson, 2005; Sims, 2006).

Peer collaboration has been defined by Kurtts and Levin (2000) as “a process in which two or more colleagues work together to improve their teaching skills by observing targeted behaviors of their partners in the classroom and providing constructive feedback” (p.298). The use of guided questions and/or feedback forms provide direction for pre-service teachers as they participate in peer coaching. These tools have been effective at eliciting detailed responses about the process, peer observations, and what these participants reflect on during the collaborative sessions (Britton & Anderson, 2010; Jenkins, Garn, & Jenkins, 2005; Kurtts & Levin, 2000; Parsons & Stephenson, 2005).
McAllister and Neubert (1995) found providing a structure for the collaboration process within their teacher education programs supported pre-service teachers as they began their teaching career. The three areas they trained pre-service teachers to focus on were: (a) focus on a specific skill, (b) learn techniques to facilitate the peer discussions, and (c) reflect on the collaborative sessions. They also noted that these practices promoted reflective thinking and reduced some of the negative feelings new teachers may face (Kurtts & Levin, 2000). While there is evidence to suggest collaboration is a positive tool in the reflective development of pre-service teachers (Newell, 1996), some researchers have found that students do not deeply explore issues within the group context. Often, the participants simply agree with one another and do not question assumptions made within the group (Fendler, 2003; Parks, 2009). In order to provoke deeper inquiry, Newell (1996) created conflicts, which lead to “productive learning experiences” (p.576). Other researchers have had students focus on issues they had during a lesson or issues they have seen in the classroom to help pre-service teachers focus on specific areas for improvement (Romano, 2003).

Britton and Anderson (2010) explored peer coaching as an underutilized concept in pre-service teacher education programs. The participants in this study collected data from field placements and were able to make connections with their peers in a non-threatening environment (Parsons & Stephenson, 2005). There is evidence that pre-service teachers could modify their teaching practices based on feedback they received from their peers. They were also able to engage in discussions that moved beyond description, and into pedagogy (Britton & Anderson, 2010; Parsons & Stephenson, 2005). Despite the occasional issue when working with friends and peers, pre-service teachers overwhelmingly enjoyed the process and would participate in peer coaching again (Britton & Anderson, 2010; Jenkins, Garn, & Jenkins, 2005; Kurtts & Levin,
Jenkins, Garn, & Jenkins (2005) found that pre-service teachers learned a lot from the mistakes their peers made, and argue that in-service teachers generally correct themselves before issues arise. Therefore, students do not get the opportunity to see how the situation would have evolved in the classroom.

Lesson study was included in this analysis because it combines peer collaboration and practice, which are two elements that support pre-service teacher learning (Parks, 2009). Lesson study is usually a cyclical process in which teachers plan a lesson, observe a teacher teaching the lesson, reflect, and then revise the lesson (Sims & Walsh, 2009). The key feature of this process is teaching the lesson to a class of students. However, Sims and Walsh (2009) found conducting microteaching activities in the university setting provided adequate training for student teachers, and they reaped the benefits of the cyclical process by getting immediate feedback from peers and university faculty.

While there are benefits to the use of collaboration in pre-service teacher education programs there are also issues that need to be addressed. Several studies found that students often perpetuated problematic thinking, for instance, the analysis of the discourse between pre-service math teachers reinforced assumptions about rule-based mathematics instruction and ability grouping (Parsons & Stephenson, 2005; Parks, 2009). However, Lu (2010) reviewed the literature regarding peer collaboration and found that there are many advantages to the use of these practices, but programs must be cohesive, teacher educators must all buy-in, and training is needed for peer collaboration to be effective. Feedback from peers, mentors, and university supervisors provide pre-service teachers opportunities to see themselves from a different perspective. The next section will explore the literature on the use of video in order to facilitate noticing in ones’ own practice as well as others.
Video-Reflection

The advances in technology are making videoing lessons easier and more accurate (Brophy, 2004; Sherin, 2004) thus they are increasingly being used to facilitate reflection. Video-recordings of lessons have been used to assess teachers, create e-portfolios, identify student engagement, and elicit specific behaviors out of pre-service and in-service teachers (Rich & Hannafin, 2009). While video can be useful to improve teaching, researchers have found that it is most effective when it is embedded within the teacher education curriculum (Brophy, 2004). This analysis of the research will cover the literature surrounding various ways to incorporate video into teacher education programs. The use of peer collaboration and video has proved to help pre-service teachers engage in deeper reflections of their practice (Harford & MacRuaric, 2008; Parsons & Stephnson, 2005; Scott, Kucan, Correnti, & Miller, 2013; Sewall, 2009). A framework for the use of videotaped lessons will be introduced. Then, the literature regarding pre-service teachers learning to notice will be reviewed. Finally, the use of peer collaboration groups and scaffolding reflection through video will be examined.

Video reflection framework. There are several frameworks used throughout the literature regarding ways to effectively use video to facilitate reflection with pre-service and in-service teachers. While each of these frameworks include elements that set them apart from one another, they do have common characteristics. They are usually based on three to four key elements that include identifying clear goals or experiences within a video, promoting reflection using guided questions, making connections between videos and broader themes, and using new knowledge to make changes to instruction (Blomberg, Renkl, Gamoran, Sherin, Borko, & Seidel, 2013; Borko, Jacobs, Seago, & Mangram, 2014; Joseph & Brennan, 2013; Van Es, Tunney, Goldsmith, & Seago, 2014). The following frameworks address the ways that video and
collaboration can be used to promote reflective practice and provide opportunities for pre-service teachers to begin to see the instructional practices being used in their classes.

Blomberg and colleagues (2013) argue that there is little evidence that supports how to effectively use video to support the learning of pre-service teachers. Therefore, they have created five heuristics for using videos in pre-service teacher education programs. They found that identifying learning goals, choosing an instructional approach, choosing video material, addressing limitations, and aligning assessments to instructional goals is a cyclical process. Rich and Hannafin used video annotation tools to provide pre-service teachers with the opportunity to “see what they are doing in the classroom, analyze it, improve upon it, and practice before, during, and after their student teaching experience” (2009, p. 65). Hamre, Downer, Jamil, and Pianta (2012) created an intentional teaching framework very similar to that of Rich and Hannafin (2009). This framework provides four steps that teachers move through in order to reach reflection. The steps are knowing, seeing, doing, reflecting and improving. Pre-service teachers first gain knowledge on instructional practice, and then see what it looks like through videos. Next, they implement the practice, reflect, and improve by making instructional changes (Joseph & Brennan, 2013). The use of this framework facilitated growth in pre-service teacher’s ability to provide peer feedback as well as improve student-teacher interactions (Joseph & Brennan, 2013). The Learning to Notice framework (Van Es & Sherin, 2002) consists of three aspects of noticing what is important about the situation, making connections, and using one’s background knowledge to understand the classroom environment.

Borko, Jacobs, Seago, and Mangram (2014) introduced a framework for planning and facilitating productive video-based discussions. This research focuses on video examples of teaching, not models of exemplary lessons. The goal of these videos were to get teachers talking
about the lessons. In order to encourage productive discussion Borko et al. (2014) broke the process up into planning and facilitating. There are three characteristics of planning: (1) choosing appropriate goals and selecting videos, (2) selecting clips that illustrate the main goals, and (3) creating guided questions that address the goals of the discussion. The second part of their framework is based on eliciting productive discussion from the participants. They identified three elements to assist this discussion: (1) probe the teachers on their thinking about each video clip, (2) prompt teachers to provide evidence for their claims, and (3) guide the teachers to make connections between pedagogy and mathematical ideas.

The final framework analyzed for this research includes the *Facilitation of Teachers’ Analysis of Video* (Van Es, Tunney, Goldsmith, & Seago, 2014). This framework includes four elements that encourage discussion based on videos within a group: (a) orienting the group to the video analysis task, (b) sustaining an inquiry stance, (c) maintaining a focus on the videos and mathematics, and (d) supporting group collaboration. These frameworks provide pre-service teachers with guidelines and tools to help them analyze classroom practice. The next section will discuss how noticing what is happening in the classroom is an important step in the process of reflective practice.

**Learning to notice.** Video is a powerful tool that can be used to identify elements of practice that may otherwise be overlooked or forgotten. However, its use as a tool for reflection can only be effective when pre-service teachers have the ability to notice key elements in practice (Dewey, 1933; Van Es & Sherin, 2002). Dewey (1933) discussed the value of observation as a catalyst for reflection. Much of the current literature focuses on the ability of pre-service teachers to notice key classroom events. Once they are able to notice these events, they can make changes to their instruction, or reflection-in-action (Osmanoglu, Isiksal, Koc,
noticing can then be scaffolded into deeper reflections.

The goals of individual teacher education programs will drive the way video is used (Brophy, 2004). However, the opportunities to learn through noticing can be taught in a variety of ways. When the focus is to notice student thinking, Cognitively Guided Instruction (CGI) is often used (Carpenter et al., 1999). CGI comes with guided videos of students solving math problems. These tools are used to highlight student thinking within university settings (Santagata & Guarino, 2011). Providing pre-service teachers with multiple opportunities to view teaching that illustrates student thinking helps bridge the gap between their teaching and student learning. This is true for videos of in-service teachers as well as videos from student teachers in their field placements (Bayat, 2010; Scott, Kucan, Correnti, & Miller, 2013). Once pre-service teachers have learned to notice key elements within instructional practice then teacher educators can begin to scaffold this skill into deeper reflections.

**Scaffolded learning through video.** It is important to provide a guide for student teachers as they begin to look for elements within a lesson (Danielowich, 2014; Ge & Land, 2004; Santagata & Guarino, 2011; Star & Strickland, 2008). Although the use of video in a variety of forms provides many possibilities for teacher education programs it is cautioned that without proper training prior to implementing this medium, students will not gain insight into the desired element of teaching and/or learning (Lu, 2010; Star & Strickland, 2008). Ge and Land (2004) suggest incorporating prompts into the problem-solving process in order to help pre-service teachers engage in reflection. There are two ways to scaffold instruction according to Saye and Brush (2002), hard and soft scaffolding. Hard scaffolds refer to preplanned questions or prompts that guide pre-service teachers to connect evidence with larger themes, while soft
scaffolds generally take place in the moment and require the educator to make decisions to support understanding based on student responses.

It is very difficult for pre-service teachers to engage in what Schön calls reflection-in-action. New teachers are faced with many challenges as they enter a classroom and they do not have the experience to reflect in the act of teaching (McDuffie, 2004). Often videos are used to show pre-service teachers what and how expert teachers operate on their tacit knowledge that cannot be transmitted. Ethell and McMeniman (2000) found that while pre-service teachers get the opportunity to observe many expert teachers in their programs, they do not understand the connection between theory and practice. Providing opportunities for expert teachers to model lessons, along with verbalizing their reflective practice, allows pre-service teachers insight into their thinking. This is an additional way to scaffold the reflective process.

**Video club.** The use of a video club is one way researchers have found to teach pre-service teachers to notice important interactions in the classroom (Frederiksen, Sipusic, Sherin, Wolf; 1998; Sherin & van Es, 2005; Star & Strickland, 2008; Tochon, 2007; Van Es & Sherin, 2002). A video club is a group of teachers who meet to discuss videotapes of lessons in order to improve their instruction (Frederiksen, Sipusic, Sherin, Wolf; 1998; Tochon, 1999; Van Es & Sherin, 2008). While video clubs are used as a form of professional development, there is also evidence to suggest pre-service teachers benefit from these peer groups (Danielowich, 2014; Harford & MacRuaric, 2008; Van Es & Sherin, 2002, 2004).

The use of video clubs provide the opportunity for honing the skill of noticing proposed by Van Es and Sherin (2008). First, identifying what is important in the particular situation. This is also referred to as a call-out (Van Es & Sherin, 2002). Next, the ability to use background knowledge about the setting in order to analyze the event. Finally, noticing requires making a
connection between the event and the bigger picture (Van Es & Sherin, 2008). This is where pre-service teachers begin to make the connections between theory to pedagogy. Scott, Kucan, Correnti, & Miller (2013) found that there are benefits for student teachers who are working in grade level specific groups. The learning becomes more authentic when all the lessons viewed are from the same grade level and there is a variety of voice, as all the teachers are teaching the lessons in their respective classes (Danielowich, 2014).

The use of videos from expert teachers can also be used to train teachers to notice specific events in a classroom. Star and Strickland (2008) identified classroom environment, classroom management, tasks, mathematical content, and communication as elements that pre-service teachers should be aware of while watching videos of teachers. Using a pre and post-test, they found that teachers could identify classroom events much better after taking the math methods course and getting adequate training on noticing the key elements in videos. Lin (2005) found that video-cases helped pre-service teachers think about student learning, as well as ways to engage in stimulating mathematical practices in the classroom. The combination of collaboration and video technology provided all members of the video clubs an opportunity to learn from each other and reflect on their own practice, which will improve future instruction (Frederiksen, Sipusic, Sherin, Wolf; 1998; Tochon, 1999; Van Es & Sherin, 2008).

Video is a useful tool for both pre-service and in-service teachers to step back and notice what happened in the classroom. Peer, mentor, and supervisor feedback are also important factors in gaining in-sight into one’s teaching. Therefore, researchers have begun to analyze the interactions of these collaborative groups (Gwen-Paquette, 2001; Sherin & Han, 2004; Van Es & Sherin, 2005, 2008, 2012; Van Es, Tunney, Goldsmith, & Seago, 2014). Gwen-Paquette (2001) found that pre-service teachers collaborated on multiple levels during their video study groups.
First, they all engaged in conversation and took turns talking while providing examples of their personal experience, whether good or bad. Next, they shared their experiences with each other. They explained what they did in each lesson as well as the knowledge they acquired when teaching particular skills. Finally, pre-service teachers brainstormed, problem solved, and questioned solutions.

The use of case studies and portfolios has also emerged from the literature, as tools to facilitate reflection in pre-service teachers. Llinares and Valls (2009) used video-clips of math lessons and student online discussion tools to build knowledge that is generally learned from practice. The results indicate the combination of video-clips and discussions supported investigation into meaningful topics. The use of case studies, personal video reflection, and self-selected videos by pre-service teachers has a positive impact on the lesson analysis skills of pre-service teachers in a mathematics teaching course (Hewitt, Pedretti, Bencze, & Vaillancourt 2003; Santagata & Guarino, 2011). Lin (2005) found similar results in pre-service teachers’ response to a case study analysis of teachers. Pre-service teachers used journals, lesson plans, and microteaching observations to record their thinking and reflections. These cases helped pre-service teachers improve their ability to identify issues with student cognition of mathematical concepts, and translate theory into practice.

**Written reflections.** The use of written reflections are a common tool in education programs (Bain, Ballantyne, Packer, Mills, 1999). Identifying the levels of reflection used in documents has been done in various ways, but consistently includes at least three levels of reflection: descriptive, illustrative, and reflective (Lin, 2005). Dieker and Monda-Amaya (1995) analyzed pre-service teacher journals and came up with observable and measureable definitions in order to examine the reflections differently. They analyzed journals by problems and
successes, teaching categories, levels of problem solving, and components of success. They found their results to be consistent with the literature, in that instructional problems were identified and then justified. External issues were addressed, but little discussion beyond that was found. Pre-service teachers who utilized journals as a means of reflective practice within teacher education programs could engage in deeper levels of reflection (Lee, 2005; Schweiker-Marra, Wilson, & Pula, 2003; Spalding, Wilson, & Mewborn, 2002).

Amobi (2006) describes four ways to increase pre-service teacher’s ability to reflect using written assignments such as journaling. First, bridging the gap between theory and practice using guided questions to prompt students to think about specific issues of “content or context,” providing the opportunity for pre-service teachers to engage in reflective educational writing using appropriate teaching strategies, allowing students time to share and illustrate their experiences, and prompting students to think deeper about their actions as teachers. Journals and narratives provided teacher educators and researchers a detailed look into the thoughts of pre-service teachers as they begin to make sense of knowledge they have gained in their preparation programs, as well as how to incorporate it into practice (Bain, Ballantyne, Mills, Packer, 2002; Collier, 1999; Moon, 2006; Peel & Shorthand, 2004).

The use of written reflection is popular in teacher education, but researchers caution that just because journals are used does not mean that they will automatically improve the reflective practice of pre-service teachers (Davis, 2006; Hatton & Smith, 1995). Davis (2006) outlines recommendations that may facilitate reflection such as moving beyond descriptive reflections, helping pre-service teachers attend to the learners not just themselves, and encourage integrating knowledge into practice. She found that written reflections help pre-service teachers see what
matters, but in order for them to be effective, teacher educators must also see what matters within these reflections to help integrate learning.

**Summary**

The literature reviewed for this paper includes seminal work in the field of reflection, definitions and background on reflection and reflective practices, reflections and how it pertains to teacher education programs, the importance of mathematical knowledge, and the variety of ways to incorporate reflective practices into teacher education programs. While reflection has been a staple of teacher education programs for nearly thirty years, there is still a lot of work to be done on how we can effectively use technology (i.e., video-taping) and teaching practices to promote reflection in pre-service teachers.
CHAPTER 3

METHODS

This chapter will discuss the methodology used within this study. In order to investigate the reflective practices of pre-service teachers, the researcher solicited participants from an early-childhood mathematics methods course. The use of qualitative research techniques were employed due to the exploratory nature of the study. First, the research design and approach for the study will be introduced. Next, the setting and participants will be explained and finally, information about the procedures and data collection methods used to conduct this research on the reflective practice of pre-service teachers will be provided. As noted earlier, the following research questions were developed to explore the practices of pre-service teachers:

1) What aspects of teaching do pre-service teachers reflect on through the use of video clubs?

2) What is the quality of pre-service teacher written and oral reflections?

3) How do the use of video clubs support the reflective practice of pre-service teachers?

Methodology

The purpose of this study is to explore what pre-service teachers reflect on and how video clubs support their reflective practice. In order to get an in-depth understanding of this phenomena, qualitative research methods were chosen as the most appropriate methodology. Qualitative research aims to explore and understand how people construct meaning of their experiences or world, not to determine a cause and effect relationship between groups or populations (Merriam, 2009). According to Creswell (2012) qualitative research methods are best suited for “exploring a problem and developing a detailed understanding of a central phenomenon” (p.16). The phenomenon in this study is reflection.
Qualitative research is an umbrella term according to Merriam (2009) and many researchers have arranged the various forms of qualitative research in a number of ways. According to Patten (2002) there are sixteen “theoretical traditions” while Creswell (2012) and Johnson and Christensen (2008) both identify five approaches to qualitative research. Merriam (2009) identified six common approaches in qualitative research. There are several different types of qualitative research and a variety of ways to classify these approaches. The most common qualitative research methods are phenomenology, ethnography, case study, grounded theory, and narrative or historical research (Creswell, 2012; Johnson & Christensen, 2008).

Merriam (2009) outlines four key characteristics of qualitative research: focus in meaning and understanding, researcher as primary instrument for data collection, a deductive process (researchers build theories from the current literature), and rich descriptions. This study is aligned with these elements of qualitative research. First, the focus of the study was to explore and understand what pre-service teachers focused on during their reflections. Next, the researcher collected and analyzed the data which allowed her to react and adjust to issues, questions, or situations that may arise during the course of study. Then, the deductive process was used in order to build themes from the current literature on reflection. Finally, a rich description of words was used to explain what the researcher learned from the data.

This study employs a case study methodology. Case studies are defined by Creswell (2007), as an “approach in which the investigator explores a bounded system or multiple bounded systems over time, through detailed, in-depth data collection involving multiple sources of information and reports a case description and case-based themes.” Cases are further distinguished by size, intent, and/or function. Stake (1995) divides intent into three categories: instrumental case study, the collective or multiple case studies, and the intrinsic case study. The
use of an instrumental case study fits the purpose of this study best because the researcher focused on a phenomenon, and then select the case that illustrates this issue (Creswell, 2007; Merriam, 2009; Stake, 1995, 2005).

Using this research design allows the researcher to study a group of people at a specific time in their lives, noting elements of how they think, talk, and develop over a single semester. Stake (1995) explains that case studies are a way for researchers to get information on “how the people being studied see things” (p.12). He also suggests that case studies catch the complexity of a single situation and we can see the complex interactions between or within contexts. This study aims to investigate the reflective practice of a group of pre-service teachers as they reflect on their math teaching. The participants are the cases that provided insight into reflection as it relates to mathematics instruction. This bounded system lends itself to a qualitative case study that allowed the researcher to gain insight into how these pre-service teachers engage in reflections.

Data collection in qualitative research differs from some of the traditional methods of surveys and statistical analysis. According to Merriam (2009) observations are a common tool used to gather data. In addition to this strategy, document analysis was used to gain insight into this phenomena. This study utilized one videotaped micro-teaching lesson and reflection, two videotaped lessons from pre-service teachers, two personal reflections of the videotaped lessons, two transcribed video club sessions, and two revised reflections after each video club session. These data sources provided the researcher with the opportunity to understand how student teachers reflect on their own instruction, as well as analyze peer lessons.

Sampling techniques also greatly differ from qualitative to quantitative research. In quantitative research, there is a concern for generalizability. In order to account for this concern
researchers rely on randomizing groups to ensure a variety of the intended population has been addressed (Merriam, 2009). Qualitative research is concerned with an in-depth analysis of a single person or group, not generalizability. It is used to gain insight into a specific phenomenon, thus, purposeful sampling should be used (Merriam, 2009; Patton, 2002; Stake, 1995). Purposeful sampling consists of choosing samples for a case study by looking at your purpose for the study (Patton, 2002). There are several strategies for selecting particular samples, but this study employed the use of a typical case sample. Patton (2002) and Merriam (2009) refer to a typical case sample as a sample that does not have extremes, and reflects the average person in the setting.

Participants

The participants in this case study consisted of 25 pre-service teachers in a mathematics methods course at a southeastern university. The course, *Teaching Mathematics in the Primary Grades*, was taught by the researcher. This course consisted of 16 weeks of math methods as well as content knowledge. Reflection was integrated into the course curriculum through additional activities, research articles, and in-class discussions. The additional activities included videos of in-service teachers teaching math lessons and articles that focused on peer collaboration and student engagement. A portion of each class session was reserved for pre-service teachers to orally reflect on each week of their practicum experience. During these sessions, pre-service teachers provided anecdotes from their field placements, made connections to lessons, and provided feedback from their personal experience.

In addition to discussions, participants observed videos of in-service teachers, teaching math lessons and provided feedback on each lesson. An attempt was made to live stream a mathematics lesson from a local elementary school. Pre-service teachers watched the lesson in
real time with the instructor/researcher and took notes on key elements of the lesson. However, the lesson was a review for a test and did not provide pre-service teachers the opportunity to observe whole group or audible small-group instruction. Unfortunately, the data collected from extended activities did not prove useful and was not included in this analysis.

The sampling techniques used for this study were typical, purposeful sampling. The aim of this study is to gain insight into what pre-service teachers reflect on during their math instruction. Therefore, participants were selected from a math methods course. This is the only math course these pre-service teachers participate in throughout this early-childhood program. During the fall semester, pre-service teachers participated in a two-week full time teach. They spent two-weeks towards the end of the semester (mid-November) in their field placement teaching lessons they have prepared throughout the semester. This early childhood program uses a cohort model in which students are enrolled in the same classes as they progress through the program, as a result, these students all know each other and have spent two semesters in all the same courses. This is a required course and it is taken during the fall of their senior year. The participants were all in their third semester of a four semester program. These students are usually traditional students, attending college as soon as they graduate high school. Consequently, the average age range of these participants was 19-23 years old, and female.

Patten (2002) discusses the difference between the depth and breadth of qualitative and quantitative research. He explains that qualitative studies provide rich, detailed data from a smaller group of participants. This study calls for six participants enrolled in an early-childhood mathematics methods course. The case being studied is 25 pre-service teachers participating in the mathematics methods course, the researcher collected data on all pre-service teachers. These participants were grouped by the same grade level they were placed in for their field placement
and were partnered together for their micro-teaching lesson. This allowed the researcher to explore the reflections of each group of pre-service teachers as they engaged in similar lessons and mathematical content over the course of one semester.

As in most qualitative research, the researcher is the instrument for data collection. The primary researcher is also the instructor of the course which allowed for flexibility in grouping and ready responsiveness to issues that may arise during the study (Merriam, 2009). Due to the dual roles of the researcher she is included as an additional participant in this study. The assignments required for the course were aimed to facilitate reflection. Weekly journal assignments included activities where pre-service teachers watched videos of in-service teachers and wrote reflections on the lessons. In addition, pre-service teachers observed their mentor teacher and reflected on the lessons. The course syllabus can be found in Appendix E.

The instructor discussed the study with all of the potential participants during the third week of classes, in order to provide students ample time to get acclimated to the semester as well as the assignments they will be required to complete for the course. The study took place over the remaining thirteen weeks during the fall semester.

Participants were selected using purposeful sampling techniques. In order to get the richest data from participants, purposefully selecting students who want to participate and will commit to the study is essential. The researcher was interested in studying how one group of students reflect, work together, and collaborate over the semester. All 25 pre-service teachers in the mathematics course were placed in video club groups by the second week of class. These video club groups were created based upon the grade level they are assigned to for their field placement. Meaning that students were grouped with their peers from the same grade level and schools. This is an important aspect of the study because the researcher is interested in exploring
how these teachers work together and learn from each other. Since the entire county utilizes the same curriculum, all the pre-service teachers placed in a particular grade level will have seen or taught the same lessons. This will allow them to discuss what worked and what did not during similar lessons.

For the purpose of this study, only one of the five video club groups was studied. This group consisted of six participants who were all seniors in an early childhood program. During the fall of 2015, they began their practicum teaching experience, which is followed by a full-time internship in the spring. These pre-service teachers are part of a cohort and have taken classes together for one year. The participants were placed at four local schools by the program coordinator at the beginning of the fall semester. Pre-service teachers were placed in groups based on the school and grade level in which they were assigned for their practicum experience. All five video club groups participated in the written and oral reflections for this course. However, after viewing the video club sessions one group was chosen to analyze for this study. This group was chosen due to the richness of their conversations and eagerness to reflect on their instruction. The following section will provide information regarding the six participants.

**Lesley.** Lesley is one of the youngest pre-service teachers in this cohort. She is a 19-year-old, white female. Lesley was placed at Rutledge Elementary school. Her mentor teacher has worked with this early childhood program for many of the 30 years she has been teaching, and she will be retiring this year. Lesley is well respected by her classmates as well as her mentor teacher.

**Anna.** Anna is a 22-year-old white, female. She was placed at Rutledge Elementary. Her mentor teacher has been teaching for 13 years and has had several interns over the years. There
were some communication issues between this mentor and pre-service teacher, which led to minor conflicts in the classroom.

Ashley. Ashley is a 23-year-old white, female. She was placed at Watson Elementary School. Her mentor teacher has worked with the early childhood program for many of the 30 years she has been teaching and she will be retiring at the end of this year.

Emily. Emily is a 22-year-old Hispanic-American, female. She was placed at Watson Elementary. Her mother is also an elementary school teacher. This is the first year her mentor teacher worked with this education program. Emily has great classroom management strategies and the ability to think on her feet. She often made changes to lessons during instruction.

Hannah. Hannah is a 21-year-old white, female. She was placed at S. Washington Elementary. Her mentor teacher has worked with this early childhood education program for many of the 20 years she has been teaching. This classroom does not have any technology and very few manipulatives, which has been an issue for Hannah throughout the semester.

Leah. Leah is a 22-year-old white, female. She was placed at Cypress Trail Elementary. This is Leah’s second year with her mentor teacher who has been teaching for eight years. This is also the first year her mentor has worked with this early childhood education program. They have a good, positive relationship.

Schools

The six participants were placed at four different schools. This early childhood program has worked with each of these schools in the past and built strong working relationships with each of them. The following section will include a brief description of the demographic information for each school.
**Rutledge.** Lesley and Anna were placed at Rutledge Elementary school. This school is classified as Title 1. Title 1, indicates a school that has a high number of children from low-income families, and receives additional federal funding in order to help students meet current academic standards. Rutledge Elementary currently has a school grade of a “C”, which indicates that it has not met the current reading and mathematics proficiency standards set by the state (USA School Info, 2016). Seventy-three percent of students at this school are on free or reduced lunch. The student population consists of 55% African American and 32% Caucasian (USA School Info, 2016).

**Watson Elementary.** Emily and Ashley were placed at Sable Palm Elementary. This school is an “A” school, meaning it meets the reading and mathematics proficiency standards set by the state. Fourteen percent of the students at Sable Palm are on free or reduced lunch. This school is located in an affluent neighborhood. The student population consists of 71% Caucasian and 10% African American (USA School Info, 2016).

**S. Washington Elementary.** Hannah was placed at S. Washington Elementary School. This school is considered an inner city school because of its proximity to a downtown area. S. Washington Elementary has earned a school grade of “B” by meeting many of the requirements of student reading and mathematics proficiency set forth by the state. Forty-five percent of the students here are eligible for free or reduced lunch. The demographics are equally distributed as 45% African American and 43% Caucasian. This school is located near a homeless shelter which contributes to high attrition rates among some students (USA School Info, 2016).

**Cypress Trail Elementary.** Leah was placed at Cypress Trail Elementary school. This school has earned a school grade of an “A”. Cypress Trail consistently meets the state requirements for reading and mathematics proficiency. Fifteen percent of students at this school
are eligible for free or reduced lunch. This school is located in an affluent neighborhood. The student population is comprised of 75% Caucasian and 13% African American (USA School Info, 2016).

**Consent Process**

All research using human subjects conducted at this university requires informed consent and approval from the Institutional Review Board (IRB) or Human Subject Committee (HSC) at the university. Before any data was collected or participants selected, the researcher submitted a Human Subjects Application for IRB approval. This approval was obtained and is attached in Appendix C.

After IRB approval was obtained, consent forms were then passed out to the target population. The instructor explained the parameters of the study during the third week of classes. She explained to the pre-service teachers that she will be conducting a study on the reflective practice of pre-service teachers and wants to use the assignments they are required to complete as data for the study. She also explained that participating or not participating in the study would not impact their grade and if they choose to participate in the study, their identity will remain confidential, and they can withdraw from the study at any point if they so desire. At the end of this class, a third party passed out consent forms for all students to complete. The consent forms were signed by all students even those that choose not to participate. These students completed the consent form and checked the appropriate box that declines participation. This way, the researcher has signed documentation from all pre-service teachers indicating they understand data will be collected throughout the semester. The researcher then evaluated which students chose to participate in order to begin gathering the appropriate data.
Procedures

This study was conducted at a four-year university in the southeastern United States. All the data was collected from pre-service teachers in their third semester of an early-childhood education program. The participants were in their last year of college. They had spent two semesters completing practicum hours in the field. During this semester, students were placed in kindergarten through second grade classes at local public schools. This research was conducted in accordance with a mathematics methods course and all the data collected for the study, was required class assignments. The participants were recruited at the beginning of the semester in order to begin data collection as soon as possible. A procedural time line and course outline can be found in Appendix D and E respectively.

Pre-service teachers began completing reflective assignments by the fourth week of class. These assignments included reflections from their field placement, connections to the course work and/or readings, observations of their mentor teachers, and reflections on observed lessons. Table 3 (see Appendix D) illustrates the data collection process throughout the semester.

All the data was uploaded to a secure Blackboard site and no hand-written copies of any documents were kept. The documents will be stored on the Blackboard site for five years or until the site expires and the data is permanently deleted. The data was collected for all participants, but the researcher only analyzed the data from six participants.

Research Design and Approach

Reflection has been studied in a variety of ways over the last three decades. The goal of this research isn’t to prove reflection is a powerful tool for new teachers entering the classroom, but to identify what pre-service teachers reflect on, and how video technology facilitates the reflective process. Van Es and Sherin (2002, 2006,) have studied the use of video clubs for both
pre-service and in-service teachers (Van Es, 2012). This study aims to continue to explore video clubs in the context of pre-service teacher education programs, and extend this research to identify what concerns pre-service teachers as they begin teaching math lessons.

This study used a qualitative case study design. This approach allowed the researcher to explore the reflective practice of pre-service teachers as they participate in a mathematics methods course. The phenomenon being investigated is reflective practice and the case study consists of students in an early-childhood mathematics methods course. The researcher was also the instructor for the course.

The study was conducted over 16 weeks during the fall of 2015. This mathematics methods course met once a week for two hours and 45 minutes over a 16-week semester. The following data was collected throughout the semester: one micro-teaching reflection, two videotaped math lessons, two video club sessions, two reflections on videotaped math lessons, and two revised reflections after the video club sessions. Each of these data sources will be discussed in the subsequent sections and Table 2 in Appendix B contains a visual representation of the research questions and accompanying data sources.

Pre-Service Teacher Groups and Micro-Teaching Lessons

All pre-service teachers in the mathematics methods course were placed in groups for the entire semester. Groups were assigned during the third week of class, as soon as they had been placed and cleared for their practicum experience. All pre-service teachers were placed in kindergarten, first, and second grade classrooms. There were 25 students enrolled in the math methods course. Students were divided up by the grade level they were placed for their practicum experience, and five groups were created within the class. Therefore, some groups consisted of four participants while others had six. The goal was to have at least 4 pre-service
teachers in each group. After the third week of classes pre-service teachers worked with their assigned group members and on in-class activities together.

One of the assignments pre-service teachers completed in these groups was loosely based on the lesson study design, and called a micro-teaching lesson. Within each grade level specific group, pre-service teachers partnered with another pre-service teacher that was placed at their same school. These partner groups used county curriculum and mentor teacher advice to choose a topic they would teach in their field placement. As a pair, they created a lesson plan for this topic. Each pair then taught one of their lessons to their peers in the university setting (see Appendix F). Pre-service teachers then debriefed and reflected on the lesson. The lessons were then revised and taught in their field placement, videotaped, and submitted to Blackboard.

**Videotaped Lessons**

Borko and colleagues (2008) suggest that bringing artifacts from the classroom into a professional development setting can be a catalyst to situated learning, by using the classroom as a tool for creating knowledge (Putman & Borko, 2000). Artifacts such as videos of lessons and student work were used in this study to initiate pre-service teacher conversations about mathematics and pedagogy. The use of video can facilitate collaborative learning when there is a focus on reflection, analysis, as well as an emphasis on improving instructional practice by discussing pedagogical strategies (Brophy, 2004). Pre-service teachers videotaped two math lessons taught in their field placements. These reflections were structured (see Appendix G). This study is concerned with what pre-service teacher focus on when reflecting on their lessons. The videotaped lessons are not the data source in itself, but were used to cross reference pre-service teacher reflections. In addition, these videos were played during video club sessions in
order for participants to give and receive feedback on similar lessons within their kindergarten classes.

In order to gain insight into what pre-service teachers reflect on, and to identify the quality of those reflections the participants were asked to videotape lessons they taught in their field placement. The first math lesson was taught in late October and the second lesson was taught during the two-week full time teach week in November. The objective of these lessons was to provide student teachers the opportunity to slow down their thinking and really “see” what is happening during their instruction. Danielowich (2014) found that pre-service teachers had more productive and lasting changes in their thinking when they watched their video as well as peer videos, before supervisor feedback. Students taped their lesson and completed a reflection allowing them to step back and reflect-on-action. Then they watched the videos with their peers to get additional feedback. This allowed them to compare themselves with equivalent counterparts in the same stage of development as well as learn from their peers. Prior to class, students watched their videos, wrote a two-page reflection on the video, and uploaded their video to Kaltura, which is a video-based component of the Blackboard site. The videos remained hidden until the researcher made them public, and then only students with access to the site could view the videos. Since the videos are sensitive material, they were made public 30 minutes prior to class, and then taken down 30 minutes after class. This allowed for students to view only their videos and those of their assigned peer groups. Students were also required to come to class with a copy of the lesson plan for the video-taped lesson.

**Written Reflections**

Journals are commonly used in research on reflective practice in teacher education (Artzt, 1999; Bayat, 2010; Collier, 1999; Davis, 2006; Dieker & Monda-Amaya, 1995; Etscheidt,
Curran & Sawyer, 2012; Freese, 2006; Samaras & Gismondi, 1998). There are varying opinions on providing structure for the journals entries. In this study, pre-service teachers were given guided questions. Davis (2006) suggests that guided prompts may be used to promote more productive journaling and provide a window into the minds of pre-service teachers. Students were asked to watch their videos and first describe the lesson, and then answer guided questions. In addition, pre-service teachers completed assignments that asked them to reflect on their field experiences as well as the course readings and assignments. Pre-service teachers watched TeacherTube videos of kindergarten math lessons, live feed observation of a teacher from a local school teaching a math lesson, and their mentor teacher teaching a math lesson. Students also read chapters from their mathematics text book, Elementary and Middle School Mathematics by Van De Walle, Karp, and Bay-Williams (2012), in order to reflect and make connections between the content and practice they were seeing in their respective field placements.

Pre-service teachers also completed four semi-structured reflections on their videotaped lessons. First, they completed a two-page reflection after watching each of their lessons on their own. This reflection was submitted to Blackboard prior to the video club sessions. Pre-service teachers then completed a revised reflection after they met with their video club groups to see what they learned about their teaching as it related to their peers. This reflection was due following the video club session.

**Video Club**

The final phase of the peer collaborative process was the video club session. Video clubs are a group of pre-service teachers who meet to watch videos of one another’s lessons and discuss various aspects of the lesson and/or instruction (Sherin, 2000; Tochon, 1999). Each group of pre-service teachers met in reserved rooms twice during the semester to review their
video-taped lessons. During these designated days, pre-service teachers first met in the regularly assigned classroom. After a brief introduction and explicit directions for the assignment, pre-service teachers were sent to designated locations to view their lessons. Five conference rooms were reserved for each group to meet for the peer review process. The sizes of the rooms varied from an entire classroom to small meeting rooms. Each participant had an assigned job during the video club. One student was asked to videotape the session using a video camera, tablet, or laptop. Other responsibilities included prompting the group after the video was played, keeping time, and playing each group member’s video for the group to watch. Appendix H contains the video club protocol. Pre-service teachers had one hour to meet and discuss each other’s videos (i.e., six videos total). They were given guided questions and time constraints in which to watch and reflect on each video. Upon completion of the peer collaboration session, students returned to the main classroom for a whole group debriefing session. The video-taped peer collaboration sessions were transcribed and then analyzed using NVivo software.

A pilot study was conducted in the fall of 2014 in order to gain insight into the research process. During the pilot study, the researcher learned many students were not able to video their first math lesson until late in the semester due to various time constraints and the limited amount of time students spent in their field placements. The second video-taped math lesson was not an issue because it was taught during the pre-service teacher’s full-time teaching later in the semester. The video club groups also posed a problem because all the students were in one classroom, which led to issues regarding volume and actually hearing the entire video. In order to negate that issue pre-service teachers were placed in separate reserved conference rooms to ensure they were able to watch and listen to peer videos.
Data Analysis

The data were first analyzed and coded by the researcher. The video club recordings were transcribed and then coded, but written reflections, and revised reflections were collected in an electronic format; therefore, transcription was not necessary. Identifying themes in student responses allowed the researcher to create categories and then themes from the data. The data were then entered into the qualitative data analysis tool, NVivo.

The video club sessions were transcribed and coded. Coding the data was an iterative process based on the literature and emergent codes. The researcher used coding schemes from several pieces of literature. Sherin and Han (2004) identified 5 main topics that emerged in their research on video club meetings as follows: pedagogy, student conceptions, classroom discourse, mathematics, and other. Van Es and Sherin (2006) analyzed teacher video segments by focusing on “what the teachers choose to attend to in the video and how they reasoned about those events” (p.127). The what that teachers attended to in the study was broken down into whom they noticed in the video (e.g., the teacher, the students, or other elements) and the topic they noticed. The topic was further broken down into mathematical thinking, pedagogy, climate, and management. Additionally, they examined the how by identifying the stance and focus the teachers took as they discussed the videos. The stance referred to the position the teacher took such as describing, interpreting, or evaluating the video. Borko et al. (2008) used the literature to develop their coding schemes as well as the evaluation of their data, and came up with four main categories, when, who, what, and content. This enabled researchers to identify when the discussion took place (i.e., before, during or after the video), who participated in the conversation (i.e., teacher who was videoed taped, other teachers), the topic of conversation, as well as the content (i.e., teacher’s thinking, pedagogy, student thinking, mathematics). Mewborn
(1999) modified the work of Fuller and Brown (1975) and Schwab (1973) to identify four stages pre-service teachers progress through as they become versed in the classroom. Mewborn (1999) grouped these concerns to fit mathematics instruction and they consist of the following: (a) classroom context and management (apart from math), (b) pedagogy of math teaching, (c) children’s mathematical thinking, and (d) mathematics content and curriculum. This literature will guide the coding scheme for the study.

Deductive analysis includes coding data using an existing framework (Patton, 2002). Davis (2006) and Van Es and Sherin (2006) were used to establish a coding structure. After all the data was coded using the aforementioned structure, the researcher began to look closer at the codes, and develop several subcategories. These categories helped identify more precise areas pre-service teachers focused on during their reflections. After all of the data was coded, the researcher used NVivo10 to analyze the number of sources and references coded for each theme. The summary of the nodes or themes found in the data illustrated there were 42 codes (see Appendix I, J, K, and L). Out of the total number of codes, four main themes emerged based on their frequency in all of the data sources, they are presented in the following sections.

Reliability

Trustworthiness is defined by Lincoln and Guba (1985) as the quality of the research that makes it notable to readers. They developed four criteria to judge trustworthiness including credibility, transferability, dependability, and confirmability. Credibility refers to the whether the respondents views and the inquirer’s reconstruction of those views match (Lincoln & Guba, 1985). Triangulation is one strategy used to increase the internal validity of the study (Merriam, 2009). This study employed written reflections, revised reflections, and transcripts from video club meetings in an effort to ensure the data from each source corresponds with one another. In
addition, member checking was used to solicit feedback from participants on their response (Merriam, 2009).

Transferability addresses the issue of generalizability. Although the data is not meant to be generalized over larger populations or other groups, it is important that there is enough information on each case to identify the similarities between cases and cases in which findings could be transferred (Lincoln & Guba, 1985). This research provides detailed information about the cases as well as the settings in order to give readers clear pictures and information on which to base transferability to other cases.

Dependability refers to the process of integrity (Lincoln & Guba, 1985). This can be obtained by providing documentation of the research in memos and field notes. These are forms of an audit trail that ensure traceability of findings. Finally, conformability is the proof that the results are facts and not simply stories made up by the researcher. An audit trail was also used to meet the criteria of conformability by providing detailed notes and quotes from the data sources.

The construct in this study is the reflective practices of pre-service teachers. The measures employed were written reflections and video club transcripts. Triangulating these measures allowed the researcher to explore the reflective practices of pre-service teachers in a mathematics method's course. Written reflections or “learning journals” as referred to by Moon (2006), are a “vehicle for reflection.” They give a sense of the writer’s reflective process, and can document growth. While journals are often used with in-service professional development programs they are frequently used in research studies taking place in university settings with a focus on the reflective practices of pre-service teachers (Bayat, 2010; Bean & Stevens, 2002; Davis, 2006; Freese, 2006; Newell, 1996; Samaras & Gismondi, 1998).
Summary

There is a plethora of literature regarding reflection, the use of video to reflect on instruction, video clubs, and mathematics but there is little research implementing all of these elements into a qualitative case study in order to explore how pre-service teachers reflect on their instructional practices as well as the perceived impact video clubs have on reflective practice. The purpose of this study is to extend the current literature on reflection and add elements to this body of work that may help provide a window into the reflective process of pre-service teachers (Davis, 2006). Current reform measures focus on the flexibility of teachers to reflect-on-action and make instructional decisions in the moment. This aim of this study was to explore additional strategies to facilitate the reflect process of a group of pre-service teachers within an early-childhood teacher education program.
CHAPTER 4

THE FINDINGS

This chapter chronicles the experience of six pre-service teachers as they began teaching lessons in their field placements, and then reflecting on those experiences. The data for this study was collected and analyzed over a sixteen-week period during the fall of 2015. This chapter begins with an overview of the data collected. Then, I will review the findings and major themes for each of the research questions posed at the beginning of this study. Finally, the chapter concludes with a summary of the findings.

As a teacher educator, I am interested in what pre-service teachers focus on as they are reflecting on their own teaching experiences, as well as those of their peers. This qualitative case study analyzed pre-service teachers’ reflections throughout a single semester in which they began teaching lessons in their field placement. In addition, I recorded and transcribed group discussions which occurred during video club sessions. These sources provided insight into what pre-service teachers focus on, as well as the quality of their reflections. The following research questions informed this study:

1) What aspects of teaching do pre-service teachers reflect on through the use of video clubs?

2) What is the quality of pre-service teacher written and oral reflections?

3) How do the use of video clubs support the reflective practice of pre-service teachers?

The research findings presented in this chapter are based on an analysis of data from six pre-service teachers using the following sources: one micro-teaching reflection, two personal video reflections, two revised reflections, and two transcribed video club sessions. The next section includes the findings related to each of the research questions.
**Data**

The data collected for this study consisted of written and oral reflections from math lessons taught during the Fall of 2015. First, pre-service teachers worked with partners to create a math lesson to teach to their peers, this lesson is referred to as the micro-teaching lesson. The lesson was taught and videotaped during three weeks in late September and early October of the Fall semester. After teaching the lesson, each pre-service teacher wrote a guided-reflection, consisting of: a) describing and analyzing their lesson, b) how they made the math content engaging for their students, and c) how the pre-service teacher elicited and responded to student thinking during the lesson. The assignment can be found in Appendix G. In addition, each pre-service teacher videotaped two different math lessons taught to children in their field placement class, and completed written reflections based on each lesson. The first video was taped in late October and the second video was recorded during their two weeks in their field placement in late November. Pre-service teachers were asked to watch each video and describe each of the two lessons in their own words. Then, they answered several guided reflection questions found in Appendix G. Both of these reflections were used in this data analysis.

The final data source analyzed consisted of oral reflections from transcripts collected during video club sessions. Pre-service teachers met twice during the semester with their assigned peer group to discuss the lessons they taught in their field placements. These groups consisted of six pre-service teachers who were interning in kindergarten classes. The first video club meeting took place in late October after all pre-service teachers individually recorded and reflected on their first videotaped math lesson. Pre-service teachers met in a large conference room for their first video club session. This session lasted about one hour. Videos were projected on a large TV screen and all participants were able to view all six of the participant’s videotaped
lessons within each session. The second video club was recorded in December. This video club session took place in a university classroom with all videos projected for easy viewing. This session consisted of the same six pre-service teachers who participated in the first video club and lasted exactly one hour. The transcripts from each of the video clubs were transcribed and coded. Prior to the session, I chose a group organizer from the six participants. This person was responsible for keeping the group on track and organized during the videotaped sessions. The morning of each session, I met with the group organizer to discuss the protocol and video information. Each group assigned participants a job, which included being responsible for recording the session, keeping time, uploading the individual videos for viewing, or organizing the session and asking questions. The protocol found in Appendix H, included guided questions to ask after the viewing of the videos.

**Findings**

This section includes background information on the coding scheme used for this study, and the findings related to each of the research questions. Initial coding was done using the current literature. First, I used coding schemes from Davis (2006) in order to code the data from the participants. Her interest was in what aspects of instruction pre-service teachers focus on when reflecting on their lessons. The four categories Davis (2006) used were learners and learning, subject matter knowledge, assessment, and instruction. In order to precisely identify what aspects of teaching pre-service teachers discussed during written and oral reflections, subcategories were used. Both written and oral reflections were analyzed using the same codes.

First, learning and learners included information regarding student thinking, engagement, the developmental processes, and prior knowledge and experiences. Next, subject matter knowledge focused on the content and concepts of the lesson. Then, assessment was coded as
comments regarding goals, alignment between assessment and instruction, and evaluating the effectiveness of lessons. Finally, instruction encompassed a wide range of comments including: management, artifacts, activities, instructional goals, time, confidence, and instructional representation. While Davis (2006) did not use subcategories in her research, I chose to create subcategories for each of these themes to get a more precise idea of exactly what the participants focused on during their reflections.

Next, research on teachers’ ability to notice from Van Es and Sherin (2006) was used to further analyze the reflection of the participants and identify what they focused on during the video club sessions. This framework was used to investigate how pre-service teachers reflect on their lessons. Van Es and Sherin’s research contained four main dimensions, the agent, topic, stance, and focus. The agent refers to who is discussed or identified in the reflection. Next, the topic refers to what is being discussed (e.g., management, student thinking). Then, stance analyzes how the event was reflected upon (e.g., described, evaluative). Finally, the focus is how comments made by participants were narrowly or broadly discussed. I used these codes as a guide as I began the coding process. However, additional themes emerged from subcategories of the codes created from Davis (2006) and Van Es and Sherin (2006). These subcategories will be explored in the following sections. The chapter will be broken into three sections based on the findings for each of the research questions.

**Reflections from Pre-Service Teachers**

The first research question was, *What aspects of teaching do pre-service teachers focus on when reflecting on their lessons?* In order to address the first research question, I used the current literature and deductive analysis. This research question was designed to gain a deeper understanding of what pre-service teachers focus on and discuss in both their written and oral
reflections. The data from these sources indicates that they focused on similar items in both the written and oral reflections. The three main categories that emerged and will be discussed in this chapter are as follows: (1) focus on classroom management, (2) focus on instruction, and (3) focus on student understanding. Within each category themes emerged that summarized what pre-service teachers focused on during their reflections. Each of these categories as well as their themes will be discussed in detail throughout the following sections.

**Focus on Classroom Management**

Pre-service teacher reflections, both written and oral, revealed a significant focus on student behaviors. I categorized this descriptive code in the discussions as classroom management. The themes that emerged from this category included excuses and child blame, logistics and transitions, student engagement, and positive affirmations. Throughout the data, classroom management was referenced over 100 times and discussed in almost every data source collected. The frequency at which management was discussed shows that this category was significant to pre-service teachers.

These pre-service teachers were placed at four schools with very different demographic make-ups. The findings were not specific to the schools in which these pre-service teachers were placed. In fact, those pre-service teachers placed at schools with lower incidence of violence focused on classroom issues and student behavior far more than those placed at schools that reported more violent acts. As I explored the category of classroom management, several themes emerged that revealed what these pre-service teachers focused on during their reflections. The following sections will describe the four major themes in detail.

**Excuses and child blame.** One of the themes that emerged from the category of classroom management was excuses and blame focused on the children. There were several
incidence where pre-service teachers blamed their students, the activity, or the chosen manipulatives as the reason there were behavior issues. However, some pre-service teachers noticed the issues and discussed ways they could have handled the behavior differently. This theme was found in both written reflections and oral discussions regarding their lessons.

To begin with, Emily discussed her struggle with behavior issues during her second lesson and identified some areas to improve upon. She explains that the problem during this lesson has to do with her students’ inability to calm down. Emily described her lesson saying:

When I brought the nine students up to the front, they were standing right in front of the smart board, so as time went on, they started messing with it, and touching the screen. Also, they were really squirmy up there, and very impatient. So I think that was a minor distraction. Next time, I would have them stand at the opposite side of the carpet facing the smart board, so they couldn’t fidget with it.

She added:

My students are very antsy, so I really don’t expect them to be sitting in quietly, crisscross applesauce 24/7; it’s just not realistic. You can see from the start of the video the little boy in the garnet shirt, is up, down, all around, but that’s normal for him. He’s a squirmer.

Emily also blamed student behavior on the fact that it was Crazy Hat Day. The children participated in crazy hat activities before filming the lesson, and she believed this was the reason her children were not focused during instruction. Emily explained, “I think they were a little crazy because of the hats. The kid in the back is still messing around with them (referring to the hat).” Hannah had an excuse for behavior issues in both lessons she taught. In the first recording, her students just received new seats. In the second recording, she used the fact that her mentor
teacher passed out new pencils right before her lesson as the reason why she struggled with management issues throughout the lesson. She explained:

It was a difficult day because the students had just gotten new seats before the math lesson, so they were interested in talking with their new tables. Even though some of the students were talking, which I don’t mind a noisy classroom as opposed to one where everything is quiet, but only a few of the students were doing what they were supposed to be doing and following along.

During the second video, Hannah explained:

My teacher passed out all new pencils before I started my lesson. So they’re in kindergarten, so it was like the coolest thing. So they were like super distracted. Even though they’re just plain pencils they are so excited that it's sharp, and it has an eraser that works.

Hannah also felt she needed to disclose her children’s behavioral disorders with the video club group stating, “We have like six kids in my class with ADD. And it’s just, they’re the six kids who are always on like yellow.” She does not provide additional strategies to engage these children. She uses their disorder as the reason they are off task.

These pre-service teachers blamed student behavioral issues on the children’s age, manipulatives, new seats, pencils, and behavioral disorders rather than looking at ways they could have adjusted their management styles to facilitate student focus and learning during instruction. When these topics were discussed in video club sessions, there were conversations and feedback from peers regarding how classroom management strategies could have been used more effectively. For example, one participant explained that new pencils should have been taken away if children were playing with them. Another suggestion included using cups to help
contain the manipulatives. This was discussed in relation to the issues surrounding keeping materials contained. In many cases, the pre-service teacher who blamed the student continued to find an excuse as to why the solution was not probable.

**Logistics and transitions.** These pre-service teachers spent a considerable amount of time discussing issues and strategies in regard to management. Pre-service teachers discussed a variety of issues they faced during instruction. Many of these issues included logistical concerns such as the layout of the room and transitions. While there was discussion around strategies to deal with management issues, they were often vague. Many references to management were descriptive, in that, pre-service teachers simply stated strategies that are important, but failed to support how they could be used or implemented. In addition, randomly calling on students as a management technique was discussed frequently, as well as the logistics of moving students or having them complete activities at their desk rather than the carpet. This theme captured the issues and strategies pre-service teachers used and found significant as they reflected on their instruction.

To begin with, Anna noticed issues she and her micro-teaching partner experienced during their lesson. Anna stated, “I noticed that our transitions weren’t as smooth as I thought, and sometimes they felt like awkwardly silent gaps.” Lesley also referenced transitions saying, “The transition to the carpet, it is quiet, but takes up to a full minute to finish the transition.” Lesley has become aware of the time it takes kindergartens to move from one activity to another and how valuable her time is throughout the day. Lesley also discussed that time management is an issue she needs to work on saying:

The area that did not go as well would be the extra wait time within the classroom to set up the materials and prepare for students to think through problems or answer other
problems. The extra wait time made time management more complicated, and the lesson ended up going a little longer and cutting into preparation time to go home.

In addition to transitions and time management, logistical issues such as where the pre-service teacher positioned herself during instruction were referenced. Hannah, like other participants, noticed that she turned her back to the class several times during her lesson. She stated in her reflection, “I did start out the lesson having my back turned to the class and noticed that a few times throughout the lesson.” Ashley recognized how management is an area of instruction she needs to work on. Her mentor teacher eventually had to take over her lesson because her children were so off task and distracted during instruction. Ashley’s reflection reveals how the video illustrated her underdeveloped management skills stating:

Classroom management is something that I know I need to work on, and it clearly shows in this video, and the fact that my mentor teacher had to say something to get the students to pay attention to me. This also leads me to feel that this wasn’t a good lesson.

Ashley and Emily worked together on the micro-teaching lesson they taught to their peers. Emily handled all the management issues during the lesson. However, Ashley commented on the use of manipulatives in her reflection stating, “I think we gave the students the M&Ms, but we didn’t do enough with the M&Ms, so they became a big distraction and eventually had to be taken away from the students.” Ashley continued to have issues with the use of manipulatives and materials when teaching lessons in her field placement. She expressed how she felt about the use of a variety of items during instruction stating, “I felt that if they had both the manipulatives and their workbooks and pencils it would have been too many materials for the students to handle.” Ashley seemed concerned with how the students would handle so many items, and she
goes on to explain how she could have managed the manipulatives and student behavior better stating:

If I were to teach this lesson again, one thing that I would change is to give even more specific rules for the cubes. I had given rules to the students at the beginning of the lesson, but I think what lacked was that I didn’t have any consequences tied to them so some of the students didn’t feel the need to follow the rules.

Ashley recognized in her reflection that rules need to be followed by consequences in order to be effective.

Emily revealed her frustration with management during her video when she said, “However, no amount of planning would have been able to prepare me for the chaos of my students.” Emily explains in detail the management issues she faced from the beginning of her first math lesson. She states:

Right in the beginning of the video you can hear my (mentor) teacher whispering to a student to show his board and be quiet, so even before I started the lesson there were students already off task. That same student was the one who was saying, “no, no, no, no, no, no,” when I gave them another type of example to do. Another area where I noticed my students were extremely off task was when I was doing the example with the two students. I was waiting for the two students to show me their boards, and the rest of the class is playing with their counters. That type of scenario happened a lot throughout my video because let’s be honest, when you give a 5 year old counters, they will play with them; but I think that issue escalated more when my focus was on the two students giving the example.
Emily seemed to recognize that some of the management issues she encountered during her lesson had to do with the use of manipulatives and how she was focused on specific students instead of the entire class. During the video, you can see the students are off task and playing with magnetic counters. However, Emily seems to believe that because the students are five, they do not have the ability to use manipulatives and participate in a lesson. This is in contrast to how Emily handled behavior issues during her micro-teaching lesson, where she removed items that were distracting students, thereby making instructional decisions in-action.

There was also an acknowledgement of some missed opportunities as well as frustration dealing in with management issues. First, Hannah stated:

When the talking did get slightly out of hand, there wasn’t anything I did for classroom management, which is something that I wouldn’t let slide in my actual classroom. I feel like this would have been a good opportunity to try out a new classroom management strategy and see how it worked.

Hannah went on to express her feelings of frustration and explained how she got through them when she stated:

I had to deal with behavior management issues with my two children who act out, and I really struggled with how to handle it. After talking with other teachers, they expressed that it is hard for everyone to gain good classroom management, I felt better about myself.

Leah also recognized her inability to be tough with the students as a management issue when she stated: “I think I could have been more stern with talking, but I knew they were all distracted and I didn’t feel comfortable enough yet to put my foot down. I feel that did not go as well as it could have.”
Ashley focused on randomly calling on students and classroom logistics in many of her reflections. She gave her partner praise during their micro-teaching lesson because she wrote peer names on pieces of paper in order to randomly call on students to maintain their attention. Ashley explained, “I also think that it was a good thing that Emily made the paper with names for us to randomly draw and call on students.” Ashley uses this video reflection to think ahead and develop strategies that will help her maintain control of the class. She states:

One of the things that I would change if I did this lesson again is to have the students sit at the tables to do this work. I think that if the students had a little more space in between them that it might have been easier to manage the classroom.

Lesley began to reflect more frequently on what management techniques work well for her students and why that is important during her second video reflection. For example, Lesley explains:

The teacher (referring to Lesley) begins student participation at 24 seconds within the video, also using this as a classroom management technique and engagement. The students must be sitting nicely and tracking the speaker in order to be a special helper.

She goes on to say, “When students were learning a more complicated lesson, behavior management had to become an even higher priority. Student engagement and participation was vital to the students understanding the concept in the first place.”

Lesley also learned how to incorporate a variety of classroom management strategies to deal with student behaviors, for example, she states:

As a result of the previous videoed lesson plan, I learned different management techniques to maintain behavior. I wrote the words “turkey cupcakes” on the board (a student treat at the end of the day) and the students were aware that if I had to write their
name on the board, then the student would not receive a cupcake and was given a single opportunity to have their name erased from the board. The students were more attentive with stronger management and more eager to participate in lessons and share their ideas.

Leah also found an effective strategy to manage student behavior and shared it with the group during the video club session. She explained:

The thing I started doing, I'll show you on the back (refers to drawing on her paper). I did a happy face and a sad face, during whole group and then when they collectively make a good choice they get a tally. Emily asked, “Does that work?” Leah replied, “Yeah it works really well.” Ashley asked, “What's the prize?” Leah explained, “A stamp and if they get enough stamps, they call them compliments. They get a party, like a popcorn party. Um so they like it, then they tell each other to be quiet, instead of me.” They’re like, “Stop talking to me so we can get a tally.” And I'm like, “Yes, thank you.”

Emily reflected on the importance of effective classroom management strategies during instruction. However, she was unable to explain what her strategies were in reference to dealing with management issues that may arise saying:

The students can make or break the success of a lesson. The second the class gets too wild, the lesson goes south and everything you planned, every detail you spelled out, just went right to the gutter. Student issues arise at random moments and are something that you simply can’t plan for. However, you can have strategies to deal with them when a problem does arise.

This section revealed that pre-service teachers identified a variety of logistical and transitional issues in the classroom, and recognized how they impacted management. They have begun to identify areas they need to improve upon, as well as the logistics of transitions and time
management. Participants were quick to notice when lessons began to derail and why. Some of
the participants realized missed opportunities for managing behavior. Another showed
confidence and the ability to reflect in-action during the micro-teaching lessons, but were not
able to make instructional changes when teaching children. These management issues illustrate a
variety of concerns these pre-service teachers focused on during their reflections. They also
discussed classroom management strategies they found effective, placements of students and
materials during instruction, as well as the importance of a variety of management strategies.
However, they were not able to reference research based practices they have learned in their
teacher education program, nor were they able to elaborate on a variety of general strategies their
mentor teachers used during instruction. Many of the participants seemed to try to “reinvent the
wheel” rather than discuss the management issues with their mentor teacher, or use existing
management strategies.

**Student engagement.** Engagement refers to “the quality of student’s connections or
involvement with the endeavor of schooling and hence with people, activities, goals, values, and
places that compose it” (Skinner, Kindermann, & Furrer, 2009, p.494). Pre-service teachers
frequently referenced student engagement as a concern or issue. Often it was discussed in
relation to or including classroom management. Leah described student engagement in terms of
what a good lesson looks like, explaining, “A good or successful lesson is when the students are
engaged, having fun, and learning according to their learning style.” This quote summed up how
the other pre-service teachers defined student engagement.

The conversation in both written and oral reflections included a focus on student
engagement in conjunction with their classroom management strategies. Pre-service teachers
discussed engagement in terms of their ability to get the class’s attention and keep them focused
with a variety of manipulatives. Lesley explained, “The math content was engaging for the students, by creating a fun story to begin the lesson with and capture the students’ attention.”

Anna added:

Lesley and I tried to make this lesson engaging by making it as interesting as possible. We agreed that instead of just standing up at the board, a story would be more attention-grabbing to kindergarteners. We also made the lesson engaging by including a variety of activities (e.g., buttons, ball toss, scavenger hunt) that were appropriate to kindergarteners.

There was also discussion on how the students followed along in the lesson and the strategies they used to gain student attention. Lesley explained, “The students were engaged during the lesson, especially during the cow activity game because each student had to keep track to know when they had to count and what number they would be.” Anna said, “At first, I didn’t think my students were engaged. About halfway through the lesson (in the video, when I began calling students up to the smartboard) the students began to be engaged.”

Ashely provided examples of how her class was engaged during the lesson, with references to several strategies used to facilitate engagement. Ashley reflected on the experience by identifying elements of the lesson that may have caused the class to lose focus. She also discussed three ways she, along with her partner, were able to engage the class during the lesson saying:

Emily and I did three things to help keep students engaged in the lesson. First, reading the story at the beginning helped to engage the students in the lesson. It also helped that it was a story that most of them had read before and liked so they wanted to pay attention to the story. Next, using the students at the front of the classroom to help show addition,
helped keep the students engaged in the lesson. One last way that we were able to make
the content engaging is by giving the student’s manipulatives (M&M’s) to help them
understand the content. I think we could have made the content more engaging by
referring to the manipulatives more.

Ashley provided specific examples of when the students were engaged in her video. She
identifies that the students were engaged when they were actively participating in the lessons
using manipulatives. Ashley also focused on engagement as a form of classroom management.
She explained how she did not notice students at the back of the classroom were playing with the
manipulatives instead of using them to solve math problems. Ashley explains:

Throughout the lesson, there were times that the students were engaged and there were
times that not all of the students were engaged. When the students were putting the
counters on their tens frames, the students were engaged. However, when we were
reading the book at the beginning of the lesson, not all of the students were engaged and
quite a few of the students in the back were playing with their bags of counters, which I
didn’t notice while I was teaching, but my mentor teacher noticed and got onto some of
the students.”

Ashley and Emily both identified the counters in their lessons, as elements of student
engagement as well as a reason the students were not paying attention. Emily states:

Half of the class was engaged, and the other half was either being disruptive and shouting
out unrelated comments or just completely disregarding the lesson and having a party
with their counters. There were moments when I would have everyone with it and then
times that everyone is off in their own world.”

Leah explained she would make sure all the students are actively participating in all
aspects of the lesson to keep their attention, saying:

To make the math content engaging for the kindergartners, I had them all actively participate in every part of the lesson. Even in direct instruction, the students answered questions and participated in sky-writing the numbers on the board. The two games provided a fun opportunity for every student while strengthening the lesson focus.

Most of the pre-service teachers, explained student engagement in terms of how their students followed along with the lesson. Hannah felt the students were engaged because they were doing what they were supposed to do, while Leah felt that calling out random names to answer questions kept her students engaged and participating. Leah explained, “The students were engaged throughout the lesson. The first part of the lesson, the concept map, was something that they do to introduce both new letters and numbers, so they were very familiar with it and enjoyed it.”

Leah moved past thinking of engagement in terms of being able to answer questions and follow along, to include activating prior knowledge and building confidence. Leah explains, “Engaging students by calling them to the board helped build self-confidence and cause the entire class to pay attention because they all wanted a chance to go.” She finds evidence of engagement and student thinking when a student was surprised they completed a math lesson due to the hands-on nature of the lesson. She goes on to explain details of her lesson and student engagement as, “The introduction immediately engaged them because it pulled from prior knowledge, giving them a chance to show-off what they already knew. This built confidence for them to continue to participate in the rest of the lesson.”

In conclusion, student engagement was a central element of the written reflections, but was not addressed in the video club sessions other than to say that engagement looks different in
different settings. Student engagement was a central theme of the math methods course and pre-service teachers were given opportunities to read articles on student engagement and discuss them in class. However, engagement was consistently used as a term to explain if students were on task rather than their connections with the content taught. In many cases, pre-service teachers used engagement and effective classroom management interchangeably.

**Positive affirmations.** The final theme related to the category of classroom management consists of the positive affirmations pre-service teachers had throughout this reflective process, as well as feedback and comments made by peers. The reflections and video club discussions revealed several references to the positive perceptions of management strategies used by pre-service teachers and in reference to their peers. The participants identified how they managed student behaviors, their personal growth and confidence in classroom management, and they provided advice to their peers during the video club sessions.

Pre-service teachers often discussed management issues in a positive way when referring to their lessons, and those of their peers. Mobility during instruction was one topic many pre-service teachers mentioned as a way to monitor student behavior and understanding. Hannah and Leah both referenced their mobility during instruction and independent work as a positive management tool. Hannah stated, “I feel like, as the teacher, I did a good job moving about the room and checking to see if students were on task, or if they needed any help.” Leah made a similar comment, saying, “During the lesson, I walked around the room and monitored student activity. I asked students how they got to a specific answer for both correct and incorrect responses.”

Ashley identified areas she needs to improve upon, but she seemed much more self-assured after this lesson. She goes on to say, “I think that this lesson was a good lesson. The
objectives were met, and I feel that I had better classroom management than my previous videotaped lesson.” Anna explained a behavior issue that she addressed during her lesson as follows:

I think one thing I did well was classroom management. However, one of my students had a meltdown after the plastic bug counting activity. He started crying because he did not get chosen to count the bugs. I handled this by transitioning the students to their tables by color team, and discreetly telling him to stay behind. In a stern, but loving manner I told him that he needed to learn to take turns and behave like a first grader, to which he responded very positively.

There were also references to the confidence some pre-service teachers felt about their management skills. Emily explains that she is confident in her management skills saying:

While the kids may have been playing around and not listening, I got them right back on track by taking points away from them on the Dojo. Because I have been working around kids for most of my life, managing their behavior is something that comes very easy to me.

When asked what she thought went well about her lesson Emily replied, “I don't know. I guess my classroom management. Cause like, I feel like I'm pretty good at dealing with them and knowing when and when not to do things.”

During the final video reflection, Ashley began to see vast improvements in her management skills. She was able to use the video to see how student behavior improved from the first lesson to the second. She states:

I also feel that I have grown in my classroom management skills. Compared to where I started at the beginning of the two weeks to where I ended, I can see how I had much
better control of the classroom. Again, my teacher’s suggestions were really helpful because she has been teaching for a long time and knows different skills and strategies to use.

Anna, also had a revelation after the first video club session. She was surprised by the management skills of her peers. Watching their lessons helped her feel more confident. She stated:

Unfortunately, and by no means do I intend to sound conceited, but I was surprised by some of the videos of my peer group. Certain classmates of mine that I had previously viewed as being very effective teachers seemed to be overwhelmed by their students. I’m not sure if this is due to their particular mentor teacher’s philosophy (maybe they’re more Montessori-style?) or if they had poor classroom management themselves. Either way, it made me feel more confident about my own classroom management skills.

Finally, pre-service teachers provided advice to one another during the video club session. In most cases it was positive, regarding how their peers handled management situations. However, advice was provided on a few occasions to help the peer work through a troubling issue. The participants discussed Emily’s lesson during the video club session:

Lesley explained, “You did a really good job of like running the room. You were going all over the place you were keeping and redirecting them. You even watched them when they were at their desks you were going around and not just standing there.” Anna added, “You had really strong classroom management.” Leah added, “Yeah, it's inspiring.”

Emily gave Hannah advice on a management issue she had during her second videotaped lesson. Emily stated, “A good management tool to do with that would be to…so the ones that can't sit still and deal with the pencils…would be to just take them away. So you can get your old pencils
back.” This advice was very basic, if the child does not behave with the new pencil take it away. Hannah’s pencil issue remained a topic of discussion for the group with several other participants’ joining the conversation. Hannah began:

“And then she was playing with two pencils (referring to the girl in the video) Leah added, “That girl with the flowered shirt is so distracted.” Hannah, “Yeah she's in her own little world all the time. She's like the baby of the class, she can't do anything for herself really, so she just kind of doesn't do it. Hannah said, “You can't like move her bug either (referring to the behavior management system) because of her like parents.” Leah continued, “You just need to find different ways, my mom told me to take things away, like if you have classroom jobs. Take away their class job.”

Hannah said, “That's a good idea.”

Leah included advice from Emily in her revised reflections stating, “Emily made a good point to seat the child who had a problem paying attention near the front and ask him more questions to keep him engaged. I will have to use this in future math lessons.” Leah also reflected on additional advice provided by her peers stating, “I also was told to make it clearer if I expect them to shout out their answers or raise their hands. I never thought of this and need to do this in the future.”

Anna provided advice for Ashley when she said:

I think your classroom management could have been improved if you talk a little slower, and your instructions and expectations would be clearer to them. And I think that would help your classroom management more because when you talk really, really fast they kind of take that as a free ticket to like, like whisper to their neighbor and like…
The theme positive affirmations, illustrated how pre-service teachers can learn from one another, as well as see improvements they have made over the course of the semester. They were also able to provide advice to their peers during video club sessions. The data identified that mobility and transitions during instruction were areas of the lessons pre-service teachers focused on when providing feedback to their peers. This appeared to be a common theme because many of the participants struggled with how to effectively move around the room while teaching and monitoring student behavior. They also discussed their confidence regarding classroom management. Some of the participants noticed changes in their abilities over the two video club sessions while others learned from watching and conversing with their peers. Overall, pre-service teachers were able to identify key elements of lessons that may be small and seem insignificant to some, as essential to effective classroom management.

Classroom management is a tough skill even for seasoned teachers. These pre-service teachers focused on excuses and blaming students for their behavior, logistics and transitions, student engagement, and positive affirmations to themselves and one another as they reflected on their lessons and those of their peers. Each of these themes illustrates not only what pre-service teachers focus on, but what they notice when watching each other’s videos during the video club sessions. Management seems to be the key element of the discussion because it set the tone for the lesson. Richert (1992) suggests that new teachers may be overcome with the stresses of teaching and afraid to fail so they are hesitant to look back on their instruction with a “critical eye” (p.189). This seems to be consistent with these findings regarding classroom management. The participants in this study often blamed students rather than look at their role in each situation. Additionally, the data suggests pre-service teachers have the ability to notice when a lesson begins to go off track or when student behavior becomes an issue. They are often able to
identify the very second in a video when they lose control. However, they do not have the ability to make in the moment decisions to get the lesson back on track. They try to push through each lesson regardless of what is going on in the class. This inability to reflect in-action and make instructional decisions on the spot is what Schön discussed as a key element of teaching and reflection.

The findings also suggest that pre-service teachers have the ability to notice small elements of a lesson such as how they move around the room and student transitions during instruction. The participants discussed this area frequently in both their written and oral reflections. Pre-service teachers noticed the importance of transitions and mobility when they provided positive feedback to their peers, thus reiterating the importance of classroom management when teaching. Student engagement was the topic of many in-class discussions and was a key theme in the reflections. However, when engagement was discussed it was associated with classroom management issues. Classroom management was an important topic of both the oral and written reflections, and the themes within this category show that pre-service teachers have the ability to notice elements of each lesson that may contribute to management issues. The next section will discuss what pre-service teachers focus on in relation to instruction.

Focus on Instruction

The next category that pre-service teachers discussed during their reflections was instruction. Pre-service teachers were asked to reflect on their lessons; therefore, naturally these reflections would consist of several references to instruction. I used instruction as a coding category. Davis (2006) identified instruction as one of the four aspects of teaching that pre-service teachers consider when they reflect on their lessons. Davis classified several elements of teaching under the umbrella of instructional representation including: the introduction/ closure of
a lesson, finding lesson ideas, activities, instructional representations, artifacts and/or worksheets, and finding lesson ideas or drawing on current resources.

Pre-service teachers made several comments regarding instruction and how to teach lessons. However, their discussion revolved around basic implementation issues. They focused on instruction in terms of surface level discussions, questioning, assessment as a way to gauge student understanding, and noticing mathematics and making connections. Much of this dialogue took place during the video club sessions where pre-service teachers began thinking through pedagogical issues, including how to teach concepts to their students. Some of these issues were in direct relation to math content while others dealt with logistical issues. The following sections will describe the four main themes that emerged from this category.

**Surface level discussion.** Pre-service teachers discussed instructional practices throughout their reflections. However, their discussions were based on surface level and often logistical issues rather than elements of instruction that may significantly impact student learning or curriculum implementation. After watching her first video, Lesley discussed how to effectively represent the number nine when drawing it in the air. Lesley explained, “The teacher must face the same direction as the students so that they see the correct perspective when writing. This way, a 9 does not turn into a “P” on papers.” The participants focused on this visual representation on a few separate occasions throughout the first video club session. It appeared that several pre-service teachers did not realize that the direction a number is “air written” might potentially confuse students because it looks backwards. The group discussed this topic in great detail.

Next, there was a focus on representing numbers and problems. Leah discussed representing numbers by discussing the importance of the way the numbers were written in the
air and then written on the board. She believes that having multiple representations of the numbers is useful. Leah explained:

Students were able to count the number of objects drawn on the board and see both the number symbol and the word written on the board. The students also sky-wrote the numbers when the teacher wrote the number symbol on the board.

Ashley also discussed an activity that she and her partner created for their lesson where they tried to show different groupings of numbers. Ashley explains:

After we read the story, we showed students that 3 and 2 equal 5, by adding 3 brunette students and 2 blonde students together and then vice versa. I think this was a great way for the students to be able to visually see addition being done.

Emily referenced how using a text to practice counting during their micro-teaching lesson would have been a good instructional tool. It could have been used to show pictures of fun objects and get students counting. However, she explains this tool was not effective because too much of the text was read. Emily explained, “The first activity was reading the book together as a class and counting different objects in the pictures. The idea of the activity was good; I just think it could have been executed differently to make it more effective.”

Hannah used a saying for how to write the number five as an introduction to her micro-teaching lesson to her peers, “Go across, take a dive, make a loop and that’s a five.” This saying was well received by her peers and several pre-service teachers praised her and wanted to use it in their classrooms. She explained how she learned this representation was useful:

The class did like my saying for the number 5, so I will probably use that in the classroom to help the kids with writing their numbers properly. I will also use sayings for the other numbers as well which I did not do during the lesson in class.
The micro-teaching lesson allowed Hannah to get feedback on a creative way to teach her students how to write numbers.

Instructional representation was referenced throughout the data sources. Analysis of the data sources showed that these pre-service teachers focused on how the lesson was taught and the various ways to represent numbers and word problems while watching each other’s videos. There were several questions and praise regarding how these lessons were implemented. While the participants referenced instructional representation in a few of their written reflections, there was a greater emphasis on the concept during debriefing sessions, when they could give and receive feedback from their peers.

As the pre-service teachers continued to watch the videos, Emily discussed how she wanted to teach the lesson, which required students to fill in a tens frame. She explains, “I was going to have one kid pick a number and put it on the ten frame and then another one pick another number, and they were going to compare it.” Pre-service teachers struggled with the use of the tens frame as an instructional tool throughout their micro-teaching lessons. The tens frame is used to help children easily identify anchor numbers such as five and ten. When the participants began teaching their micro-teaching lessons using the tens frame, they struggled to identify its purpose. Many of the groups came up with fun ways to fill in the frames, but didn’t seem to understand how knowing the anchor numbers is important, or how the frames easily illustrate a number such as five or ten. Leah noticed a connection to how students interpreted the tens frame saying:

You know what's been cool? As we've been watching the videos and learning, I've like seen their strategies with the ten frame. Like I'll just show it full and like say how many
are in here, and it's funny to see the kids who can just say ten or just say five for the top row or who have to count.

Emily and Lesley discussed Emily’s part-part-whole lesson which is another concept discussed in the math methods course. Emily explains:

“Their making 1, 2, 3, 4, 5, 6, 7, 8. Lesley clarifies, “So you would be able to move them in the different groups and manipulate it so that they could see that 3 and 5 are the same as 2 and 6?” Emily responded, “Yes, and they saw that even though we didn’t add anything, it’s the same amount.”

During Lesley’s video, she explains a strategy she used to teach greater than or less than. Lesley stated:

I started doing this for matching (modeled with fingers, holding the first number and matching all the fingers, and counting the one left) with the kids. I did this on a previous lesson. I used their fingers, umm, so we could say if we had three and then four we match it and saw that this one has extra. Leah added, “Essentially, it's like greater than or less than.”

Anna described details of her lesson as the group watched. She explains, “Right now, I'm modeling the first part of the problem to get them to set up their model and then to circle their answer at the end.” Lesley learned a new way to represent figures on the SmartBoard saying, “Wait I haven't used those shapes. I can draw on them? That's awesome.”

This section illustrated how pre-service teachers often engage in surface level discussion regarding their instruction. The discussions regarding instruction increased over the course of the semester as did the content of the conversation. Pre-service teachers described their lessons and provided positive feedback to their peers. They also seemed to learn new ways to utilize
technology and additional instructional strategies from one another. However, their discussion regarding instruction was often surface level, meaning it often contained vague references to instructional practices. There were no connections made to the level of student understanding or their ability to master mathematical concepts as they moved toward a better understanding of numbers. The focus of much of this conversation revolved around how concepts were physically represented and strategies to teach concepts. The discussion evolved over the course of the semester and there was a greater understanding of the concepts being taught, but the conversation did not include depth on why strategies were effective or how children were able to master concepts.

**Questioning as a tool to help pre-service teachers.** Pre-service teachers discussed questioning in a variety of ways throughout their written reflections and video club sessions. When pre-service teachers think about instruction, they often reference questioning. However, their focus was on themselves and how they could understand their students’ thinking. It appears that pre-service teachers focused on themselves as the beneficiary of the questioning. There didn’t seem to be a focus on how questioning students may impact their understanding of mathematical concepts. In addition, there were references to questioning as a way to informally assess students.

To begin with, pre-service teachers referenced student understanding in their reflections, and recognized its importance during instruction. Ashley reflected on what she could have done to elicit student thinking saying:

One-way we tried to elicit student thinking is by having students explain how they got the answer that they gave. A way that we could have improved on this is by having more
opportunities for students to ask questions. We also should have asked more questions to try to understand what the students understood and what they needed more help with.

In addition, there was discussion on the use of questioning as a powerful tool to elicit student thinking. Hannah believed reviewing an assignment before collecting it was helpful to ensure student understanding. She stated, “I think reviewing this with the students after, instead of just collecting it without talking about it was beneficial to them understanding how they did, and if they understood.” Hannah explained how she tried to elicit student thinking and noted the difficulties she faced trying to understand the solutions her students provided. She stated:

I tried to encourage student thinking by asking them what they thought the symbols meant or how they got the answer they did. I did notice that the images on the worksheet made it hard for students to interpret which number went with what, so using manipulatives might have been easier for this age group. Their thinking was similar to what I expected. It is just difficult sometimes to figure out a solution to their understanding of problems.

Leah referenced the strategies her students used to compare numbers. She found that using math talks, where students dig deeper in the mathematical concepts by questioning and communication, helped her students compare numbers stating:

The students used a variety of strategies to compare numbers, a fact that was found through math talks and small groups the day before. When a student would compare two numbers, I would ask them, “How did you know which one was greater?” They would go on to explain that they either counted on their fingers or used a different strategy.

Anna describes how she had her kindergarteners show their work and found there were some concerns with how they wrote the number nine. She discussed how she tried to get students to
think and understand the number nine by providing students with multiple opportunities to make and represent the number explaining:

As the teacher, I tried to elicit student thinking by attempting to bring things to their attention throughout the lesson that would give them a different perspective. For example, we asked the students to make a ‘9’ with their bodies, to draw it in the air, show us on their fingers, and had nine students stand up to show what nine people look like. These are four different ways of showing nine that are not simply writing and showing nine counters.

One pre-service teacher did reference how questioning impacts not only her as the teacher, but the students’ ability to learn from one another. Emily stated, “Not only does asking these questions help me to better understand their method of thinking, but it helps the other students as well.”

While pre-service teachers were able to identify the importance of questioning within their lesson, they were not able to go beyond simply restating the question, to truly understand the child’s thinking. It appears that they recognize the importance of this instructional strategy, but again, only on the surface. As if the fact that they asked a question means they are effectively using the skill. They have engaged their students, checked for understanding, developed critical-thinking skills, and prompted children to seek new knowledge, all with a few simple questions. This inability to see past surface level instructional practices is common for pre-service teachers who are beginning to understand instructional practices. They do not yet, have the ability to analyze their teaching, provide evidence for the claims they make or “question their assumptions” (Abell, Bryan, & Anderson, 1998, Davis, 2006, Harrington & Hathaway, 1994,
The next section explores how student understanding was discussed in terms of assessment.

**Assessment to gauge student understanding.** Pre-service teachers discussed assessment in a variety of ways throughout their written and oral reflections. They seemed to gauge student learning by test scores. They also used informal assessments as a management tool. Pre-service teachers referenced calling on students to check for understanding as well as a means to keep them focused during instruction. There were references to both formal and informal assessments within written reflections.

Anna used a formative assessment to reflect on how well her students understood the mathematical concepts taught. Anna explained:

I believe my objectives were met, because when I did formative assessments throughout the lesson the students did them successfully. Even when I called on someone whose hand wasn’t raised, they were able to spell it. Also on the test, it showed that the students had mastered this concept.

Ashley also referenced student performance on an assessment as an indicator that students understood the mathematical concepts she taught. She explained:

When I was walking around and checking the student’s work with the cubes, most of the students were able to get this. Or if they did get it wrong, most of the time if I told them to go back and check their work they would recount and fix their mistakes.

Hannah reflected on student understanding in terms of questioning in her micro-teaching reflection. She used an in-class activity as a formative assessment to measure student understanding, and then used the worksheet that was completed incorrectly as a way to correct the misconception as a whole group. Hannah said:
No one seemed to have a bunch of questions or different forms of student thinking throughout the lesson, but once we collected the results, I saw that one student did not complete the worksheet with 100% accuracy. I responded to this student’s thinking on the overhead projector. I did not say who the student was so as not to embarrass them. I had the class count as a whole the objects in each box.

Pre-service teachers also began to see the impact assessments have on instruction. As they spent more time in the field, the participants saw the importance of looking at assessments to see how questions would be asked so they could better prepare their students for tests. Participants discussed the language used during instruction as a way to ensure students were familiar with the vocabulary used on assessments. For instance, Emily says, “I like the way you used different words to explain it.” Lesley responds, “Because I know the worksheets have all these different phrasings than the tests. So I try and make them familiar with the vocabulary.

By the end of their two weeks teaching in their field placement, pre-service teachers used assessments as a way to determine the effectiveness of their lessons. Several references were made regarding how their students did on assessments and they were usually followed with positive affirmations from peers or the pre-service teacher herself. For example, during the second video club session, the participants discussed instruction in terms of assessment:

Lesley said, “So it seems like they are getting it.” Emily answers, “They are getting it. My teacher said they did really well on the test.” Leah adds, “That feels nice. I graded my tests yesterday and they were good. I was like happy (smiles).”

Pre-service teachers discussed assessment, but never in relation to the mathematics content they taught. There was a consensus among the participants that the concepts they taught were mastered based on assessment scores. While there was mention of the use of assessments to
drive instruction, it was based on the vocabulary used on the tests rather than mathematical concepts. They did not talk about the specifics of instructional practices that helped students do well, or the quality of the assessment. Pre-service teachers seemed to be focused only on the final score, and to them, that was proof the objectives were met.

**Noticing mathematics and making connections.** Pre-service teachers provided a lot of feedback to their peers as they watched each other’s videos. Feedback was categorized as a theme, and then broken down to identify what pre-service teachers focused on when providing feedback to their peers. The first video debriefing session included praise on how these pre-service teachers taught their math lesson. Emily explained, “The way you read the story was real good. Like you kept them engaged. You weren't just like reading (acts out staring at an imaginary book).” In addition, Lesley added, “I really did like how you showed her work. Because it was her strategy that she knew, but you were like let's all look at this together and used her as the example.” Participants also provided feedback on strategies to improve peer instruction. Leah stated, “I would just work on questioning. Like asking, you asked a question and the student said the answer, and then like further question on why do you think that.

In addition to being placed at similar schools, the participants have taken all the same classes and found each other using instructional strategies taught at the math methods course. Leah stated, “I saw you apply a lot of what we have learned into that lesson like the questioning.” Leah also said, “Great literature incorporation, Lesley.” This comment was directly related to an in-class activity, bringing mathematics and literature together.

The transcripts indicate that as these pre-service teachers spent more time in their field placement, they began to provide feedback to one another on their instruction. For example, Leah explained:
At the beginning, one thing that I think would have helped was when you said, “Three on this side and one of this side. How many do we have all together?” To go through and count again, 1, 2, 3, 4. Just to count again. In case they can't count.

There was also discussion regarding how to represent concepts. Emily and Lesly discussed how one video included a good example of how to explain subtraction. Emily stated, “I really liked the bed thing.” Lesley added:

Yeah, I like the bed example that was really good. It's a drawn-out explanation of taking away, but it's something they are familiar with. They can connect it to themselves. Like I have those on my bed and three of them fell off…”

Lesley also adds, “I think you've reinforced it (counting) through the entire thing. You showed it. You even reinforced the word *model*, which some kids might not understand.”

During the debriefing sessions, pre-service teachers focused their discussion on how mathematics instruction was implemented. They made connections to the math methods course and praised the instructional strategies of their peers. They were also able to make comparisons to one another since they were all teaching children in the same grade level and implemented similar lessons. This theme indicates a focus on math as it relates to instruction. The second video club session included greater references to mathematics and specific comments on instructional practices, which reiterates the findings that as pre-service teachers spend more time in their field placement, they are able to notice more elements of teaching including content.

When watching math lessons it is only natural that the discussion revolves around instruction. This category included themes that illustrated what these pre-service teachers focused on when discussing instruction. The conversation included surface level discussion around instructional practices, questioning as a tool to help pre-service teachers, assessment to
gauge student understanding, and noticing mathematics and making connections. Pre-service teachers noticed various ways their peers modeled mathematical concepts for their students, as well as wait time and questioning techniques. There was an emphasis on how to represent numbers and provide examples for new concepts. Pre-service teachers focused on how to teach concepts and ensure students were understanding as well as following along. This data provided insight into what pre-service teachers focused on in terms of instruction and how they looked at these areas of instruction. They often looked at instruction on the surface. They discussed elements of a lesson that have to do with how they represent numbers or problems. They also used questioning and assessment as a way to measure student learning, and provided feedback to one another when watching their videos. The next section will review how pre-service teachers thought about student understanding.

**Focus on Understanding the Students**

The final element of teaching that pre-service teachers focused on in their reflections, was how to understand their students. They referenced prior knowledge on several occasions. As I began coding, I found pre-service teachers’ conversations focused on student understanding which I used as a descriptive code. A closer examination of the descriptive codes, highlighted an emphasis on prior knowledge, and both student and teacher misconceptions. In this section, I will discuss what these reflections revealed about what pre-service teachers focus on in terms of student understanding. The micro-teaching reflections consisted of pre-service teachers beginning to recognize misconceptions, and deciding how they would handle these issues when teaching in their field placement. As they began teaching in their field placements, their written reflections began to indicate issues in understanding what students need, and how they think.
They began to realize that students think differently than they do, and they need to account for this before teaching a lesson.

**Making connections between prior knowledge and instruction.** The reflections on student understanding revealed a focus on the prior knowledge children come to school with, and that which is built in the classroom. Pre-service teachers began to discuss and notice the importance of this knowledge after they spent two weeks teaching in their field placement. Most of the references regarding students’ prior knowledge came during the second written reflection and video club session. This shows that as they spent more time in the classroom creating lessons and teaching children, they become aware of outside influences that impact their lessons as well as how lessons build on one another.

To begin with, Leah described how her students began to understand greater than or lesson than concepts and how students used personal experiences to help them understand mathematical concepts. Leah explained:

> Student thinking during the lesson pleasantly surprised me. When I asked the students how they got their answer, they replied with a variety of different strategies. For instance, the question was “How do you know that nine is before ten?” The student replied that her brother had just turned nine, and he had previously been eight, and he will eventually be ten. It was interesting to see her pull from personal experiences to help with math. The students also found it helpful when they numbered each object as they worked. It helped them keep track of their numbers and not lose count. They had previously learned this method in a math television show called “Monster Math” and frequently referred to it in their work.
As pre-service teachers participated in the video club sessions, they began to explain why they used certain math strategies in their lessons. For example, Lesley explained how using a matching up strategy that was taught at the beginning of the year was useful when teaching greater than or less than. This was helpful for her peers who seemed to struggle with this concept. Lesley explained:

We had done matching up before, so we just kind of used it again, because this lesson didn't necessarily call for it originally, but it's something that they used before so I tried to bring it back by matching to see if this one has more or this one doesn't. Because we did it for the greater or less rather than chopping thing. So I kind of reenacted it to tie it in.

Leah seemed to realize the importance of accessing prior knowledge of the students during her second videotaped lesson and video club session. Leah referenced how student knowledge impacted their ability to understand concepts and master them. She focused on the students in her reflections and not herself. This was a major change from most of the participants who focused on how student understanding impacted them, as teachers, rather than identifying the benefits for their students. Leah explained, “The lesson was a concept that was introduced the day before, so it was not foreign to them. They felt pretty confident in it and were able to complete it with mastery.” During the video club session, Leah goes on to explain the role of prior knowledge in understanding new concepts saying:

I could tell that students were relying on prior knowledge to help them with this lesson. As they were counting a group of objects on the board, they numbered each object one to nine, a strategy that they learned in Monster Math, a math TV show.

Making connections between prior knowledge and instruction is an important part of becoming a teacher. Knowing what your students know and building on that knowledge helps
teach children new concepts. The significance of accessing student prior knowledge evolved over the semester. It did not appear in the first reflection or video club session or written reflections. However, as these pre-service teachers spent more time in their field placement and created and taught lessons to their kindergarteners, they could see the significance of building on what their students already knew. One participant was able to focus on her students and see how the structure of lessons and tools used to teach students could positively impact student learning. These findings illuminate how pre-service teachers are often not able to make connections with university work and instruction until they spend time in their field placement.

Pre-service teacher and student misconceptions about content. Within the category of student understanding, I found several references to misconceptions. These references were in regard to preconceived notions and errors pre-service teachers brought into their classroom and those of their students. These errors have the potential to impact student understanding; therefore, they were included in this section.

During the first micro-teaching lesson and reflection, both Lesley and Anna identified issues within student thinking or noticed misconceptions during their lesson. They referenced an incident where a peer, acting as a child, was counting objects and did not follow the method that was modeled. The directions were to cross out the object with one diagonal line. Instead, this peer (acting as a child) placed an X over the objects they counted. In doing so, she counted one object twice. In an effort to work on one-to-one correspondence during this math lesson, the pre-service teachers focused on this issue during their reflections. They feared this error may cause problems in the future if a single object is counted twice. Lesley said:

We were sure to notice differences, such as one student making X’s on her objects instead of crossing them out. The student’s method for crossing it out was still functional,
but it was made clear to be extra careful not to count it twice. When the object is crossed out or has an X on it then that is only one, and then we move on to the next picture for the next number. Students were also able to show their work after completing the worksheet to show their thought process.

Lesley identified the ability of her students to show their work was significant to ensure they understood the concept. Anna gave an example of how she monitored student thinking and tried to clarify misconceptions during the micro-teaching lesson saying:

I responded to student thinking a few times throughout the lesson. First, when Leah didn’t write the number 9 correctly, instead of telling the class it was wrong and sitting her back down, we had her practice writing it on the board to correct her error. This is an effective method of stopping misconceptions/understandings in their tracks.

As these pre-service teachers began teaching, the way they looked at student thinking changed from a focus on questioning to actually thinking about how students will understand the concepts being taught. In these reflections, the emphasis is truly on how the students interpret the problems and how to anticipate issues students may encounter. There is a realization that just because these are kindergarten concepts that does not necessarily make them easy to teach. Also, a lot more goes into to planning a lesson than just looking at a teacher’s manual. Emily explains:

Before doing the actual lesson with my classroom, I thought I knew all about student thinking. However, when I actually went up and executed the lesson, I learned a lot more about the way students think and learn. I didn’t realize how different all of them think. During my examples, when I would ask them how they got their answer, some of them would simply say, “I don’t know,” while others would have no problem telling me the steps that they did to get there.
Ashley also realized the importance of thinking about how students will solve and interpret problems. She explained what she learned about student thinking saying:

One thing I learned about student thinking is that at this age, they tend to look at everything as a whole instead of just looking at a part. For example, when I asked the students to talk about how many were in the bottom ten frame, the student gave me the answer for how many were in both of the ten frames. I had not thought much about student thinking and the way they might think about the problems prior to this lesson. However, I know I need to think more about how students may think about the different math lessons and anticipate ways to help the struggling students.

Ashley went on to say, “After teaching and talking with my mentor, I am better able to anticipate how the students are going to see problems and what questions they may or may not have.”

Pre-service teachers continued to recognize their misconceptions in their reflections. Hannah discussed how she struggled to teach greater than and less than concepts to kindergartners. Hannah explained:

I learned that students do not think the same way that we do because they do not have all the prior knowledge we do. When I was talking about greater or less than, a lot of the students were asking what that means so I had to explain in more depth. I did not expect them not to understand this, and it was evident that even after explaining this some students still did not understand.

As the pre-service teachers participated in the second video reflections, they began to make connections with student thinking and the math curriculum. They began to identify issues with the curriculum that caused confusion for students. They were then able to think through ways that would help with student understanding. In addition, they questioned students on how they
solved math problems and found that students used a variety of strategies. In some instances, this helped pre-service teachers understand student thinking. In others, it was difficult to decipher how the kindergartner solved the problem. Hannah explained:

I learned that all students think differently, and it is not as advanced of a process as our way of thinking is. When encouraging them to draw pictures to help them, some students could not understand that if I drew three circles over the number three and two circle over the number two and added all the circles I drew, it would give me the answer. This was frustrating because sometimes it is easy to forget that five-year-olds do not think the same way we do.

When looking at student understanding pre-service teachers focused on misconceptions they had, as well as those of their students. These misconceptions showed a lack of understanding of what their students knew or should know in kindergarten. The findings suggest that pre-service teachers do not think about where their students are when teaching a new concept, but rather focus on lesson plans to guide their instruction. They also discussed how surprised they were when students did not understand a concept, and their thinking is so different from that of their kindergarteners. These findings identify a gap in understanding as pre-service teachers begin to teach lessons. There seems to be a consensus that all children learn the same and will learn a concept the first time it is taught. By the end of the semester, there seems to be a greater understanding that all children are different and learn at a different pace.

Student understanding is an essential element of teaching children. These pre-service teachers did focus on student understanding, which included discussion on student prior knowledge and misconceptions from the pre-service teacher and students. However, they did not go in detail about student understanding and mathematical concepts. Much of the conversation
included how surprised the pre-service teacher was that the student came up with a strategy to solve a problem or shocked that they could not understand the task. Pre-service teachers learned the value of accessing students’ prior knowledge to help them understand mathematical concepts. They also began to think through issues they had when teaching math content, as well as issues their students may face when learning these concepts. By the end of the semester pre-service teachers recognized that children look at problems much differently, and they need to think through lessons from the child’s perspective before teaching a lesson.

Summary

In conclusion, the written and oral reflection of these pre-service teachers revealed they focused on classroom management, instruction, and student understanding. Within each category, several themes emerged. The first category, classroom management, included four themes: child blame, logistics and transitions, student engagement, and positive affirmations. These themes illustrated how pre-service teachers often blame their students for their poor behavior, rather than reflecting on the ways they may have handled the situations. The findings indicate that much of the conversation included a focus on transitions and mobility around the classroom. This was also evident when pre-service teachers provided feedback and praise to one another. Their attention to how their peers managed the classroom and taught each lesson was an important element of the conversation as well. Finally, student engagement was discussed throughout the written reflections. This topic was also discussed during the math methods course. While this theme was discussed on numerous occasions, the conversation included engagement as a form of classroom management. Pre-service teachers did not make the distinction between students following the rules and following along with the lesson, and being engaged in the content.
Instruction was another category that emerged from the data. As pre-service teachers watched their lessons and those of their peers, instruction became an essential topic of both oral and written reflections. Four main themes emerged in relation to instruction, including surface level discussion, questioning as tool for pre-service teachers, assessment to gauge student understanding, and noticing mathematics and making connections. These finding indicate that while pre-service teachers are beginning to think about instruction, they do not yet have the ability to move past conversations regarding how items are represented. While they describe instructional elements of their lessons, they fail to make the connection between the lesson and math content knowledge. In addition, they began to see how questioning is an important tool when teaching, but did not use questioning to understand student thinking. Rather, questioning was used to clarify their own understanding of the topics. Assessment was discussed as a form of student understanding. Pre-service teachers used the weekly assessment to identify the language used and teach appropriate vocabulary, not necessarily mathematical concepts. Many of the participants expressed excitement that their students did well on the assessments. Therefore, in their mind, lessons were effective. Finally, pre-service teachers began to notice elements of their lessons that were related to mathematics and make connections between the university setting and their field placement. They began to discuss elements of instruction that went well and others that could be improved upon. They also discussed strategies that helped them teach their lessons.

The final category pre-service teachers focused on was student understanding. While several studies have found pre-service teachers do not have the ability to think about their students at this stage in their development, these pre-service teachers did discuss student thinking throughout their written and oral reflections. The conversation was not in-depth, but there was a
recognition that student thinking is important even though they were not able to address many of these concerns. There was a discussion on how student prior knowledge impacts teaching new concepts. Pre-service teachers also identified several misconceptions they had when it came to student thinking. As they began to spend more time in the field teaching lessons, the differences in how pre-service teachers and children think became clearer. These findings indicate that pre-service teachers are aware of the importance of understanding how children think and accessing their prior knowledge. However, they do not have the skills to effectively use these tools in their instruction. In conclusion, pre-service teachers focus on management, instruction, and student thinking when noticing elements of their instruction and that of their peers. The findings illustrate that while they identify these areas as important, much of the conversation is surface level. They focus much of their attention on management and instructional strategies, but do not spend a great deal of time thinking about the mathematical concepts they are teaching.

Quality of Reflections

The second research question addressed, *What is the quality of pre-service teacher reflections?* This research question aimed to investigate the quality of both written and oral reflections (i.e., video club discussions). Van Es and Sherin (2006) investigated “how teachers noticed and interpreted classroom interactions” orally (p.126). They identified topic, stance, agent, and focus as dimensions of teacher noticing. Research question one addressed the topics pre-service teachers focus on in both their written and oral reflections. This question focuses on the quality of pre-service teacher written reflections as well as the quality and substance of their oral reflections. Van Es and Sherin (2006) define stance as “considering the position the teachers adopted to analyze practice” (p.127). Stance was broken down into three categories, describe, evaluate, and interpret. Van Es and Sherin define description as when the participants simply
narrated the events of the video they filmed. Evaluation was described as comments that were critical and discussed what went well in the lesson or needed improvement. Finally, interpreting referred to comments made by teachers that included inferences to elements of the lesson. In this case, “they made an attempt to explain what happened in the lesson and why” (p.127). Van Es and Sherin (2006, 2012) used this coding scheme to evaluate oral reflections, but the researcher chose to extend this study by using these codes for not only the oral discussion, but also written reflections, to provide consistency among all the data.

To remain consistent, the researcher used the same framework from Van Es and Sherin (2006, 2012) to code the discussion during the video club sessions. While Van Es and Sherin identified several areas of interest when coding their data, for the purpose of this study the researcher chose to use stance and substance to gain insight into the quality and substance of the video club conversations. Stance, as previously mentioned, includes how pre-service teachers described, evaluated, or interpreted the lessons being discussed. Substance refers to the quality of the conversation as well as the collaboration between participants. These items were coded as substantive, surface-level, and closed. Substantive refers to the math discussion that involves sense making between several participants, including evidence and details to support claims made by participants, and the group working together to share their ideas (Van Es & Sherin, 2006, 2012). Surface-level issues include discussion that includes teaching and learning, but does not provide evidence to support claims, or elaboration on topics discussed. Closed conversation includes opened ended discussion that is not addressed by the group (Van Es and Sherin, 2012).

**Written Reflections Related to Stance**

After analyzing the written reflections from pre-service teachers, I found most of the reflections contained descriptions and evaluations of their lessons. I classified very few
reflections as interpretive. The participants in this study were first asked to describe their lessons. Therefore, all the reflections included some form of description. Naturally, upon initial analysis of the data, I found most pre-service teachers described their lessons. However, after further review the participants did evaluate their teaching by identifying elements that were positive as well as what could have been improved upon. Lessons were coded as descriptive 24 times and evaluative 48 times, thus providing evidence that while pre-service teachers do describe their lesson in great detail, they spend more time evaluating each lesson.

**Description.** As mentioned previously, description consists of simply recounting the events of the videotaped lessons. The written reflections for both lessons consisted of almost the same amount of description. Pre-service teachers spent the first part of their reflection simply describing the videotaped lesson and offering very little additional information to the events that took place. For example, Ashley wrote:

> This lesson was about teaching students the number ten. First, we read a book together as a class that had the numbers one through ten in it. On each page it had a number and an amount of objects that matched that number. One student would get called on to say what number was on the page and then together as a class, we would count the objects on the page. After completing the book, I showed students the number 10, and then had the students turn and talk to their friend about what they saw. I then told the students to freeze and had them share about what they talked about and what they saw.

Ashley’s description of her lesson is consistent with those from her peers, simply describing what happened in sequential order and offering little explanation or insight into why she executed the lesson in this particular way. All pre-service teachers were asked to describe their lesson and provide feedback regarding their perceptions of the lesson. The task was intended to
give pre-service teachers the opportunity to explain their lesson, and then allow them to reflect on the lesson and what they may have learned throughout this process. The next section illustrates how pre-service teachers move from simply describing their lessons to evaluating how it went, and looking at changes that could be made for future instruction.

Evaluate. Pre-service teachers were able to evaluate their lessons with the help of guided questions that focused on thinking beyond basic descriptions. These questions focused on what pre-service teachers learned from their lessons, things they would change, and identifying elements of the lesson that went well (see Appendix G for all guided questions). These guided questions provided a framework for pre-service teachers to think beyond basic descriptions of their lessons and begin to evaluate their instruction.

The written reflections pre-service teachers completed indicated that they have the ability to evaluate their lessons with the help of guided questions. There was an increase in the codes for evaluation of lessons from the first to the second reflection from 21 references to 26. After watching her video Hannah noted:

I could have gone more in-depth on certain aspects of the pages. For instance, I could have started the lesson talking about what greater means or what less means as an intro so that when I got to that part of the worksheet, it would be a review for the students, and they would know what it means.

In this reflection, Hannah explained how she could have taught greater than or less than concepts to her kindergarteners. She did not simply recount the lesson, but thought through what she could have done differently. She recognized that the concepts she was teaching were more difficult for her students to understand than simply following workbook pages. Emily also noted a few things that she would have done differently in her lesson stating:
So I think that actually planning what I am going to say and writing everything out instead of having the general idea will help me to reach all of the students because I feel like my questions were more targeted to one side, and I didn’t really mix things up as much as I wanted to.

Emily saw, after watching her video, the importance of planning. Often times pre-service teachers don’t think through the lessons they will teach. This is evident in Emily’s reflection on the importance of writing out every aspect of the lesson in order to meet the needs of all of her students.

In the second reflection, pre-service teachers continued to evaluate their lessons. The conversation was similar to the first reflection, including references to “planning more” or “researching the content.” Ashley stated in her second reflection:

I definitely felt like I have grown in how I teach math. I feel like after this time and talking with my mentor teacher, I am better able to anticipate how the students are going to see problems and what questions they may or may not have.

Emily shows an ability to evaluate her lesson and reflect-in-action when she explains how she modified management strategies to deal with participation during instruction. She explained:

While teaching I noticed that the same couple of students were continuously raising their hands to answer, so in order to mix things up, I decided to start picking out names from the red cup that was used for a previous example.

These references indicate that pre-service teachers do evaluate their lessons in addition to describing what happened. They can identify elements of their lessons that went well and issues that arose during instruction. These pre-service teachers noted how planning, researching, and going deeper into the content would have made their lessons more effective. There were also
revelations about how much they have grown and learned throughout the semester. While these pre-service teachers were able to describe and evaluate their instruction, there was little evidence of their ability to interpret what happened in their lesson. This indicates a focus on noticing elements of instruction and thinking through why they occurred and how they can be modified for future lessons.

**Video Club Discussions**

Video club discussions were analyzed and coded using both the stance (i.e., description and evaluate) and substance (i.e., substantive and surface level) of the conversation. The data suggests, much like the written reflections, pre-service teachers describe their lesson when participating in the video club discussions. The substance of these sessions is often surface-level or off task. There is evidence to support that pre-service teachers evaluate their lessons as well as those of their peers more in the second video club than the first. However, the conversation remains surface-level throughout both video club sessions. The next section will provide evidence of the stance and conversation of pre-service teachers during the video club sessions.

**Description.** Pre-service teachers spent a lot of time recounting events or clarifying elements of their video. Description was a common theme in both video club sessions. Each participant provided background information before they played their video for the group. This conversation did not included questions, but statements about the class, mentor, or events of the day. The substance of these descriptions was generally surface-level or off task. For example, Anna explained the story she used to begin her lesson was actually a story she learned as a child, saying:
I learned this from kindergarten. This is the exact same story my teacher told us. Well I'd changed it because the story my teacher told us was the number 9 got into a fight with someone, and they pushed him but it was like too violent, so I changed it.

Leah explained an instructional issue she faced during the video session, saying:

I'm pausing the video. Um they had such a hard time with the concepts of greater than and less than that we had to tape number lines to their desk, and we did the review sheets that were in the curriculum and they kind of got to point to the numbers and I would be like, “Which one is first? Which one is last?” Like the one that comes last is greater than. So this was kind of like their pre-assessment of the skill because my mentor didn't expect them to get it.

Hannah described an incident she experienced to her peers during the video club stating:

I have to say a little side comment. So we were doing 10 yesterday, and one of the ways ten was written was two sets of five, but it was just smashed together. And one girl like pointed it out "that's two sets of five." Um and I was like I didn't know you realized that.

Emily provided background before her video stating:

I'll skip ahead, but I'll explain what I was supposed to do. What I was going to do was have to have one kid pick a number and put it on the ten frame and then another one pick another number, and they were going to compare it. Like ask the class, which one is more? But it literally took them five minutes just to put the counters down... because they were taking their time. I was like alright speed this thing up.

Description was a key element of both video club sessions. Pre-service teachers provided background knowledge about the lesson or explained parts of the video that may be unclear to their peers. The conversation usually included references to the math lesson in terms of how they
implemented the lesson, strategies they used to help children understand the concept, or classroom management. The conversation did not include a focus on the math content taught.

**Evaluate.** Pre-service teachers were able to judge most of the lessons and provide feedback to one another. However, the substance of these conversations were often surface-level. They often made broad statements, such as, that was a good lesson, or I like the way you moved around the room. For example, Leah said, “I like the way you switched up activities. You did so many different things, but it was all still engaging and didn't stray from your topic at all.” Hannah added, “Yeah, that was real good.”

The group often offered praise for an activity they enjoyed watching, but did not provide additional information about the lesson. Lesley stated, “I really like the nine activity. Did you come up with that?” Hannah replied, “My mentor teacher did.” Lesley, interjected, “Yeah that's really cool because it also shows them how to visual representation the number.” During Emily’s lesson Lesley pointed out, “You did a really good job of like running the room. You were going all over the place. You were keeping and redirecting them so I really liked that, you even watched when they were at their desks you were going around and not just standing there.” Anna added, “You had really strong classroom management.” This conversation included references to classroom management and interesting activities but lacked a focus on math content.

Lesley evaluated Hannah’s lesson when she said, “In your examples, you showed the children there were four, but you did not say the number four. So kind of reinforcing the vocabulary is probably a good idea. It would help them understand what the numbers mean.” Hannah agreed and then added, “But then the test has it phrased completely different. It's like I don't know how what to do.” Ashley interjected, “Just reword it.” This was one of the only times
During the video club sessions that the discussion included feedback on how the math content was taught.

During the video club sessions, pre-service teachers were able to evaluate one another’s lessons. However, the discussion was often surface-level and related to classroom management strategies or activities done within lessons, rather than math content. One pre-service teacher, Lesley, was able to provide instructional feedback related to math instruction during the second video club. This data suggests that while pre-service teachers are capable of evaluating lessons they focus on management issues rather than instructional issues, and rarely reference mathematics in their lessons. There were no references in either of the video club sessions that were classified as interpretive. This would include how conversation on how pre-service teachers “reasoned about what they noticed” (Van Es & Sherin, 2012, p. 107). The next section will review the data as it related to surface-level and substantive conversation.

Substance. In addition to addressing the quality of oral reflection as descriptive, evaluative, or interpretive the conversation was further analyzed as substantive, surface-level, or closed. After analyzing both video club sessions, the findings indicate that almost all of the conversation was surface-level. Meaning pre-service teachers discussed general elements of the lesson, but did not make claims that were supported by deeper conversation. In fact, most of the discussion did not include a math focus at all. There were references to classroom décor, what outfit the pre-service teacher wore, and management issues.

Pre-service teachers engaged in surface level discussion during Anna’s lesson stating: Ashley said, “I would think the next time when you do it like I could hear you just fine when you didn't have the microphone on I don't know it just seemed like you were trying to go back and forth and hold it. I mean wear it, but I could hear it just fine when you
weren't messing it with it.” Anna replied, “Ok yeah in my previous video lessons I've always had a soft voice. I felt weird talking into it.” Hannah added, “The kids listen so much better when you use the microphone.” Emily interjected, “I'm too loud to use a microphone.”

This conversation highlights much of the discussion these pre-service teachers had during the video club. They talked about elements of the video which did not include references to instruction and while they may have discussed the topic as a group, with several different perspectives, they did not talk about relevant subject matter that could potentially impact future instruction.

Pre-service teachers did not engage in substantive conversation in either video club session. Their discussion remained surface-level and often off task. There were two occasions where a closed conversation was coded. This is where a pre-service teacher made a comment about a lesson, and nobody responded or added any information to the lesson.

The findings for this research question indicate that the quality of the participants’ reflections, both oral and written, were mostly descriptive and evaluative. The video club sessions were coded for substance; however, the findings prove that most of the conversation was surface-level. Overall, in both the oral and written reflections the discussion was focused on classroom management or lesson activities rather than mathematics instruction. These findings show a lack of focus on mathematics even though each of the lessons were math based. These pre-service teachers did not focus on the curriculum or concepts that may have challenged children, beyond noting a lesson was “tough.” The quality of written reflections were descriptive and evaluative. It is worth noting that the written reflections included guided prompts to help pre-service teachers think through their lesson and evaluate what they saw. The oral responses
were not guided, and pre-service teachers were able to describe and evaluate lessons. However, they were not able to move beyond surface-level conversation regarding each video.

**Video Clubs and Pre-Service Teacher Reflections**

The third research question was, *How does the use of video clubs support the reflective practice of pre-service teachers?* To answer this question, I analyzed written reflections and transcripts of discussions during video club sessions. Pre-service teachers completed a written reflection after their micro-teaching lesson, and videotaping both of their math lessons in their field placement. In addition, they submitted a revised reflection after participating in each video club session. The revised reflections included any additional information or thoughts they had after watching peer videos and participating in discussions regarding their videos. Finally, the transcripts from the two video club sessions were analyzed.

To answer this research question, I first examined the video club discussions to understand how this process supported the reflections and development of pre-service teachers. Next, I looked more closely at how two of the participants reflected on their lessons and contributed to the video club. Finally, I looked at the feedback pre-service teachers provided in their revised written reflections to gain insight into their perceptions of the video club process.

**Examining Video Club Discussion**

In order to answer this question, I examined the transcripts of the video club sessions. The video clubs provided pre-service teachers with the opportunity to observe their peers in similar teaching settings. These transcripts provided insight into how the conversations evolved over the course of five weeks.

Pre-service teachers provided feedback to each other during video club sessions. This feedback evolved over the course of the two video clubs. The focus of the conversation during
the first video club included questions on when students should be corrected, praise for lessons considered engaging, and talk about how to flip worksheet pages. It appeared that pre-service teachers were just beginning to think about the intricacies of teaching an entire class, and the focus revolved around whole group instruction and general issues. After watching their peers during the first video club and spending two weeks teaching in the field, the conversation began to shift. During the second video club session, there was a greater emphasis on instruction and curriculum. The conversation seemed more concise and not as general. The feedback still contained a lot of praise, but pre-service teachers were able to make connections to the curriculum and how lessons were taught across schools.

During the first video club session, Emily, questioned the way Anna handled a student response. The group began to discuss how to respond to their students. They seemed to be unsure of when they should correct a student and when to ignore the mistake. The conversation began with Emily discussing the issue:

Emily said, “In the beginning (referring to Anna’s lesson) when the kid counted wrong he said eight, and instead of just like ignoring him, I would have froze too like uh no, what do I say? But you should've probably said something to him. Instead, you just moved on to the next kid. Over little stuff like that, sometimes I'm like do I correct, like when they count a little off?” Emily added, “Well you can just say like, How did you get that?” Hannah interjected, “Or let's do it all together.” Anna tried to explain by saying, “I was going to correct him, but then I was like we're about to show our work so it's like correcting him.” Lesley interjected, “I love the way you corrected with the one student who said, no. Like, why do you disagree? It's like oh let's come count it again. So then they all came up there. So I really liked the way you corrected with that one.” Leah
asked, “Do you all correct them when they write numbers backwards?” Lesley responded, “I don't right away, especially if they are just learning it. Like you try to correct it first, but at that point, they are already recognizing it, 4,5,6,7, and so I'm like a little more lenient when they are first starting to write.” Anna said, “I used to just want them to count correctly and like know, ok, this is seven and how many seven is, and I didn't care if they wrote it backwards. As long as they knew it was seven, but now we are correcting because…” Ashley completes Anna’s thought saying, “Because we are moving on to addition.”

This conversation illustrates how these pre-service teachers think about student learning and how they are grappling with how to correct their students, yet not upset them. During this video club session, Leah began to make connections between coursework and implementation of teaching strategies stating, “I saw you apply a lot of what we learned into that, like the questioning. You didn't just pull it out of the air.” Leah also watched Anna’s lesson and pointed out good teaching practices and added areas she needs to work on based on the lesson. She stated:

You had really good whole brain learning. I've been learning a lot about it recently. Like engaging their entire body because you had called on them to respond, and had them listening with their ears and looking with their eyes, that was good. You repeated the vocabulary and spelling throughout. And like you kept the focus, and you had them repeat a lot. That's one thing I have to work on, I'm like oh you get this let’s go.

Anna and Lesley worked together to create their micro-teaching lesson which they taught to their peers. They were one of the few partners who taught that same lesson to their kindergarteners in their field placement. Before Lesley’s video began, Anna stated, “I am curious to see what you were able to do, because we did our lesson together.” As all the pre-service teachers watched
Lesley’s video, they all seemed to be very impressed with her lesson. Lesley inquired about feedback to her lesson:

Lesley asked, “So what feedback or questions do you have?” Hannah replied, “I don’t want to go after yours, especially with how bad mine went (referring to watching her video after Lesley’s). I liked the way you switched up activities.” Leah added, “Yeah, engaging.” Hannah explained, “You did so many different things, but it was all still really engaging, and it didn't stray from your topic at all.” Leah agreed, saying, “Yeah that was real good.” Emily added, “And the way you read the story was real good. Like you kept them engaged. You weren't just like reading (acts out staring at an imaginary book).”

Hannah said, “You like acted it out.” Emily stated, “I like the way you made them a part of it. You told them to put up the stick, and they felt like they were a part of the story.”

While the whole group was commenting on how engaging Lesley was during her lesson and how she was able to get her student’s attention, Ashley’s focus was on where the students were completing their work saying:

I like that you keep your students at their desk for a lot of the math stuff, because in my classroom, my mentor teacher does it on the carpet and when I try to do it on the carpet, it's a hot mess. Cause they are just too cramped on the carpet. And so I've recently started putting some of them are at the desk and some of them are on the carpet but still… And I like the way you have so much room to move, around up there.

Lesley added, “It was actually very helpful for that, because you've got space, and you can walk between their desks, and it’s really good for classroom management.” Anna and Lesley’s were micro-teaching partners. Therefore, they taught the same the lesson to each of their classes.

Anna’s feedback after the lesson included:
I like the way you were able to use all the activities we did and still have time for the
worksheets, and I'm like jealous. I wish I was able, I was able, to like do everything we
had written, and you did it. You got through it quickly, but you still did it effectively.

During Hannah’s lesson the comments focused around how kindergarteners flip worksheets that
are stapled together. The conversation surrounding the worksheets led to a realization that
teaching includes thinking through all the details of a lesson:

Leah asked, “They don't know how to flip worksheets?” Hannah answered, “They
understand the pancake concept, but they don't understand how to get to the pages in the
middle.” Leah explained, “Well it's the back page I always have trouble with.”
Emily asked, “Do you tell them like flip it up, tuck it under, turn it... Lift it up, tuck it
under, and turn it?” Leah replied, “Never.” Lesley adds, “It’s the little things that you
have to think about teaching, but you never did.” Emily said, “Yeah, it works.”
Ashley interjects, “My low kids you have to do it for them because it's painful for them to
do.”

Anna had a hard time verbally providing feedback to Hannah after watching her video. She
stated:

I know this isn't your fault, but I feel like it's hard for me to form an opinion, like I think
you did a good job, but it's hard because there was like no direct instruction. You’re like
not teaching any new material. You were doing a worksheet with them so it was hard.
Emily added, “Yeah, so it wasn't an actual lesson.” Anna seemed afraid to criticize Hannah and
followed up with, “It's not your fault because you said you did like three different video
recording. This isn't the lesson I would have chosen to video record, but like again, that was like
a technical issue.”
The focus shifts after the group watched Leah’s video. They now discussed management strategies. Anna began by inquiring about the expectations for raising a hand to answer questions asking:

Anna asked, “I don't know what your teacher prefers, like the kind of environment where kids can like just call out answers or does she want it like, raise your hand?”

Leah responds, “It's both. It just kind of depends.” Anna replied, “It's like you didn't set expectations at the beginning. I'm assuming that's because they know what they’re supposed to do. Like I just wasn't sure when I was watching.” Leah explained, “They call out and then if I specify like, “See the pencils.” Then they know who's going to answer the next question.”

Towards the end of the video club session, Amy noticed how all the kindergarten students were looking and trying to understand the tens frame. Since all the pre-service teachers are placed in the same grade level and teaching similar lessons, they began to notice some of the strategies students were using to solve the problems, Leah stated:

You know what's been cool is as we've been watching the videos about and learning. I like to see their strategies with the ten frame. Like I'll just show it full and like say how many are in here, and it's funny to see the kids who can just say ten or just say five for the top row or who has to count.

The second video club session included references regarding how pre-service teachers began to use the sessions to dig into teaching issues. Their discussion during this video club revealed these participants used peer videos to talk about concepts children may not understand, the curriculum, and how to effectively teach lessons. The beginning of the second video club illustrates the shift in conversation:
Ashley said, “This concept is really hard for them because we tried it like four different ways because there are like five lessons in a row of this concept. Because they increase the numbers. Like we had to try like three different ways until they like got it.”

Leah asked, “Why is this in chapter 4? And it was so confusing.” Lesley added, “Chapter four was rough.” Ashley said, “They’re like, it's not even funny, it's not working for every kid, but it's the only way that worked the best for most children.” Emily added, “Yeah we did part-part whole, and that was good for my kids.”

While the participants discussed the curriculum, they did not go into detail as to what exactly was the issue with chapter four. They just noted it was difficult for the students. This is consistent with much of their conversation.

As the group watched Ashley’s video, they discussed the use of manipulatives and how they can help kindergartners understand mathematical concepts, but cause management issues:

Anna said, “I liked the use of the mats and how you handled using cubes because that's something that I've had problems with, so I really liked that idea of having them in a circle but also mats to establish like this is your mat don't be putting cubes over here or messing with them. So I liked that a lot.” Leah added, “Oh yeah when I use cubes, I've been taking points away.” Hannah agrees, “Oh yeah I've been taking a lot away. Because it's rough. My mentor, I'm just like should I use cubes or just put them away. I'm like not today, don't use cubes.” Ashley said, “We tried it first without using the cubes but like they just did not get the concept.” Hannah explained, “Sometimes they need to visually see it.” Ashley interjected, “Like it’s abstract. Like I was doing it on the board and modeling it in front of them, but they just didn't get it.” Emily adds, “They need to see it. And once they can actually manipulate it and do it. They’re like oh!” Leah said, “I did the
manipulatives hands on, small group.” Ashley said, “We tried it small group, but still some of them weren't getting it so then we had to do it like this, where I was basically directing them how to do it the entire way. And they all did fine on the test, but this is like, we tried it like four different ways for them to get this concept, and this was the way it worked the best for the students.”

This discussion illustrates a focus on best practices. These pre-service teachers seem to be trying to work through the benefits of using manipulatives to teach math concepts in addition to dealing with the management and logistical issues associated with additional materials. The conversation then moved to teaching kindergarteners how to make eight. During Emily’s video, pre-service teachers looked at how the students manipulated numbers to create a number sentence that equaled eight:

Hannah asked, “Are they trying to make 9 or 10?” Emily explained, “They’re making 1, 2, 3…8.” Lesley tries to understand, saying, “So you would be able to move in the different groups and manipulate it so that they could see that 3 and 5 are the same as 2 and 6.” Emily responds, “And they saw that even though we didn't add anybody that's like a new problem.” Leah asked, “Did you like ask them their thinking behind it? Emily says, “Yeah I said, how do you know?”

Leah adds a good point at the end of the conversation regarding Emily’s questioning. She wanted to ensure the students understood how moving the numbers around doesn’t change the total number of objects. Next, Hannah discussed her lesson with the group and talked through issues she had teaching the equal sign:

Hannah explains her issue saying, “I didn’t know how to explain the equal sign. You can kind of see I struggled with what to say.” Anna said, “My teacher says it means the same
as.” Hannah replies, “The same as. Yeah, I said it means that the number that comes after that, is what it is.” Leah adds, “I like that, the same as.” Hannah replies, “I tried to show them it was the same by doing, like at the end. Like $2 + 1 = 3$, and then I was like you draw two circles over the two and one over the one. How many circles do I have? And there is like 3. And I said, “Do I have three?” I drew the three circles over the three. Some of them got that some of them had a hard time.” Hannah adds, “That’s a really good idea. And like space them out.” Lesley said, “The word altogether and in all is a very good phrasing.” Hannah reiterates, “In all.”

This discussion shows how pre-service teachers are beginning to understand that they might not know what certain mathematical concepts actually mean. The group really liked how Anna’s mentor teacher explained equal as the same as, and would use this in future discussions of the equal sign.

Once again, there was a lot of positive discussion surrounding Lesley’s lesson during the second video club. The pre-service teachers really liked the way she was able to capture the classes’ attention, and they talked about how they needed to incorporate some of these strategies into their lessons.

Hannah discussed Lesley’s lesson, saying, “You had good classroom management. Like they were engaged the whole time.” Leah adds, “Yeah, you’re like putting on a show.” Anna says, “You gave expectations before pretty much everything you did.” Leah said, “I need to learn that.” Emily interjects, saying, “You kept it like a mystery, cause they were like oh, I don't know what's she's doing so they were like…they wanted to be quiet. They wanted to know what was going to happen next.” Hannah adds, “Instead of like next, next we are going to do this, and transitioning into that, it gives them time to talk.
Instead, you were leading them into it.” Anna says, “When asked a question you set expectations for how they’re going to answer it. Just little things like that you always tell them what to do before they do it.”

This discussion showed pre-service teachers can engage their kindergartners and create suspense in math lessons. During the second video, most of the participants moved past discussing logistics of placing students on the carpet or at their desk and how to flip worksheet pages, to how the curriculum is structured and to properly incorporate manipulatives.

This section examined the discussion pre-service teachers engaged in during the video club sessions. The conversation shifted from the first to the second video club. During the first video club, pre-service teachers were interested in when to correct student mistakes, providing feedback to one another, and thinking through where to place students during instruction. The second video club included a focus on how to teach mathematical concepts such as equal and issues with certain chapters within the curriculum. The video club captured the evolution of these pre-service teachers as they moved from observing lessons and beginning to teach to spending a full two weeks teaching math in their field placements. They seem to be much more aware of instructional practices and issues during the second video club session. The next section will highlight two pre-service teachers who did not evolve as much as the rest of the group in terms of noticing essential elements of teaching.

**Individual Pre-Service Teacher Reflections Over Time**

The findings for this research question included information on individual pre-service teachers’ reflections evolution over time through the use of the video clubs and extended time teaching in their field placements. I found that both written and oral reflections increased over the course of the semester for five out of the six participants. The feedback provided by the
participants indicated the video club was beneficial to them. However, the conversation between participants may have lacked depth and focus on some instructional practices. The following section will illustrate how two pre-service teachers used the video club in their reflective practice. I chose to highlight these two pre-service teachers because their contribution to the video club or lack thereof, focused on different elements of teaching. They each used the video to facilitate their reflections; however, their focus differed from the rest of the group.

**Ashley.** In Ashley’s written reflections, there was an increase in her references to key themes in this study over the semester from 16 to 20 references. Her contribution to the video club conversation also increased over the course of the semester. She commented 49 and 55 times respectively during the two video club sessions. This is in stark contrast to some of the other participants who joined the conversation over 100 times. While she did contribute more to the group discussion, the conversation was often superficial or related to her mentor teacher, in both the written and oral reflections.

Ashley’s reliance on her mentor is evident in her written reflections and oral contribution to the video club. During her first written reflection, she commented heavily on her mentor in terms of how she would intervene with the lesson if there were issues. She stated:

*The last part that did not get videotaped, my mentor teacher said that we should just see how the lesson goes and decide if we continue. At the end of my lesson, my mentor teacher decided that she was going to teach the next part of the lesson.*

Ashley’s mentor also stepped in when her lesson began to fall apart. She explained how this impacted her, “I also know that once my teacher had to step in my confidence was shaken, and it was hard for me to recover after that.” She also referenced how her mentor had to step in to handle classroom management issues, stating, “My mentor teacher had to say something to get
the students to pay attention to me.” There was also an issue with the manipulatives Ashley passed out to her students, and she seemed to blame her mentor for them not having the correct number of items in each bag saying, “My mentor teacher told me that she thought there were twenty-five counters in each bag, and I trusted that.” During the second written reflection, Ashley only referenced her mentor teacher twice. Explaining how she and her mentor decided to present the material she stated, “My mentor teacher and I had tried several different ways to teach this topic and this seemed to be the way that was most beneficial to this group of students.” She seems to think of her mentor as more of a partner in her second reflection, and the emphasis moved from her mentor to herself and the students. She also seemed to recognize the support her mentor provided stating, “I have a really great mentor teacher who is really good about giving helpful feedback and suggestions that I am able to apply to my teaching.”

Ashley continued to reference her mentor during the video club sessions. She did not provide much feedback to her peers but when she did, it was in relation to her mentor teacher. For example:

I think for classroom management. The one thing my mentor teacher tells me to do is move around the carpet and walk around while the kids are at the board to kind of help manage behaviors, but that's just what my mentor teacher tells me.

Ashley again provided advice to her peers stating, “But like, the one thing my teacher tells me all the time. She's like make sure you have all the kids’ attention before you move on. Because if not their still going to go off in their own little world.”

The feedback and contribution Ashley provided during the video club sessions were often not related to instruction. For example, she stated, “What my teacher does with her microphone is she ties it so it’s shorter around her neck so you don’t not have to hold it up. That way, you’re
not messing around with it.” This recommendation was in reference to using the microphone while teaching. She also added, “I like that rug. It's like so different than my colored carpet.” She goes on to comment on a lesson from her peers regarding making math problems authentic by using student names in word problems. She stated, “We choose the good kids to be put in the problem.”

Ashley relied on her mentor for instruction as well as management during her lessons. At one point, her mentor even had to step in as her lesson began to go off track. Ashley seems to lack confidence in her teaching and thus finds it difficult to provide constructive feedback to her peers. Her feedback is often related to cosmetic classroom elements, or she supports her comments by explaining they are not her views, but rather that of her mentor teacher.

**Anna.** Anna was the only participant whose reflections decreased over the course of the semester. Her written reflections contained 25 references to the identified themes while her second reflection contained only four. In addition, she did not actively participate in the video club discussions. She was vocal in discussing her video during the video club session, but did not provide detailed or quality feedback to her peers. During the video club, she engaged with the group 62 times during the first session and 41 times during the second session.

Anna also focused much of her comments on her mentor teacher. In contrast to Ashley, her references to her mentor were framed as blame rather than support. For example, “My mentor teacher didn’t want the students to miss out on any of the common core aspects, and due to time constraints, I had to stick to the curriculum.” She added, “As mentioned, my lesson had to be drastically changed to accommodate my mentor teacher’s requirements in the field.” Anna went on to explain:
My mentor teacher pointed out to me that because I was following my lesson plan and not the book, I missed a few higher-order-thinking questions. These are important and next time I’ll be careful not to forget them. She also pointed out that while my ideas were creative and related to the topic being taught, the attention I gave them took away from the essential questions in the book.

Anna and her mentor struggled to communicate effectively during the fall semester. Some of this miscommunication is referenced in a conversation she had with her mentor after the lesson stating:

- After I taught the lesson she said, “You did good,” but she was a little disappointed because I did try to veer off of the curriculum because we were instructed to make our own lesson plan and not follow the curriculum exactly. And she wanted me to follow the curriculum exactly, and like it was kind of a miscommunication. She didn't realize I was going to try to reinvent the wheel, so like… we talked about it, and she was like you know next time stick to the curriculum and if your assignment is not to follow the curriculum exactly, then add to it but don't take away from the curriculum and that’s what I did.

Anna’s discussion regarding her mentor continued, as she discussed areas she needs to work on as a teacher stating:

- My mentor teacher and I are working on improving my academic language and vocabulary when it comes to mathematics instruction. I’ve never had to dissect such a simple problem like “Which number is bigger, six or three?” and I found myself stuttering a little when I was searching my brain for the correct terminology. This is a work in progress, and I can see my own slight improvements in the video, but there’s
definitely more progress to be made. Carrying around my own notebook on top of the teacher’s book is a strategy my mentor teacher has introduced to me, and it has been working tremendously.

During the video club sessions, Anna made comments such as, “What I found when I tried to teach the finger thing, was my kids aren't very flexible with their fingers. It doesn't work for my kids.” This comment was in reference to a counting on strategy one of the participants used during her lesson. Another comment she made in reference to her videotaped math lesson included the following:

So the video is really choppy because every now and then there's a kid who (models a kid looking up) so it's going to skip a lot, but it’s all there. And at one point towards the end, somebody has a meltdown, well he actually fell asleep. So um, I tried to transition the kids and wake him up. So yeah, that’s that.

I chose to illustrate these two pre-service teachers because their contributions and reflections were distinctly different from the rest of the group. While some of the initial video club conversation revolved around mentor teachers and superficial discussion about classroom decor, after the two-weeks in the field, most of the pre-service teachers in this study switched their focus to their students and curriculum. However, Ashley and Anna remained fixated on their mentor and either choose not to contribute to the group discussion, or did not feel comfortable in this group setting. While Ashley’s contribution to the video club did increase over the two video sessions, the substance of her comments did not evolve over the sessions. Anna, on the other hand, did not use the video club as an avenue to reflect on her teaching or provide feedback to her peers. Instead, she discussed her mentor teachers’ feedback and comments. The
next section will provide further insight into how the video club process supported the reflective process by examining the feedback provided by the participants.

**Positive Feedback on the Video Club Process**

This section examines the feedback provided by pre-service teachers in their written reflections to gain insight into the extent to which they believe the video club and independently watching their recorded lessons supported their reflective process.

To begin with, Lesley explained how watching her video impacted her opinion of the lesson, stating:

The video was helpful because it showed me moments that I was not aware even happened, for instance, the student in the red-striped shirt moving from place to place and the student in the green shirt swinging his arms. My opinion changed slightly because I saw that some students who were seen not paying attention in the video did not do as well on the activity. I did not notice that the red-striped shirt student was moving and looking around, and then he struggled later on understanding that he needed to cross out each ticket and count how many each one had (not all had nine).

Leah recognized the importance of clear expectations and following through with classroom management issues after watching her video. She explained, “The video revealed that I need to be more assertive regarding student behavior during the lesson and set high expectations in the beginning of the lesson so that students know the high goal set for them.” Hannah added, “I also learned new ways for behavior management during whole group instruction, as well as feeling more comfortable in my classroom management skills compared to some of my peers.” These pre-service teachers used their videos to see issues they missed during the lesson as well as identify issues they need to work on in the future.
There was a large emphasis on noticing instruction and instructional issues during the videotaped lesson. Lesley noticed that her students might learn differently. She stated:

After completing this lesson and re-watching the videos, I am able to see how my students are visual and kinesthetic learners. This shows that my future lessons should contain movement aspects to learn the concepts for each of the students. The students will have a visual representation of the problem as well as a way to solve it without sitting at a desk for the entire time.

In addition, Leah found ways she could improve on her questioning strategies explaining:

The video taught me that I ask lots of questions to the students, but I want to explore the answers deeper. Maybe in the future, this could be by seeing if other students agree with one student’s answer or further questioning the student during independent work time.

Hannah explained, in her first video reflection:

Some knowledge that I gained through watching the videos was how I could incorporate different activities and still stay on task with my students and the objective. I also learned that there are several different ways to teach students and that even though some ways are more effective than others, the lesson can still be fun and teach the students.

During her second reflection, Hannah explained the lesson went well because her kindergarteners were engaged and correctly solved the given math problems. After watching her video, she stated, “I still feel that this lesson went well with the students, and the video showed engagement and successful self-correction and correct answers when solving the problems and comparing the numbers.”

Pre-service teachers focused on how they looked and acted during instruction. Ashely explained:
I learned from watching the video that I need to watch my facial expressions and not go blank in the face. I feel that the video was helpful in seeing how I look and act as a teacher. It also made me see some things differently than I had remembered.

Hannah had a similar revelation, saying:

The video was helpful because I got to re-watch things I couldn’t remember and got to see how I carry myself in the classroom. Watching the video gives me feedback on myself for myself. The videos are also helpful because they provide me with what I need in order to better myself for the next lesson.

Emily added:

Watching the video over, and over, again has helped me see what actually went well in the lesson and what did not. Because it was my first time ever teaching a math lesson for my actual kindergartners, there was a lot more bad than good.

Ashley and Hannah used the video to evaluate themselves as teachers. They noticed how they looked to the students and how that can potentially impact instruction. They also noted how watching the video helped them see how things may have gone better, worse, or different than they remembered. They had positive feedback for the use of video in analyzing how they carry themselves during instruction.

Pre-service teachers identified several ways that videotaping their lesson was useful. Most participants commented on being able to see things they missed during instruction. However, most of their comments were related to classroom management issues. They also found watching their peers useful, as they were able to see similar lessons taught using different instructional strategies. One participant even noted how watching her peers helped her become a
more confident teacher. There seemed to be a realization that they are all on the same level and can learn a lot from each other as well as their own lessons.

**Video Clubs and How They Support Reflective Practice**

This study used collaboration as a way to help pre-service teachers reflect on their practice. In order to analyze how peer collaboration supported the reflective practice of these pre-service teachers, I examined the reflections each participant completed after they videotaped and watched their math lessons, as well as a revised reflection they completed after each video club session. I found that pre-service teachers included greater references to their peers in the revised reflections as opposed to their micro-teaching reflection which they worked with a partner to create a lesson. However, they mentioned the feedback they received from their peers during the micro-teaching lesson in regard to how they modified their lesson for their kindergarteners in their respective field placement. There were several positive references to the peer collaboration process as well as what they learned from each other.

To begin with, Leah mentioned what she learned from her peers during the debriefing session, saying:

Working with my peers helped me with this lesson because I was able to learn from their strengths and weaknesses. My peers had lots of beneficial tips and tricks such as incorporating stories, and lesson focuses as integral parts of the lesson. This helped me remember to keep the lesson engaging and focused.

Hannah added how she found the process to be beneficial because she was able to compare herself to her peers and realize they are all dealing with similar issues and struggling with the same tasks. She explains:
After watching the videos with my peers, I learned that we were all still on the same playing field, for the most part, with classroom management. It made me feel better to see that I wasn’t the only one with a slightly noisy class.

Hannah explained how the micro-teaching lesson prepared her for the lesson she videotaped. She said:

Working with my peers made me feel more prepared for this lesson because I learned that if I can get up and teach a lesson in front of twenty adults, I could stand up and teach in front of a group of twenty, five-year-old children.

Ashely received feedback from her micro-teaching lesson that she could transfer to the lesson she taught in the field. She reflected:

Working with my peers did help me prepare for the lesson. Getting some of the feedback from my micro-teach helped for how I instructed the lesson. In my micro teach, I often forgot to go back and reference the manipulatives, and it was something that I tried to make sure that I did when I was teaching my lesson to my class.

Leah learned a great deal from her peers, she said:

In Ashley’s lesson, she used mats to keep all of the manipulatives in one place. The kids sat on the edge of the rug during whole group. They were able to focus and stay organized. If I taught this lesson again I would use manipulatives in this way. My peers were again very encouraging with their feedback. It was beneficial to watch their lessons because I learned from their management strategies.

Lesley learned about her ability to engage her students during the debriefing. She explained:

After working with my peers, they expressed that the teaching styles presented were energetic and engaging. They described that the students were kept in mystery and were
excited to see what would happen next in the lesson. The students were waiting quietly eager to learn what the next activity would be.

In conclusion, these pre-service teachers found the peer collaboration process helpful. Research suggests that reflection is a “social process” (Copeland et al., 1993; Convery, 2001; Parsons & Stephens, 2005; Richert, 1992; Ruddock, 1992; Russell, 1993; Zeichner & Tabachnick, 1991). The use of video clubs allowed pre-service teachers to better reflect on their instruction. In addition, research suggests that placing peers in the same grade level and allowing them to watch their lessons before supervisor feedback, may create a lasting impact on the participants (Danielowich, 2014). Pre-service teachers also cited how the micro-teaching lesson and peer feedback helped prepare them for teaching math lessons to their students in the field. They also referenced several incidents of encouragement from their peers, and they learned new ways of teaching the same topics. Since they were all placed in kindergarten, they could see different strategies to teach similar concepts. Overall, these participants felt they benefited and learned from their peers.

Summary

In this chapter, I presented the findings from this study. The findings were based on an analysis of videotaped reflections, micro-teaching reflections, revised reflections, and transcripts of two debriefing sessions from six pre-service teachers during one semester in a mathematics methods course. The findings were discussed in relation to the three main research questions. In the first section, I discussed the major themes that emerged from the data, in regard to what pre-service teachers reflect on. I found these pre-service teachers reflected upon classroom management issues, instruction, and student thinking. The themes found within each of these categories illustrated that when pre-service teachers discussed classroom management they were
quick to blame student for issues, they were concerned with logistics and transitions during instruction, discussed student engagement as a way to manage behavior, and provided positive affirmations to their peers in relation to transitions and mobility during a lesson.

The next section analyzed the quality of pre-service teacher written and oral reflections. Using the framework from Van Es and Sherin (2006, 2012) I coded the written data for stance, which includes descriptive, evaluative, and interpretive reflections. The oral reflections were analyzed using stance as well as substance. Substance was divided into three codes substantive, surface-level, and closed. The findings illustrate that these pre-service teachers describe their lessons in great detail and are able to evaluate the effectiveness of each lesson in both their oral and written reflections. The substance of the oral reflections remained surface-level with no substantive comments during the video club discussion. There was no evidence that these participants were able to interpret their reflections in order to reason about what they noticed during the lesson. They did not move past simply stating how and why a lesson was good or bad to make inferences regarding what they noticed when watching the video clips. While both lessons viewed by the individuals and group were math lessons, pre-service teachers struggled to make connections to math instruction. Most of the conversation included references to management strategies used by peers. or elements of activities designed to engage children. There was little explanation about these activities or discussion as to why they may have been effective.

The last section of this chapter included an analysis of how the video club process supported the reflective process for pre-service teachers. The data suggests that the conversation evolves over the course of the semester and video club sessions. Pre-service teachers began by discussing logistical and trivial classroom issues, and as they spent more time in their field
placement, the conversation evolved to management and curriculum issues. In addition, I looked at how two of the pre-service teachers who participated in this study focused their reflections on their mentor teachers and basic classroom concerns. Finally, the feedback gathered from the revised reflections provided insight into the perceptions these pre-service teachers had of the video club process. The data suggests that the peer collaboration and video recording aspects of the study had a positive impact on these participants.
CHAPTER 5

DISCUSSION, RECOMMENDATIONS, AND CONCLUSION

The purpose of this study was to investigate the use of video clubs with pre-service teachers. Specifically, I was interested in what pre-service teachers reflect on when watching their lessons and those of their peers, the quality of their written reflections and video club discussions, as well as how the video club supports the reflective process in the early stages of becoming a teacher. This research was conducted using six pre-service teachers in their senior year in an early childhood education program. The data collected consisted of reflections from one micro-teaching lesson, two math lessons taught and videotaped within field placement classrooms, transcripts from two video club sessions, and two revised reflections after each video club session. This chapter will discuss the findings of each of the research questions through the lens of the current literature on the reflective practice of pre-service teachers. Furthermore, this chapter will explore the limitations, implications of these findings, and the conclusion of this research.

Discussion

The theoretical framework that guided this study was that of Dewey (1933), Schön (1983, 1987), and Brookfield (1995). As discussed in chapter one, this study explored the reflective practice of pre-service teachers and their ability to identify an issue in their instruction, evaluate this issue, and make a change to the problem at hand. The goal of this research was to investigate what issues and topics pre-service teachers focus on when reflecting on their lessons and how video clubs support reflective practice.

The shifts and new reform measures call for teachers to show they have a positive impact on learning and are able to make instructional changes in action (NCATE, 2008). Research
suggests that when pre-service teachers are given the opportunity to reflect on their practice they are better prepared to deal with instructional issues during their teaching (Bean & Stevens, 2002; Etscheidt, Curran, Sawyer, 2012; Harford & MacRuaire, 2008; Ryan, 2013; Ward & McCotter, 2004). The aim of this study was to illustrate what pre-service teachers focus on and how video clubs can support the reflective process. These questions were answered using written reflections and transcripts from video clubs collected from pre-service teachers. The research questions were as follows:

1) What aspects of teaching do pre-service teachers reflect on through the use of video clubs?

2) What is the quality of pre-service teacher written and oral reflections?

3) How does the use of video club support the reflective practice of pre-service teachers?

The theories of Dewey (1933), Schön (1983, 1987), and Brookfeild (1995) guided this study. Pre-service teachers used videos to first identify issues in their instruction and then worked together to solve these problems. The next section will highlight how the literature connects to each of the research questions posed for this study.

**Focus of Reflections**

The first research question investigated what aspects of teaching pre-service teachers focus on through the use of written reflections and video clubs. To review the findings and make conclusions based on the data collected for this study, I must return to the literature regarding reflection. According to Schön (1987), there are various times in which reflection takes place. This research question concentrates on reflection-on-action or as McDuffie (2004) explains, delayed reflection. Pre-service teachers’ written reflections provided insight into their thinking and what they focus on when looking at their lessons (Bain, Ballantyne, Mills, & Packer, 2002,
Collier, 1999, Moon, 2006, Peel & Shorthand, 2004). According to Dewey (1933) and Schön (1983, 1987), reflection occurs when a teacher is faced with an imbalance in her classroom. This imbalance is a troubling situation that leads her to make a change in her practice. The data from the six participants in this study indicate that there was a focus on classroom management, instruction, and student understanding. These findings indicate that these pre-service teachers found issues with these three areas of instruction. This is consistent with the literature that states instructional and classroom management issues are frequently addressed in reflection of videotaped lessons (Rhine & Bryant, 2007).

Within the three major categories that pre-service teachers focused on during their reflections, several themes emerged that illustrated exactly what the participants found important or troublesome during their instruction or when watching their peer’s instruction. To begin with, participants noticed elements of classroom management throughout their reflections. They often focused on blaming the children or circumstances that were out of their control. This is consistent with the literature that supports new teachers are often afraid of failure, and look for outside sources as a reason for a disequilibrium in the classroom (Richert, 1992). These pre-service teachers also focused on mobility, transitions, and logistics. They noticed these elements of instruction in terms of their own lessons and in video club discussions. Van Es and Sherin (2002) identify noticing, “what is important in teaching situations” as a characteristic of noticing (p. 573). These findings suggest that pre-service teachers see logistics and mobility during instruction to be a key element of quality instruction. This may be a result of feedback from peers and mentor teachers during instruction. Finally, student engagement and classroom management were used interchangeably throughout reflections. Student engagement seems to be
a word pre-service teachers have heard a lot, and they are not able to discern the difference between when a student is paying attention to a lesson and engaged in the content.

The finding also suggest that pre-service teachers focus on instruction when reflecting on math lessons. The themes that emerge from this category include surface level discussions, questioning as a tool for pre-service teachers, assessment to gauge student understanding, and noticing mathematics and making connections. In the written reflections, pre-service teachers were provided guided questions to answer, related to their math lesson. These questions led to greater discussions on mathematics. However, it would appear this was only because the context of the lesson was related to math and the conversation remained surface level. The lack of depth on mathematics and instruction may be due to pre-service teacher’s lack of understanding of mathematical concepts and pedagogy (McDuffie, 2004). In addition, questioning and assessment are terms that pre-service teachers hear a lot in their field placements and receive feedback on during instruction. There is research to suggest that what a teacher notices is directly associated with her experience (Van Es and Sherin, 2002). Findings from this study are consistent with the literature, in that the participants notice the concepts of questioning and assessment because they have experiences with them both in university coursework and during field placement.

The final area that pre-service teachers noticed when reflecting included student understanding. There is a consensus in the literature that indicates pre-service teachers do not focus on students or student understanding, but concentrate on themselves throughout their reflections, with little regard to various aspects of teaching (Laboskey, 1994; Santagata, Zannoni, & Stigler 2007; Star & Strickland, 2008). This study found that while there is a significant emphasis on the pre-service teacher during their reflections, there is also an awareness of the students, their engagement, and understanding. In addition, as pre-service teachers began to teach
more lessons in their field placements, they began to think about student achievement and understanding in different ways. This supports research that indicates video-based reflections provide pre-service teachers the opportunity to analyze their instructional practices, reasons for management issues, and focus on their students in terms of achievement and understanding (Rhine & Bryant, 2007).

In addition, I found that pre-service teachers often struggle with understanding student thinking during instruction (Mewborn, 1999, Stump, 2010). Research indicates the ability to understand and interpret student thinking is essential, and the use of video can facilitate this skill, by allowing pre-service teachers to reflect and review student responses in a safe environment (Philipps, Thanheiser, Clement, 2002; Sherin & Han, 2004). This study provided evidence to support pre-service teachers’ awareness of how students think and solve problems. There was a focus on their students throughout their written reflections.

The emphasis of this research was on how pre-service teachers look at their lessons, notice events during instruction, and think about changes to their future instruction. However, reflection-in-action was noted in one of the videotaped lessons and the participant’s personal reflection. This shows that while uncommon at this stage of their development, pre-service teachers do have the ability to reflect-in-action on instructional elements in which they feel comfortable. While most participants did not reflect-in-action, all of them were able to reflect-on-action which is essential to Schön’s theories of reflective practice, and an important step to move toward making changes during instruction.

As these participants moved through the semester, they were able to make connections between their instructional practices, student behavior, and student achievement. This supports video club research that indicates teachers who participate in these groups begin by discussing
pedagogy, and then move on to making connections between pedagogy and student thinking (Sherin & Han, 2003). There is also evidence from the video club sessions that suggest pre-service teacher focus evolves over the course of the semester. The findings indicate that during the first video club session, pre-service teachers focused on classroom management and student understanding, while positive affirmations and noticing areas of mathematics was noted more during the second video club session. This is consistent with the literature that explains that making sense of events comes with experience within a specific context (Van Es and Sherin, 2008). This session included greater references to instruction and how lessons were taught. There was a consistent conversation around classroom management throughout both video club sessions and written reflections. This study supports findings that show pre-service teachers engage in reflective practice, and their focus shifts from the self to the students as they begin teaching in their field placements (Lee, 2005).

In conclusion, the first research question aimed to investigate what pre-service teachers focused on when participating in video clubs and writing reflections based on their lessons. The findings are consistent with much of the literature regarding reflection. Since the literature was used in the deductive analysis process of coding the data, the categories are consistent with Davis (2006). This study investigated three aspects of teaching identified by Davis which included a) classroom management, b) focus on instruction, and c) a focus on student learning. Within each of these categories several themes emerged to illustrate what these pre-service teachers focused on when reflecting on their lessons. Researchers have found that pre-service teachers struggle to understand student thinking. This study supports those assumptions, but also found that pre-service teachers began to think about student learning as they moved through the semester. There is also evidence that shows the focus of reflections evolves over time due to the time in the field
and the use of a variety of reflective tools. In addition, the conversation did not focus on mathematics as a content area but rather as the setting in which the videos were taped. This lack of focus on mathematics indicates that pre-service teachers may have trouble understanding the concepts themselves and chose not to focus on the content of the lesson. This could also be a factor as pre-service teachers may not have opportunities to observe many math lessons, therefore they do not have the tools and experience to participate in discussions on the content.

**Quality of Written Reflections**

The second research question focused on the quality of the reflections. Written reflections and oral discussion from the video clubs were analyzed. There is a push for the use of reflection within teacher education programs. However, simply giving pre-service teachers the opportunity to reflect does not promote reflection (Davis, 2006; Hatton & Smith, 1995). This study employed the use of guided prompts to promote written reflections. These prompts allowed pre-service teachers to reflect on their lessons using guided questions rather than simply describing the events in the videos. Providing pre-service teachers with guidance as they begin to look at their lessons is important for them to notice key elements of teaching (Danielowich, 2014; Ge & Land, 2004; Santagata & Guarino, 2011; Star & Strickland, 2008). The use of written reflections or reflective journals have been used in many teacher education programs (Bain, Ballantyne, Packer, & Mills, 1999). This study supports the current literature, stating that the use of written reflections and guiding prompts within teacher education programs help pre-service teachers engage in deeper reflections (Lee, 2005; Schweiker-Marra, Wilson, & Pula, 2003; Spalding, Wilson, & Mewborn, 2002).

Davis (2006) found pre-service teachers focused on the fact “that learning is happening and what is being learned” but didn’t notice how learning happens (p. 295). The findings for this
research question indicate similar issues as these participants provided descriptions on what they taught, but did not spend a great deal of time on why these strategies were effective and how students came to understand new concepts. This was evident in both written and oral discussions. Additional findings indicate that pre-service teachers have the ability to reflect beyond simple descriptions and themselves, to see how students are engaged and understand the content.

As the semester progressed, these pre-service teachers began to evaluate their lessons and move beyond simple descriptions to include additional information within these descriptions that led to evaluations of their instruction. Davis (2006) recognized that pre-service teachers could reflect critically on several aspects of teaching. However, we cannot expect them to automatically possess the ability to be reflective (Zeichner & Liston, 1996) we must provide them with opportunities and experiences that will help them notice key elements of teaching and learning (Bean & Stevens, 2002; Etscheidt, Curran, Sawyer, 2012; Harford & MacRuaire, 2008; Ryan, 2013; Ward & McCotter, 2004). The findings are consistent with the literature; pre-service teachers were given the opportunity to reflect using guided prompts that allowed them to describe their lessons and then begin to evaluate their instruction.

The most surprising finding regarding the quality of reflections was pre-service teachers’ lack of focus on mathematical concepts. Throughout the oral reflections the discussion referenced math but only because that is what the lesson was about. The conversation rarely included clarification or questioning regarding math concepts. The conversation was surface-level and did not include substantive conversation between peers beyond the use of a microphone or classroom management strategy. As noted previously, mathematics is a difficult subject area for many pre-service teachers and their lack of understanding of the concepts may be a reason
participants focus on areas of instruction they can clearly identify and articulate, such as classroom management.

**Video Clubs and the Reflective Practice of Pre-Service Teachers**

The third research question investigated how the use of video clubs support the reflective practice of pre-service teachers. The data was collected from written reflections and transcripts from video clubs. The findings based on this research question, include information on how the conversation evolved over the course of the semester, how two of the participants used the video club sessions, and positive feedback in the process. This section will discuss the findings related to the current literature.

First, Schön (1987) recognized the value of reflection, explaining that reflecting on your teaching allows you to see things that you did not realize you were doing. This was evident within this study due to the use of the video clubs. Pre-service teachers referenced several incidents that they only became aware of after watching their video. Brookfield (1995) discussed the four lenses that teachers can use to improve their reflections. This research question included the use of two of those lenses, student views and colleague views. Videotaping allowed pre-service teachers to understand how their students see them during instruction, and the video club sessions allowed them to give and receive feedback with their peers. Reflection is not a solitary process, but a social process in which participants can give and receive feedback from one another (Copeland et al., 1993; Convery, 2001; Parsons & Stephens, 2005; Richert, 1992; Ruddock, 1992; Russell, 1993; Zeichner & Tabachnick, 1991). There was positive feedback from participants on the use of the video clubs, which is consistent with the literature surrounding the effectiveness of group reflection. During the video club sessions, pre-service teachers discussed four main topics regarding their experience and personal revelations,
classroom management issues, noticing of instruction, and effects of peer collaboration. Pre-service teachers made connections to children and content during the video club sessions. Scott and colleagues (2013) identified similar results, which they contribute to the experience of viewing peer videos of similar lessons. They find that pre-service teachers have a vested interest in the videos because they all created similar lessons, and the settings were authentic and personal. The participants in this study were able to share similar challenges with the curriculum and children because they were all placed in the same grade levels.

Brookfield (1995) also discussed that in order to become a critical thinker, one must stand outside themselves and examine what they do through a different lens. The use of the videotapes of lessons in combination with the video club sessions allowed pre-service teachers to see themselves through the lens of their students and colleagues. Pre-service teachers began to notice how their actions are seen in the eyes of their kindergarteners.

Lee (2005) also found differences in pre-service teacher reflections based on the format in which the reflection was conducted. For example, written and verbal reflections can provide different levels of reflection and identify strengths or weaknesses in the communication style. This study found similar results as some participants did not verbally engage in the group discussion as much, but provided detailed written reflections. Lee (2005) suggests using multiple formats and providing a variety opportunities to allow for practice to reflect on their instruction. This study utilized a variety of opportunities to reflect and then revise those reflections in both written and verbal formats.

In addition, instruction was a common theme throughout oral and written reflections. Rosen (2008) found that video-based reflections provided pre-service teachers with the opportunity to focus on instructional aspects of their lessons and pay more attention to students
in terms of their learning, understanding, and thinking. The use of video and written reflections has proved to have an impact on pre-service teachers’ ability to reflect-on-action. The findings in this study indicate that these participants were able to examine their own actions and become critical of their teaching.

Video clubs where participants meet and discuss videos of lessons have also been found useful in improving the instructional practices of pre-service teachers (Danielowich, 2014; Harford & MacRuarie, 2008; Van Es & Sherin, 2002, 2004, 2008). The findings support current research regarding the discussion and focus pre-service teachers have on instruction and how lessons are taught during these sessions. These meetings provided pre-service teachers the opportunity to learn from each other and reflect on their own practice which the participants found beneficial (Frederiksen, Sipusic, Sherin, Wolf; 1998; Tochon, 1999; van Es & Sherin, 2008).

In conclusion, pre-service teachers focused on classroom management, instructional representation, student understanding, and feedback during the video club sessions. Through the course of the semester and the two video club sessions, there was a shift in emphasis from the self and mentor teacher to the students and instructional practices. These findings support the current literature regarding the effectiveness of peer collaboration in pre-service teacher education (Frederiksen, Sipusic, Sherin, Wolf; 1998; Tochon, 1999; van Es & Sherin, 2008). Participants provided feedback to one another with open-ended dialogue as well as answering guided questions. Written and verbal reflections allowed these pre-service teachers to explore their lessons in a variety of ways. The next sections will focus on the limitations and implications of this study.
Limitations of the Study

Limitation of this study include generalizability and researcher bias, logistical issues, and time restraints. This section will provide detailed explanations of each of these issues. First, this qualitative case study focused on understanding the reflective practice of pre-service teachers in an early childhood education program. A cohort of early-childhood education students were solicited for this study. I choose one group of pre-service teachers who were all placed in a kindergarten class during the fall semester of their senior year. I was interested in the dynamics of this group of pre-service teachers during their final semester of course work before their internship. Therefore, the results are not generalizable to a larger population which can be considered a limitation of this study. In qualitative research, generalizability is dealt with on a “case-to-case transfer” (Schwandt, 2007, p.299). “Sufficient information on the case studied” should provide details in which the reader can identify the “degree of similarity between the case studied and the case to which findings might be transferred” (Schwandt, 2007, p.299). Miles and Huberman (2002, p.174):

The goal is not to produce a standardized set of results that any other careful researcher in the same situation or studying the same issue would have produced. Rather it is to produce a coherent and illuminating description of and perspective on a situation that is based on and consistent with detailed study of that situation.

This study has provided contextual information on the school setting and participants through three different data sources. The reader has the tools to make an informed decision on the generalizability of this study. In addition, the researcher was also the instructor of the course. This may have impacted the results as she guided the topics of the course and the study. Pre-
service teachers may have reflected in ways that they thought the instructor would like, thus skewing the data.

Next, there were two logistical limitations, filming the lessons and timing of the video sessions. To begin with, filming the lessons was an issue for a variety of reasons. First, some mentor teachers did not allow children to be in the frame. This caused a problem for Anna who had to edit her 50 minute video to ten minutes due to students turning around or walking in front of the camera. It was difficult for her peers to give feedback on her lessons because so much of the lesson was edited or completely removed. Ashley and Hannah both experienced issues with their video recording as well. Ashley thought she pressed record but then looked at the camera over half way through the lesson and it was off. Hannah recorded her video but it did not save so she lost that entire video and had to teach a new lesson, one in which she did not have adequate time to plan. These pre-service teachers were left with fragments of a lesson or taught a new lesson in which they were not as prepared.

The timing of the videotaped lessons was also an issue. A recurring comment throughout the first video reflection was how many of the participants had not seen a math lesson taught by their mentor teachers prior to them videoing their first lesson. Providing multiple opportunities for pre-service teachers to teach and see expert teachers teaching math lessons may help ease some of the trepidation that comes with teaching a content area for the first time. To negate this problem, I scheduled a math lesson to be remotely observed by participants. However, the lesson began before the remote observation started and it was apparently a review for a test where students worked independently for 45 minutes and then the teacher went over the work. This lesson did not provide pre-service teachers with a good model of mathematics teaching.
The final limitation identified in this study is the limited amount of video club sessions pre-service teachers had the opportunity to participate in over the course of the semester. There were two video club sessions scheduled for the semester. As mentioned earlier, these pre-service teachers did not have many opportunities to observe or teach math lessons until their full-time teach (mid-November). Because of this, there was only time for two video club sessions, one right before and one right after their full-teach. Additional data and insight may have been gained by having pre-service teachers participate in the video clubs from the beginning of the semester and watching them evolve over multiple sessions rather than just two.

In conclusion, this research had a few limitations. Generalizability is an issue for qualitative research as the results cannot be associated with a larger population. There were also issues with filming individual videos and getting quality footage from each participant. Next, pre-service teachers did not have many opportunities to see math lessons before they recorded their first lesson. In addition, it may have been helpful to have pre-service teachers participate in the video clubs throughout the semester and watch videos of various lessons to get a better understanding of quality instruction.

**Implications**

This study offers a glimpse into what pre-service teachers focus on, as well as the quality of their reflections and the usefulness of video clubs in the reflective process. Future research is needed to study the various aspects of video clubs as it relates to reflection. First, pre-service teachers reflect on elements of lessons they find important. Why do they notice classroom management but fail to make connection when it comes to mathematics? Research on why pre-service teachers focus on specific areas of instruction, and not others, could help teacher educators refine their delivery of pedagogy and content specific information.
Early-childhood and elementary education students consistently experience anxiety when it comes to math instruction (Brady & Bowd, 2005). They often struggled in these subject areas as children and have a fear of teaching them (Brady & Bowd, 2005; Bramald, Hardman, & Leat, 1995; Scarpello, 2007). How can teacher education programs provide pre-service teachers with the confidence they need to be successful math teachers, regardless of their personal experience? Most teacher education programs provide one or two mathematics courses throughout their program. Research on the impact of additional math courses may be useful. In addition, providing video club sessions or professional development workshops on math may also alleviate fears related to a specific content area.

Mentor teachers play an important role in the development of pre-service teachers. Research to better understand their views and perceptions of mathematics may also provide insight into why pre-service teachers focus on certain aspects of teaching. What would mentor teachers focus on if they reflected on their lesson or participated in video club sessions? How would that differ from that of the pre-service teacher? Providing opportunities for in-service and pre-service teachers to participate in video clubs may also provide insight into the dynamic between mentor and students, as well as similarities and differences in their perceptions of lesson and focus during the sessions.

Research suggests that video clubs have a positive impact on pre-service teachers and their reflective process. Identifying the elements that make a video club a constructive place where participants can learn from one another, and provide feedback in a safe environment, could make their use easier in a variety of educational settings. Finally, video clubs have proven useful when looking at math and science instruction. Research regarding its effectiveness in
other content areas may also extend the body of knowledge of video clubs and what pre-service teachers focus on when viewing videos from reading or social studies lessons, for example.

**Conclusion**

Reflection is a key component of current reform measures (InTASC, 2011; NCTM, 2000) and teacher education programs (Zeichner & Liston, 1996). The results of this study provide insight into how video clubs support the reflective practice of pre-service teachers as they participate in teacher education programs. The data from this study indicates that pre-service teachers focus on three elements of teaching: classroom management, instruction, and student understanding. Even though this research took place within a math course, the focus of the reflections did not contain references to math content but focused on general areas of instruction. This could be due to the lack of confidence many early childhood pre-service teachers have in their math abilities. While these three elements are important to teaching, and as teacher educators, we should recognize these topics as essential components of teacher education programs and courses. Further research should be conducted to understand why these pre-service teachers did not focus on their math instruction.

Research suggests collaborative and collegial learning settings promote school change beyond individual classrooms when effective professional development is implemented with inservice teachers (Darling-Hammond & McLaughlin, 1995; Darling-Hammond & Richardson, 2009; Hord, 1997; Knapp, 2003; Louis, Marks, & Kruse, 1996; Perez et al., 2007). There is also evidence to suggest teachers act as a support group to one another in these nonthreatening communities and work together to improve instruction, reflect, and question instructional practice (Darling-Hammond & Richardson, 2009). This study supports that claim and adds the dimension of video to support the collaboration between pre-service teachers. Video clubs were
used in this study as a tool that supports reflection. However, additional opportunities to engage in these activities may further support pre-service teachers’ abilities to reflect on their lessons and provide quality feedback to their peers.

Pre-service teachers using video clubs to reflect on their lessons differ from traditional written reflections. Unlike written reflections, pre-service teachers do not have to rely on their memory to reflect, and they have the opportunity to pause, which is not an option in the midst of teaching. Moreover, the use of guided questions may have helped these participants move past basic descriptions. Each reflection included an opportunity for a description of the lesson. This allowed the participants to first describe what happened in the lesson, and then answer follow-up questions that made them think deeper about their instruction.

In conclusion, this qualitative case study provided insight into what pre-service teachers’ value in their instructional practice. They focused on similar themes throughout their written and oral reflections. Their focus shifted after spending more time in their field placement, and they began to give more attention to instructional practices. However, the conversation remained surface-level. While many pre-service teachers describe their lessons and offer little evaluation or interpretation of their lessons, these participants were able to evaluate elements of their practice and that of their peers. The participants enjoyed the video club sessions that allowed them to see how their peers taught a lesson in comparison to themselves. While there were issues with videoing some of the lessons and some of participants did not have many opportunities to see effective math lessons before their first video was taped, they did have the opportunity to teach a lesson to their peers and reflect on their instruction. These experiences allowed pre-service teachers to move past describing their lessons and begin to reflect on their practice in a way that will promote change in their instruction.
APPENDIX A

LEVELS OF REFLECTION

<table>
<thead>
<tr>
<th>Author</th>
<th>Types and Levels of Reflection</th>
</tr>
</thead>
</table>
| Schön                         | Reflection-in-action  
                              Reflection-on-action                                                                                 |
| Van Manen (1977)               | 1. *Technical reflection*- application of pedagogy in the classroom  
                              2. *Practical reflection*- the interpretation of pedagogy as it is  
                              related to an individual teaching element  
                              3. *Critical reflection*- examines the constraints of the situation  
                              as well as the dichotomy of one’s personal beliefs and practices |
                              2. *Technical*- Identifies problems but does not question or think beyond the issue  
                              3. *Dialogic*- Inquiry is initiated, others’ view and insights are  
                              considered  
                              4. *Transformative*- questions assumptions and makes changes                              |
APPENDIX B

RESEARCH QUESTIONS AND DATA SOURCES

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) What aspects of teaching do pre-service teachers reflect on through the use of video clubs?</td>
<td>Written Reflections</td>
</tr>
<tr>
<td></td>
<td>Video Club Sessions</td>
</tr>
<tr>
<td>2) What is the quality of pre-service teacher’s written and oral reflections?</td>
<td>Written Reflections</td>
</tr>
<tr>
<td>3) How do the use of video clubs support the reflective practice of pre-service teachers?</td>
<td>Written Reflections</td>
</tr>
<tr>
<td></td>
<td>Revised Written Reflections</td>
</tr>
<tr>
<td></td>
<td>Video Club Sessions</td>
</tr>
</tbody>
</table>
APPENDIX C

INFORMED CONSENT

Early-Childhood Mathematics Methods/ Fall 2015
Florida State University

Student Consent Form

Dear MAE 4300 Student:
My research focuses on the reflections of teacher candidates (pre-service teachers) in math education. I have studied practices that support the reflective practice of pre-service teachers. With the goal of diversity, equity and social justice understandings in math education, my teaching and research aim to improve mathematics learning experiences for teachers and their students. Therefore, this research proposal involves continual work in math teacher education with early-childhood pre-service teachers.

As a participant in MAE 4300 Math Methods course, you were asked complete some assignments to demonstrate your understanding of the ideas I wish to study. All assignment tasks were part of the regular course work and did not require additional time beyond the scheduled course meetings and homework assignments. As the researcher, I would like to use these assignments as data, i.e. your journals, reflection papers, video-taped lessons, video-taped peer collaboration groups, and peer collaboration forms.

Additionally, some students may be chosen to participate in audiotape interviews or small focus groups with the researcher (optional); however, if you are chosen for an interview or focus group, you may decline to participate or refuse to answer specific questions, without penalty. You may prescreen any audiotape of you and request that any portion of an interview be erased.

The collected work from the course (math journals, reflection papers, video-taped peer collaboration groups, peer collaboration forms, video-taped math lessons) and interviews (if selected to participate in an interview or focus group) will allow me as the researcher to determine the effectiveness of course assignments as well as help in understanding pre-service teachers’ learning and development as reflective teachers. Thus, participation involves analysis of assignments. Analysis of assignments (math journals, reflection papers, video-taped peer collaboration groups, peer collaboration forms, video-taped math lessons) and interviews or focus groups will be the basis of this study and your participation. You will not be rewarded nor penalized for participation or non-participation in this study; your course grade for participation or non-participation in this study will not be affected.
An invitation to be interviewed or to participate in a focus group will come later, if you are selected.

Your privacy will be protected by the maximum extent allowable by law; therefore, all identifiers, such as student names and school ID numbers, and etc., will be removed from collected worked that will be analyzed by the researcher in the analysis process—myself. The researcher will assign you a pseudonym when referring to your work and audiotape.

If you have any questions about this study, please contact: Traci Kervin. If you have questions or concerns regarding your rights as a study participant, or if you are dissatisfied at any time with any aspect of this study, you may contact, anonymously if you wish, the Institutional Review Board, Florida State University.

Please read and sign the attached form—even if you consent not to participate in this study. Participating in the research (math journals, reflection papers, video-taped peer collaboration groups, peer collaboration forms, video-taped math lessons) is voluntary, and you may choose to discontinue participation in the research aspects at a later time. Thank you for your consideration!

Sincerely,
Traci Kervin, M.Ed.
Early-Childhood Mathematics Methods/ Fall 2015
(Sign and Return to Researcher)
Florida State University  

Student Consent Form

You have read about the goals of this project and the nature of your participation in it. The data from this study will be used to improve the reflective practice in teacher education programs and to support teacher candidates’ preparation in math teaching and learning.

1. The data and research findings from this study might be used in reports, articles, presentations at conferences, and in teacher education classes. Some data may be used in teacher support materials.

2. Your identity will not be revealed in reports of this work. A pseudonym assigned to you will be used in any written or oral reports about this work. Your privacy will be protected by the maximum extent allowable by law.

3. You may be asked to participate in an interview or focus group. You may choose to pre-screen any audio tape and have any segment of audio tape in which you are identifiable not be used in the study or in products or presentations.

4. All data will be held in confidence, in locked offices or cabinets, or password protected/private site online. Information of a personal or sensitive nature will not be elicited during the interviews. In addition, you can request that any portion of the tape of an interview be erased or that a particular interview not be taped. You may refuse to answer any question without penalty.

5. You will not be required to spend extra time outside of class for the purposes of this study, except to the possibility of participating in an interview, or focus group (optional). Interviews or focus groups will require up to 1 hour total time and will be arranged to meet your schedule, at a later date.

6. You may discontinue your participation in this research project at any time during the project period (August 2015- December 2015) without penalty. You will not be rewarded nor penalized for participation or non-participation in this study; your course grade for participation or non-participation in this study will not be affected.

7. If you have any questions about this study, please contact: Traci Kervin at. If you have questions or concerns regarding your rights as a study participant, or if you are dissatisfied at any time with any aspect of this study, you may contact, anonymously if you wish, the Institutional Review Board, Florida State University.

I wish to participate in this study- Name (Please print) ________________________________

Signature______________________________ Date________________________

I wish to participate in an interview or focus group at a later date. Yes ____No ____
I wish NOT to participate in this study- Name (Please print) ________________________________

Signature___________________________________________________ Date________________________
## APPENDIX D
### PROCEDURAL TIMELINE

<table>
<thead>
<tr>
<th>Week</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2015- Prior to the Study</td>
<td>IRB Approval, Consent forms created, researcher/ instructor planning</td>
</tr>
<tr>
<td>One</td>
<td>Introductions, course expectations, student questionnaire to provide background for each participant.</td>
</tr>
<tr>
<td>Two</td>
<td>Pre-service teachers will begin watching expert teachers teaching mathematics lessons. They will watch the following video and summarize the lesson as well as reflect on the lesson:  <a href="https://www.teachingchannel.org/videos/skip-counting-with-kindergartnerers">https://www.teachingchannel.org/videos/skip-counting-with-kindergartnerers</a></td>
</tr>
<tr>
<td>Three</td>
<td>Pre-service teachers will be given consent forms and asked to complete them during class. Pre-service teachers will complete an observation on their mentor teacher, implementing a mathematics lesson.</td>
</tr>
<tr>
<td>Four or Five</td>
<td>Pre-service teachers will watch a math class via live observation feed from FSUS and write a summary and reflection on the lesson.</td>
</tr>
<tr>
<td>Six</td>
<td>Pre-service teachers will teach their micro-teaching lesson in partner groups. Micro-teaching lessons will be videotaped and pre-service teachers will watch individual videos and submit a reflection of this lesson.</td>
</tr>
<tr>
<td>Eight</td>
<td>Pre-service teachers will teach their micro-teaching lesson in partner groups. Micro-teaching lessons will be videotaped and pre-service teachers will watch individual videos and submit a reflection of this lesson.</td>
</tr>
<tr>
<td>Nine</td>
<td>Pre-service teachers will teach their micro-teaching lesson in partner groups. Micro-teaching lessons will be videotaped and pre-service teachers will watch individual videos and submit a reflection of this lesson.</td>
</tr>
<tr>
<td>Ten</td>
<td>Pre-service teachers will upload their math lessons to Blackboard and write a two page reflection on their lesson.</td>
</tr>
<tr>
<td>Eleven</td>
<td>Pre-service teachers will work in peer groups and watch peer video-taped lessons and provide feedback to group members. Students will reflect on what they have learned through the video club and video recording process and submit a revised reflection to Blackboard.</td>
</tr>
<tr>
<td>Twelve-Thirteen</td>
<td>Pre-service teachers will not attend class, they will participate in a two week full teach in the field. They will tape their second math lesson during this time and upload the video along with their reflection of the lesson to Blackboard.</td>
</tr>
<tr>
<td>Fourteen</td>
<td>Pre-service teachers will work in peer groups and watch peer video-taped lessons and provide feedback to group members. Students will reflect on what they have learned through the video club and video recording process and submit a revised reflection to Blackboard.</td>
</tr>
<tr>
<td>Fifteen</td>
<td>Pre-service teachers will submit a final reflection detailing their experiences over the semester as well as the use of the video club to monitor their teaching and learning.</td>
</tr>
</tbody>
</table>
APPENDIX E

COURSE SYLLABUS

Teaching Mathematics in the Primary Grades
MAE 4300

*Instruction that moves, Leadership that inspires,
Research that makes a difference.*

Class meets: Thursday 9:30–12:00 in STB G106
Office hours: Thursday 12:30-1:30 and by appointment

Prerequisites or Co-requisites
All undergraduate students must have completed Blocks I and II in the Early-Childhood Education program. All students registered must also be registered for EEC 4907.

Course Description
MAE 4300 provides prospective teachers an opportunity to develop methods for teaching mathematics and implementing effective mathematics content for children ages 3-8 years old. The course is designed to further the development of preservice teacher’s ability to make mathematics curriculum decisions about:

1) What do I know about this content?
2) What do children learn about this content?
3) What is their thinking and their level of mathematical understanding?
4) How can I most effectively teach this concept to children?

Students in this course are required to demonstrate teaching competencies in field situations under supervision and guidance of their mentor teacher or instructor. They will critically analyze and discuss issues related to young children including principles and classroom practices for teaching young children using developmentally appropriate teaching methods; effective planning, teaching, and assessment methods for young learners according to individual needs. The overarching goals of the class are the development of mathematics skills with emphasis on topics such as number sense, patterns, basic algebra, geometry/measurement, and data analysis and probability.

Course Objectives
Upon completion of the course students will have demonstrated the following knowledge, understanding, skills, and professional/mathematics dispositions. These objectives are in line with the Florida Educators Accomplished Practices (FEAPs) and English for Speakers of Other Languages (ESOL). Students will have demonstrated how to:
1. Develop an understanding of the ways children develop mathematical knowledge and apply this knowledge to plan developmentally appropriate instruction. This includes children with special needs and limited English proficiency.
2. Use a variety of assessment and evaluative techniques (including diagnostic, formative, summative, informal, and formal) to promote the child’s continuous development of mathematical concepts and skills. This includes children with special needs and limited English proficiency.
3. Plan, implement, and evaluate effective instruction.
4. Identify subject matter, instructional techniques, and instructional materials of the elementary school mathematics curriculum.
5. To develop specific teaching strategies to maximize the child’s learning of mathematics. This includes strategies for children with special needs and limited English proficiency.
6. To identify and integrate with planning and instruction, a wide variety of materials including journals, textbooks, trade books, curriculum standards, children’s literature, video, and computer software.
7. To identify and apply techniques for developing and maintaining a positive learning environment.
8. To identify and apply teaching strategies for children with diverse needs, including: learning disabilities, communication disabilities, different learning styles, cultures, limited English proficiency, socioeconomic background, and gender.
9. To demonstrate professionalism, continuous professional development, and leadership; draw connections among course topics, university classes, university classroom experiences, public school classroom experiences, theory, and practice.

**Required Texts, Readings, and/or other Resources**

- Research articles and other required readings will be provided via Blackboard during the semester.
- You will need to use a computer to complete most assignments, which will be submitted via Blackboard.

**Topical Course Outline**

Provided at the end of the syllabus.

**Teaching Strategies**

This course will use a variety of teaching and learning techniques. More importantly, this course is designed to involve each student in an activity-oriented setting. The activities may include lectures, discussions, cooperative learning activities, question and answer sessions, student presentations, demonstrations/explanations, and active learning will be emphasized to demonstrate strategies for
meeting the needs of all learners. Assigned reading and mathematics problem solving activities will supplement classroom lectures and discussions.

This is a professional preparation course and students are expected to behave in a manner appropriate for teachers. In addition, students are expected to participate in classroom activities in a constructive manner, exhibiting those positive traits that are expected of teachers as provided by the Accomplished Practices and the Code of Ethics.

We will discuss the content of the stated chapters in your required textbook and will do many activities that are appropriate to do with children. You should not expect; however, that we will be able to cover every item that is mentioned in your textbook. Therefore, you should read the textbook chapters carefully and ask questions if there is anything that is unclear. Also, be prepared to present results and solutions to your peers during classroom problem solving activities. **You are expected to participate in class activities and to complete field experiences satisfactorily.**

**Field/Clinical Activities**

Students will be placed in schools for observation, assessment, and application of theory to practice by working with elementary school children of all ages and from diverse cultures and economic settings. Beginning August 24 students will complete their field hours on Monday from 8:00am to 11:00am and Wednesdays all day. The week of **November 9**, students will begin their two week total teach from **November 9-20**.

**Expectations**

1. Attendance at all classes is required. Absences must be reported to the instructor prior to the beginning of class. Students are expected to arrive on time for class and to stay for the entire class period. **Tardiness and/or leaving early from class will not be tolerated.**
   Late arrival or early departure counts as 1/3 day’s absence. Missing a substantial portion of a class meeting will count as 1/2 absence or more. Students must make up all work that is missed during excused and unexcused absences.

2. Readings assigned each week are to be completed BEFORE arriving in class for that week.

3. Assignments are due at the beginning of the specified class period or when otherwise specified in the course syllabus. Assignments will be considered late if students are not in class when assignments are collected. For each day an assignment is late (including weekend days) without an absence that meets the university criteria for an excused absence, 10 points will be subtracted from the points assigned to the assignment.

4. Students are expected to apply basic rules of grammar and spelling to written work and basic rules of grammar to oral work. If a student’s work in this class indicates that remediation is needed in these skills, the student will be informed of remediation opportunities and advised to take advantage of them.
5. Class participation is strongly encouraged.

6. Professional behavior is required in class meetings and in any interactions related to this class and the Early Childhood Education Programs.

7. Cell phones and other similar devices must be turned off and remain out of sight of students and the instructor during class unless prior arrangements are made with the instructor. **The first time this expectation is violated, 5 points will be subtracted from In-Class Participation points. For any subsequent violation, the entire 10 points will be subtracted from the In-Class Participation points.**

8. **Laptops are to remain off and remain out of sight during class unless they are required for a class activity.** Note taking must be done with paper and pencil unless you have a disability or other unique learning need that would make a laptop a reasonable accommodation for you. If this is the situation, please provide written documentation of such from the Student Disability Resource Center (SDRC).

9. When appropriate, type and double-space written assignments using 1” margins at the top, bottom, and sides of the paper and a 12-point type (Arial or New Times Roman). Papers not meeting these specifications will be returned to the student for corrections before points are awarded for the assignment. The paper will be subject to the late penalty noted below.

10. Students are expected to use correct APA citation format for all written assignments. Please see the Purdue OWL website (https://owl.english.purdue.edu/owl/resource/560/01/) or the APA manual for information about citation format.

11. Students must turn in all required assignments in order to pass this course. Students should retain a copy of any work submitted through Blackboard or hardecopy.

**EVALUATION OF PROFESSIONAL DISPOSITIONS**

**Disposition Statement:**
Dispositions are defined as “habits of professional action and moral commitments that underlie an educator’s performance” (InTASC Model Core Teaching Standards, p. 6). Teacher candidates are required to demonstrate professional dispositions in coursework and field experiences. Dispositions will be evaluated each semester in all educator preparation courses. Teacher candidates must demonstrate professional dispositions at the Developing 2 or Target level during coursework. During the semester prior to student teaching, teacher candidates must demonstrate professional dispositions at the Target level in all courses.
Policies and procedures regarding dispositions can be found on the College of Education website.

Students in teacher certification programs at FSU are advised that, in addition to academic performance, their professional dispositions will be continually observed by the instructor of this course; and that the course instructor will be asked to complete a summary evaluation of these dispositions for each student at the end of the semester. **Among the traits that will be evaluated is aptitude for caring, personal and social competence, approachability, patience, sense of humor, flexibility, integrity, commitment to teaching, acceptance of others, work ethics, cooperativeness, acceptance of feedback, creativity, and organizational skills.** Your instructor will be observing your behaviors in the classroom, when meeting privately, in your interactions with other students, and in your daily school environment. These observations are used to help assure that you demonstrate the professional attitudes and behaviors appropriate for beginning teachers.

**Grading/Evaluation**

The following table is intended to provide an overview of the activities and criteria that will be used to demonstrate and assess your learning in this course. More specific criteria will be discussed in class as needed. Due dates for each assignment will be discussed in class as well.

**Objectives Matrix**

<table>
<thead>
<tr>
<th>Objective</th>
<th>FEAP</th>
<th>ESOL</th>
<th>Competencies &amp; Skills</th>
<th>K–6 Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Plan developmentally appropriate instruction</td>
<td>A1e, A3c, B1a, B1c</td>
<td>3.2.j, 4.2.a</td>
<td>60.1.6</td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>2. Use variety of assessments to promote mathematical concepts/skills</td>
<td>A1, A2, B1</td>
<td>4.2.b, 4.2.c</td>
<td>60.1.4</td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>3. Plan, implement, evaluate mathematics instruction</td>
<td>A1e, A3c, B1a B1c,</td>
<td>3.2.j, 4.2.a</td>
<td>60.1</td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>4. Know content, methods, and materials, of mathematics</td>
<td>A1e, B1a, B1c</td>
<td>4.2.b, 4.2.c</td>
<td>60.1–60.5</td>
<td>12.1, 12.2, 12.3, 12.4</td>
</tr>
<tr>
<td>5. Develop teaching strategies</td>
<td>A1e, B1a, B1c</td>
<td>3.2.j, 4.2.a, 4.2.b</td>
<td></td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>6.</td>
<td>Identify and use materials for math instruction</td>
<td>A1e, A2i, B1a, B1c</td>
<td>3.2.j, 4.2.b, 4.2.c</td>
<td>12.1, 12.2, 12.3, 12.4</td>
</tr>
<tr>
<td>7.</td>
<td>Develop positive learning environment</td>
<td>A1e, B1a, B1c</td>
<td>3.2.j, 4.2.a</td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>8.</td>
<td>Develop and apply strategies for students with diverse needs</td>
<td>A1, A3c, B1</td>
<td>3.2.j, 4.2.a</td>
<td>12.1, 12.2, 12.4</td>
</tr>
<tr>
<td>9.</td>
<td>Demonstrate professionalism and continuous improvement</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Assignments Grid**

Assignment: Journals

| Course Objectives | 1, 4, 9 |
| Accomplished Practices | A2, B1 |
| ESOL Competencies | |
| Mathematics Competencies & Skills | 60.1.6, 60.3, 60.4, 60.5 |

Assignment: Field Experience Instructional Impact Analysis

| Course Objectives | 1, 2, 4, 9 |
| Accomplished Practices | A3c, A4 |
| ESOL Competencies | 9.1, 9.3, 9.4, 9.6 |
| Mathematics Competencies & Skills | 60.1.1, 60.1.3 |

Assignments: Lesson Plans

| Course Objectives | 1–9 |
| Accomplished Practices | A1, A2, A4, B1 | A1.e, A2.i, A3.c, B1.a, B1.c |
| ESOL Competencies | 4.1, 4.2, 4.3, 7.1, 7.2, 7.5, 9.1, 9.3, 9.4, 9.6 |
| Mathematics Competencies & Skills | 60.1.5 |
### Course Objectives

1, 2, 4, 6, 9

### Accomplished Practices

A1, A3, A4

### ESOL Competencies

### Mathematics Competencies & Skills

60.1.6, 60.3, 60.4, 60.5

## Assignments and Grading

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Accomplished Practice</th>
<th>ESOL Competencies</th>
<th>Points Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Participation (10)</td>
<td></td>
<td></td>
<td>50 pts.</td>
</tr>
<tr>
<td>Attendance (20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposition (10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live Text (10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Tests 1</td>
<td>A1, A3, A4</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>3. Lesson Plans for two week teach unit</td>
<td>A1.e; A2.i; A3.c; B1.a; B1.c; A4</td>
<td>2.1c, 2.3e, 3.1b, 3.2a.</td>
<td>7@ 20 pts = 140</td>
</tr>
<tr>
<td>4. Micro Teaching, Lesson Plan, Presentation, Reflection</td>
<td>A1.e; A2.i; A3.c; B1.a; B1.c; A4</td>
<td>4.2.a; 4.2.b; 4.2.3</td>
<td>50 pts.</td>
</tr>
<tr>
<td>5. Individual Lessons &amp; Reflections</td>
<td>A1, A2, A3c, A4, B1</td>
<td>4.2.a; 4.2.b; 4.2.c; 4.2.a; 4.2.b; 4.2.c</td>
<td>2 Videos @ 10pts=20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Reflections @ 50pts = 100</td>
</tr>
<tr>
<td>6. Group Lesson Study Reflections</td>
<td>2b, 2f1, 2f2, 2h, 2i, 3a, 3c, 3d, 3f, 3g, 3h, 3i, 3j, 4d, 4f, 5a</td>
<td>4.2.a; 4.2.b; 4.2.c; 4.2.a; 4.2.b; 4.2.c</td>
<td>2 @ 10 pts. = 20</td>
</tr>
<tr>
<td>7. Weekly Journals</td>
<td>A2, B1</td>
<td>2.1c, 2.3e, 3.1b, 3.2a.</td>
<td>6 @ 15 pts. = 120</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>600</td>
</tr>
</tbody>
</table>
SYLLABUS CHANGE POLICY: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice from the instructor.

Grading Scale

<table>
<thead>
<tr>
<th>Letter</th>
<th>Percent</th>
<th>Points</th>
<th>Letter</th>
<th>Percent</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94–100</td>
<td>564–600</td>
<td>C</td>
<td>74–76</td>
<td>444–456</td>
</tr>
<tr>
<td>A-</td>
<td>90–93</td>
<td>540–558</td>
<td>C-</td>
<td>70–73</td>
<td>420–438</td>
</tr>
<tr>
<td>B+</td>
<td>87–89</td>
<td>522–534</td>
<td>D+</td>
<td>67–69</td>
<td>402–414</td>
</tr>
<tr>
<td>B</td>
<td>84–86</td>
<td>504–516</td>
<td>D</td>
<td>64–66</td>
<td>384–396</td>
</tr>
<tr>
<td>C+</td>
<td>77–79</td>
<td>462–474</td>
<td>F</td>
<td>0–59</td>
<td>0–354</td>
</tr>
</tbody>
</table>

Description of Assignments/ Course Requirements

Assignment 1-Class Attendance and Participation:
There are 50 participation points possible in MAE 4300. Your participation grade is based on attendance, as well as completion of in-class and at-home activities that are not otherwise graded. Each unexcused absence will result in the loss of 10 points. More than 2 unexcused absences will result in your course grade being lowered. The student is responsible for providing documentation in the event of an absence, as well as for taking the initiative in making up any missed assignments, information, or activities. Absences that total three weeks of class meetings will result in failing the course (for unexcused absences) or receiving a grade of Incomplete (for documented, excused absences). Late arrival or early departure counts as 1/3 day’s absence. Missing a substantial portion of a class meeting will count as 1/2 absence or more.

Participation points:
No unexcused absences  20 points  In-class participation  10 points
1 unexcused absence   10 points  Disposition/professionalism 10 points
2 unexcused absences  0 points  Live Text submission 10 points

Assignment 2-Test:
Exams: Final Exam (100 points)
A final exam will be administered this will be an evaluation of your ability to apply what you have learned. Test questions will require you to solve mathematical problems, discuss mathematical processes,
and demonstrate familiarity with sound instructional practice relating to teaching mathematics in the primary grades. The tests will be administered as noted in the course calendar.

**Assignment 3- Lesson Plans for Two Week Teach**

**7 Lessons Plans at 20 pts. each =140**

Each student will plan, conduct, and present a math based instructional unit. Using information from the classroom regarding the current content being taught in math, work with your cooperating teacher in your field assignment to identify a concept to teach from the adopted math curriculum used in the classrooms for your Field Assignment. You are to design an instructional unit composed of 7 lessons as part of your two-week teaching assignment. Connect the concept in the classroom text to an activity from the Van de Walle text. Use any lesson plan format to develop a lesson plan based on students’ needs. You must turn in your lesson to me for approval **before** you teach the lesson. You may NOT copy a Teacher’s manual for this assignment, you must create lesson plans catered to your specific class.

**Assignment 4- Micro Teaching and Personal Reflection (50pts)**

**Presentation 20 pts., Lesson plan/ Data 10 pts., Reflection 20 pts.**

Students will form groups of two-three, and each group will be responsible for the presentation of a math lesson. Your group will not simply present ideas from the text or Go Math curriculum. You will illustrate the application of these ideas to teaching. For example, you will teach the lesson as if the students in the class are your students. Your lesson must include an assessment and an analysis of your data. You should meet with the instructor at least one week before your presentation date. Your group presentation assignment will be scored on the basis of the **presentation itself (20 pts), the lesson plan/ assessment (10pts.)** and your reflection (25 pts).

Detailed instructions will be provided via Blackboard.

**Assignment 5- Individual Lesson and Reflection (120 pts)**

**2 Videos @ 10pts=20, 2 Reflections @ 50pts = 100**

The student will demonstrate competencies for teaching a specific group of children by recording **TWO MATH LESSONS** in their field placements. Group size needs to be at least five or six children equally divided. LP, reflection, artifacts, and the DVD or electronic copy of the recording for this assignment will be submitted with your name clearly labeled.

Identify appropriate math objectives, complete a lesson plan, execute your lesson plan, and analyze and critique both the content of your lesson as well as your behaviors towards children.

**Assignment 6-Group Lesson Study Reflections (20pts)**

**2 Reflections at 10 pts. each = 20 pts.**

Students will be assigned to small groups of 4-5 peers. Students will video two teaching lessons and post
them to blackboard (the first video should be completed in late October and the second during the two week total teach). Students will watch and reflect on each group member’s lesson and provide constructive feedback on their lessons. Students will be provided with a format in which to evaluate their peers. After the lesson study group students will be go back to their original reflection and make revisions based on their group conversations. More information will be provided in class, and training will be provided to students to ensure constructive feedback is given to each student.

Assignment 7- Journal Reflections:

Journals (8 @ 15 points each = 120 points)

You will have 10 homework journal assignments related to course readings, mathematics, and students’ mathematical thinking. For each journal, specific questions will be assigned via Blackboard. Your journals should be typed and submitted electronically via Blackboard. In the event of an issue with Blackboard, please submit your journal via email.

Free Tutoring from FSU

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services’ comprehensive list of on-campus tutoring options - see http://ace.fsu.edu/tutoring or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

AMERICANS WITH DISABILITIES ACT (ADA):

Students with disabilities needing academic accommodations should:

1. register with and provide documentation to the Student Disability Resource Center; and
2. bring a letter to the instructor indicating the need for accommodation(s) and what type.
This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center (850) 644-9566 (voice)
874 Traditions Way (850) 644-8504 (TDD)
108 Student Services Building sdrc@admin.fsu.edu
Florida State University
http://www.disabilitycenter.fsu.edu/
Tallahassee, FL 32306-4167
UNIVERSITY POLICIES: All FSU policies and procedures will be followed in all aspects of this course. Please pay particular attention to the policies below. A link to each policy is provided on the course Bb site under the button link to “Syllabus and Course Information.”

University Attendance Policy:
Excused absences include documented illness, deaths in the immediate family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

The instructor decides what effect unexcused absences will have on grades and will explain class attendance and grading policies in writing at the beginning of each semester. All students are expected to abide by this class attendance policy. Students must also provide, when possible, advance notice of absences as well as relevant documentation regarding absences to the instructor as soon as possible following the illness or event that led to an absence. Regardless of whether an absence is excused or unexcused, the student is responsible for making up all work that is missed.

First Day Attendance Policy:
Effective Fall 2003, University-wide policy requires all students to attend the first day of class meeting of all classes for which they are registered. Students who do not attend the first class meeting of a course for which they are registered will be dropped from the course by the academic department that offers the course. This policy applies to all levels of courses and to all campuses and study centers. In order to enforce this policy, instructors are required to take attendance at the first class meeting and report absences to the appropriate person in their department or school/college. It remains the student’s responsibility to verify course drops and check that fees are adjusted.

Sexual Harassment Policy: Sexual harassment is a form of discrimination based on a person's gender. Sexual harassment is contrary to the University's values and moral standards, which recognize the dignity and worth of each person, as well as a violation of federal and state laws and University rules and policies. Sexual harassment cannot and will not be tolerated by the Florida State University, whether by faculty, students, or staff; or by others while on property owned by or under the control of the University.

Honor Code: The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of students’ academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor
Policy and for living up to their pledge to “. . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University.” (Florida State University Academic Policy, found at http://dof.fsu.edu/honorpolicy.htm.

### Tentative Course Topics and Assignments

**MAE 4300: FALL 2015**  
**TH; 9:30 am – 12:00 pm**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>Assignment Due Today</th>
<th>Reading/HW for the following class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Specific dates will be discussed in class</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Week 1 8/27 | Introduction and Course Overview  
Developing Early Number Concepts and Number Sense | | Chapter 8: Developing Early Number Concepts and Number Sense |
| Week 2 9/3 | Concept and Skills:  
*Developing Meanings for Operations  
*Teaching Mathematics in the 21st Century  
**Methods, Pedagogy, & Lesson Planning** | Journal 1 | Chapter 9: Developing Meanings for Operations  
Chapter 1: Teaching Mathematics in the 21st Century |
| Week 3 9/10 | Concept and Skills:  
*Developing Whole Number Place Value Concepts  
*Building Assessment into Instruction  
**Pre/Post Assessments** | Journal 2  
*Sign up for group presentations | Chapter 11: Developing Whole Number Place Value Concepts  
Chapter 5: Building Assessment into Instruction |
| Week 4 9/17 | Concept and Skills:  
*Developing Strategies for Addition and Subtraction Computation | Journal 3 | Chapter 12: Developing Strategies for Addition and Subtraction Computation |
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Concept and Skills</th>
<th>Journal</th>
<th>Chapter</th>
</tr>
</thead>
</table>
| 5    | 9/24 | *Developing Strategies for multiplication and division Computation  
*Planning in the Problem-Based Classroom  
**Reflection | Journal 4 | Chapter 3: Teaching Through Problem Solving |
| 6    | 10/1 | *Exploring What it Means to Know and Do Mathematics  
**Micro Teaching Groups 1-4 & Reflections | Journal 5 Micro Teaching Groups 1-4 | Chapter 2: Exploring What it Means to Know and Do Mathematics |
| 7    | 10/8 | *Algebraic Thinking: Generalization, Patterns, and Functions  
**Micro Teaching Groups 5-8 & Reflections | Journal 6 Micro Teaching Groups 5-8 | Chapter 14: Algebraic Thinking: Generalization, Patterns, and Functions |
| 8    | 10/15| *Developing Fraction Computation  
**Micro Teaching Groups 9-10 & Reflections | Journal 7 Micro Teaching Group 9-10 Reflection | Chapter 15: Developing Fraction Computation |
| 9    | 10/22| *Developing Measurement Concepts | Journal 8 Unit Lesson Plans Due | Chapter 19: Developing Measurement Concepts |
**This syllabus is subject to change. The instructor reserves the right to alter assignment guidelines, due dates, etc. should circumstances deem this necessary. Students will be given advance notice of any changes and all changes will be posted via the course Blackboard site, as well as announced in class.

<table>
<thead>
<tr>
<th>Week 10</th>
<th>Concept and Skills:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/29</td>
<td>*Geometric Thinking and Geometric Concepts</td>
</tr>
<tr>
<td></td>
<td><strong>Small group debrief on lessons</strong></td>
</tr>
<tr>
<td></td>
<td>Video, lesson plan, and reflection due</td>
</tr>
<tr>
<td></td>
<td>Chapter 20: Geometric Thinking and Geometric Concepts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 11</th>
<th>Concept and Skills:</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/5</td>
<td>*Video Reflections</td>
</tr>
<tr>
<td></td>
<td>*Geometric Thinking and Geometric Concepts</td>
</tr>
<tr>
<td></td>
<td>Revised reflections due by Sunday 11/8 by midnight</td>
</tr>
<tr>
<td></td>
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APPENDIX F

MICRO-TEACHING INSTRUCTIONS

Choose a topic that your class should be covering towards the end of October. Partner up with 1-2 members of your assigned groups. Ideally, this partner should also be placed at your school. Create a lesson that you will teach to your students. You and your partner will present this lesson to the class. This should be a co-teaching lesson with both teachers contributing to the lesson not one-person teaching while one passes out papers. This should be a practice lesson for teaching your first math lesson.

Presentation (20 points)
You will be teaching a lesson to your assigned grade level. In order to practice teaching in an authentic way you must assume the role of an elementary-level teacher. You and your partner will need to divide the teaching time and the responsibilities up evenly for the presentation (i.e. one person cannot do all the teaching). Each lesson should last approximately 30 minutes (keeping track of the time is extremely important). You should dress appropriately for teaching your grade level, and you should look like a teacher during your presentation (i.e. no shorts and flip flops).

Each lesson should contain an opening/launch, where the lesson and topic are introduced. An interactive activity (explore) for students to engage in, the activity must be closely related to the topic and provide students with the opportunity to gain a deeper understanding of the concepts you are teaching. Finally, each lesson must include a closing. This should bring the content and activity together.

How will you check for student understanding? You and your partner need to come up with an assessment for your lesson. How will you collect and analyze student data? How will you ensure all students understood the concept and are ready to move on to the next topic? This does not have to be a formal assessment, but you do need to collect tangible data.

Lesson Plan (5 points, one per group)
Your lesson plan must follow a traditional lesson plan format. You may use the one I have provided for this course or what your mentor teacher uses. However, each lesson plan must include the following:
- Mathematical Domain
- Standards covered in the lesson
- Focus of the lesson
- Key Vocabulary
- Essential Question
- Materials
- Opening (detailed, include questions)
- Activity (detailed, include questions)
• Closing (detailed, include questions)
• Accommodations
• Assessment

Data *(5 points)*

**Visual representation of the data** *(spreadsheet, observational notes)*

You need to analyze the data you have collected from your students. Create a spreadsheet, observational document, or some other way to show who understood the concepts and who still needs help.

Reflection (20 Points, at least 2 pages)

**Data Analysis (at least two paragraphs)**

In your reflection, you will need to discuss what your next steps will be after assessing the data (i.e. I will need to research this lesson, or I will pull the three children who did poorly during recess, maybe everyone missed one question, and you will need to go back and reteach that particular question).

As you are analyzing your data think of these four areas: District level issues, School-Level Issues, Student Issues, and Teacher Issues. Choose two of these areas that you feel may have/ will impact your lesson (more information in class) and write one paragraph on each area.

**Personal Reflection**

a. Describe and analyze the lesson
b. How did you make the math content engaging for the students?
 c. How did you as the teacher elicit and respond to student thinking during the lesson?
APPENDIX G

VIDEO REFLECTIONS

After videotaping your math lesson you will reflect on the lesson. First, write a one-page description of the lesson. Next, think about and answer the following questions as you reflect (at least 2 pages). These are not yes or no questions. I am looking for you to really analyze your teaching and the lesson. This should be detailed and address every question below.

- What were your objectives for the lesson? Were they met?
- Were the students engaged during the lesson?
- What, if anything, did you change as a result of the Micro-Teaching lesson?
- Did the lesson go as planned?
- What would you change if you were to teach this lesson again?
- How do you define a good lesson? Was this a good lesson?
- What did you learn about student thinking? Was it similar or different than you expected? Did you even think about how they may solve or interpret the lesson?
- What went well? What did not?
- What did you learn about teaching or how you teach? Was the video helpful? Why or Why not?
- Did your opinion of the lesson change at all after watching the video?
- Did working with your peers help you prepare for the lesson? How or how not?

The minimum length of this reflection is three pages.
Page one = Description of lesson
Pages two- at least three= answering the guided questions

The point of this assignment is to deeply reflect on your teaching after practicing the lesson with your peers and watching several similar lessons. Use that knowledge to drive this reflection. In addition, WATCH the video. It may be uncomfortable, but you will be sharing these videos with your peers. Keep track of the time and refer to it when possible.
APPENDIX H

PEER COLLABORATION PROTOCOL

Group A

Jobs
Recorder ______________________
Time Keeper _________________________
Video Master _________________________
Organizer __________________

1. Please remember this is important data. I want to see what, if anything, you get from this experience? What have you learned about mathematics? What have you learned about classroom management? What connections do you make to each other vs your mentor teachers? What do pre-service teachers focus on when watching peers teach? Please make sure your conversation is focused on the videos.

2. You will need one computer set up per group. Make sure you have the volume up high enough for everyone to hear, but not too loud if you are in a conference room.

3. Pull up the Blackboard site and watch the videos in the following order: Ashley, Emily, Hannah, Leah, Lesley, and Anna

4. Pull up the first video and turn the recording device on. Before you start the video, say the name of the person who you will be watching. For example, The first video is _______. Then press play. Watch the video and take notes (I will collect your notes after the session) as you are watching. Watch the video for about 10-15 minutes depending on the length (you may fast forward or pause it as needed). The idea is that you see as much of the whole group lesson as possible. Once you are finished watching the video take 5-10 minutes to discuss the video. Think about how we debriefed after the micro-teaching lessons. What questions do you have? What feedback can you give? What connections do have? Can you make connections to the micro-teaching lesson taught in class? What were your perceptions of your peers’ math lesson? What went well? What do you/their need to work on? Every lesson should include one good thing you saw and one thing that the person needs to improve on. I know these are your peers, but the objective of this activity is to make us better teachers (not hurt someone’s feelings) and sometimes that means being honest. “I liked it when you did ______, but I think you need to work on ______.”

5. Repeat. Pull up the next video and say who you will be watching. Watch 10-15 minutes of the video and then discuss.
## APPENDIX I

### CODING SUMMARY

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APPENDIX J

VIDEO ONE CODING BY NODE
APPENDIX K

VIDEO TWO CODING BY NODE
APPENDIX L
CODING DIAGRAMS

Themes for Research Question One

Focus on Classroom Management
- Excuses and Child Blame
- Logistics and Transitions
- Student Engagement
- Positive Affirmations

Focus on Instruction
- Surface Level Discussion
- Questioning as a tool to help Pre-Service Teachers
- Assessment to gauge student understanding
- Noticing Mathematics and Making Connections

Focus on Understanding the Students
- Making Connections between prior knowledge and instruction
- Pre-Service Teacher and Student Misconceptions about Content

Themes for Research Question Two

Quality of Reflections
- Description of Reflections
- Evaluation of Reflections
- Interpretation of Reflections
APPENDIX M

IRB APPROVAL FORM

APPROVAL MEMORANDUM

Date: 5/14/2015

To: Traci Kervin

Dept.: EDUCATION

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research

The use of Peer Collaboration and Video Technology to Support the Reflective Practice of Pre-service Teachers

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and one member of the Human Subjects Committee. Your project is determined to be Expedited per per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 5/12/2016 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWA00000168/IRB number IRB00000446.

Cc: Lindsay Dennis, Advisor
HSC No. 2015.15474

The formal PDF approval letter: http://humansubjects.magnet.fsu.edu/pdf/printapprovalletter.aspx?app_id=15474
REFERENCES


BIOGRAPHICAL SKETCH

Traci L. Kervin

Education

Academic Degrees

Expected Grad. Aug 2016  Ph.D.  Florida State University, Major: Curriculum and Instruction, Early Childhood Education
2011  M.Ed.  University of North Florida Major: Elementary Education
2004  BA  Florida State University Major: Business Administration
2002  AA  Broward College Major: Business Administration

Certifications

2006  State of Florida- Professional Teaching Certificate (K-6)
2015  Certificate in Program Evaluation
2016  Preparing Future Faculty (PFF) Program

Teaching

College Teaching

2013- Current  Graduate Teaching Assistant, Early Childhood Education and Elementary Education, Florida State University, Tallahassee, FL
Courses:
EEC 4907 Observation/Participation
EEC 4943 Student Teaching in Early Childhood Education
MAE 4300 Teaching Mathematics in Primary Grades
MAE 4626 How Children Learn Mathematics
EEC 4604 Techniques of Child Study, Management and Discipline

2012  Facilitator, University of Phoenix, Jacksonville, FL
Courses:  HUM 114 Critical Thinking

Teaching Assistant

2014-Current  EDG 4321 Foundations of Teaching
SSE 4194 Developing a Global Perspective
SSE 4362 Fundamentals in Teaching Social Studies
SSE 4940 Field Study in Social Education
Summer 2014  Graduate Assistant-Dr. John Myers  
Created speech course and curriculum for the College of Education  
Analyzed various syllabi and course documents  
Create engaging classroom activities

Scholarship

Research  
2015-present  Using Argumentative Writing to Promote Preservice Teachers’ Noticing of Children’s Mathematical Thinking  
Dr. Ian Whitacre and Dr. Phyllis Underwood  
Tallahassee, FL  
Collected and analyzed data from pre-service teachers

2014-2015  Graduate Assistant-Dr. John Myers  
Research on simulations and pre-service teacher education  
Analysis of qualitative data from pre-service teachers

Spring/Summer 2014  Florida Center for Reading Research (FCRR)  
Tallahassee, FL  
Test administrator for Writing Research Project  
Evaluator of testing materials  
Transcribed and coded student responses

Public School Teaching  
2006-2013  Elementary School Teacher, Duval County Public School  
Jacksonville, FL.  
First grade and fourth grade teacher

Summer 2011  Kyunghee University, ESOL Teacher for Summer School Program  
Suwon, South Korea.

2008-2010  The Bridge of Northeast Florida, after school tutor, Jacksonville, FL.

Grants  
2015  National Association for Early-Childhood Teacher Educators (NAECTE) Doctoral Research Scholarship, $1000

Awards  
2011-2012  Biscayne Elementary Teacher of the Year, 2012  
2014  Juila B. Schwartz Memorial Fund, Florida State University, $1000
Elizabeth Bell Smith Endowed Scholarship, Florida State University, $1000

2015
Dennis and Kathy Newman Endowed Scholarship, Florida State University, $1000.

Presentations

International

National

Regional

Local


Poster Presentations
Kervin, T. The Reflective Practice of Preservice Teachers as it Relates to their Mathematics Instruction. Poster presentation at the Florida Association of Teacher Educators (FATE). Gainesville, Fl.

### Professional Service

#### Membership in Professional Organizations

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#### Service to Profession

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<td>Supervising Mentor for Jacksonville University and University of North Florida pre-service teachers</td>
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