Help! I have to teach math: The nature of a preservice teacher's experiences enacting mathematics instruction in a final internship

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Help! I Have to Teach Math: The Nature of a Preservice Teacher’s Experiences

Enacting Mathematics Instruction in a Final Internship

by

Lori Rakes

A dissertation submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Curriculum and Instruction with an emphasis in Elementary Education Department of Teaching and Learning College of Education University of South Florida

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Date of Approval:
June 17, 2015

Keywords: teacher education, preservice teacher support

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DEDICATION

This dissertation is dedicated to my family without whose support I could not have achieved this dream. To my children, Daniel, Nathan, Jonathan, and Joshua, who encourage and inspire me every day. To my husband, Greg, who has been my ultimate support as reflected by his sense of dedication, patience, and understanding throughout the course of my graduate studies at USF.
ACKNOWLEDGMENTS

Throughout the course of this dissertation, God has been my strength. I am thankful for how God has infused me with the knowledge and the potential to successfully complete this dissertation.

In addition, I would like to acknowledge my Major Professor, Dr. Diane Yendol-Hoppey, who did her best to support my academic endeavors, provide needed critique, and saw me through to the end of the dissertation process. Secondly, I would like to thank my Committee Members, Dr. Audra Parker, Dr. Jolyn Blank, and Dr. Sarah van Ingen who provided scholarly input and helped to develop me as a researcher.

I cannot help but express my gratitude to Katie Arndt, who was with me from the start, always encouraging and certainly good for a few laughs. I would like to also thank my office mates Jan, Brooke, and Donna for their consistent encouragement and listening ears. Thank you to Becky and Tracey for always having just the right words to say to refocus and encourage me. I owe special thanks to my husband, Greg, and sons Jonathan and Joshua for their sacrifice ensuring that every endeavor and goal was met during the course of my doctoral program despite the deprivation it caused them. I must also thank Daniel, Ashley, Nathan, and Andrea for stepping in to attend concerts, give rides, and fill in whenever they were asked in order to provide support in my absence. A special thanks also to my grandson, Jaxon, who provided much needed respites during stressful times.
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ABSTRACT

The purpose of this case study was to better understand the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety as she planned and implemented instruction during her internship by answering: What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she planned for mathematics instruction during her final internship? What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she implemented mathematics instruction during her final internship? Using an interpretivist approach to a case study inquiry, I used semi-structured interviews, observations, audio journals, and artifacts to collect data on a preservice teacher, cooperating teacher, and college supervisor. Member checking was used with interview data and a peer reviewer reviewed all data collection and analytic procedures. I analyzed the data using content and thematic analysis. The findings indicated that lack of planning, lack of instructional support, lack of content knowledge, and lack of transfer of what she learned in the mathematics methods course impacted the preservice teacher’s planning and implementation of mathematics instruction. In this way, the study identified the importance of instructional support for preservice teachers during K-12 classroom experiences, theory-to-practice connections between coursework and field experiences, and preservice teacher reflection to recognize weaknesses and seek out solutions to solve problems of practice. The study closed with a discussion from the viewpoint of reviewed literature, my interpretation of the findings and suggestions for future research.

Keywords: teacher education, preservice teacher support
CHAPTER ONE: INTRODUCTION

“I don’t like mathematics. I’ve never been good at it and I hated it in school. I want to teach fourth or fifth grade, but I don’t know if I can teach the math” (Kelly, elementary education major).

The above statement was made by a preservice teacher enrolled in the teacher education program where I am employed as an instructor. Though not all preservice teachers express these same inhibitions toward a content area such as mathematics and its teaching, some have such an aversion to mathematics that it leads them to doubt their potential effectiveness in teaching mathematics to children (Gresham, 2009). Learning to teach in a content area is a topic researchers have studied for many years (Ball, Hill, & Bass, 2005; Ball, Lubienski, & Mewborn, 2001; Brown & Smith, 1997; Charalambous, 2010; Hill & Ball, 2004; Hill, Schilling, & Ball, 2004). In fact, educators have learned that learning to teach involves a wealth of interrelated knowledge. Shulman (1986) indicates that the “capacity to teach” (p.8) is a concept that entails knowing content knowledge, pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners, knowledge of educational contexts, and knowledge of educational ends. Shulman adds that pedagogical content knowledge is “of special interest because it identifies the distinctive bodies of knowledge for teaching” (p. 8).

Knowing the content well enough to explain it, working with students in practicing it, and addressing misconceptions (pedagogical content knowledge) that may develop in it is crucial for learning to take place in the classroom. Elementary mathematics is no exception. Ball, Thames, and Phelps (2008) explain that mathematical knowledge for teaching (MKT) is critical for any
teacher of mathematics. Teachers need to know mathematics in ways useful for, among other things, “making mathematical sense of student work and choosing powerful ways of representing the subject so that it is understandable to students” (p. 404). Without ample mathematical content knowledge, the teachers lack in explanations, knowing how to illuminate the concepts, and have difficulty with the problems of misunderstandings (Shulman, 1986). Learning how to teach mathematics in ways that students can understand the concepts is part of preservice teacher learning.

Learning to teach mathematics can be difficult for preservice teachers, but for those with high levels of mathematics anxiety, it can be overwhelming (Battista, 1990; Gresham, 2004). Preservice teachers' internship experiences are opportunities for both preservice teachers and teacher educators to gather information about capabilities for teaching (Gresham, 2009). Gresham believes preservice teachers often underestimate the complexity of the teaching task in their ability to manage lesson planning and knowledge of subject content. To the preservice teacher with mathematics anxiety, those complexities create a gap between effective teaching and what is happening in the classroom (Gresham, 2004, 2007; Vinson, 2001). Since the quality of mathematics instruction in the elementary school depends on the preparation of preservice early-childhood and elementary teachers of mathematics (Battista, 1990), it is important to try to understand the nature of the experiences of preservice teachers, self-identified as having mathematics anxiety, as they work in real classrooms. Given the complex and multiple types of knowledge needed to effectively teach mathematics, the purpose of this study is to describe the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she plans and implements mathematics instruction during her final internship.
Statement of the Problem

Some preservice teachers enter their teacher education program with preconceived ideas about teaching. According to Lortie and Clement (1975), the images of teaching, learning, students, and subject matter formed during an individual’s own schooling provide a basis for interpreting and assessing the ideas and practices they encounter during their teacher preparation. Preservice teachers come to university and college programs with concepts, attitudes, and beliefs stemming from their own experiences about content areas including mathematics. Through past experiences, preservice teachers can also develop mathematics anxiety (Fiere, 1999). If preservice teachers come into teacher education programs with preconceived feelings and anxieties about mathematics, it may be difficult to change their attitudes (Hoy & Spero, 2005). Teacher education programs provide opportunities for preservice teachers to examine their own attitudes and feelings as well as learn how to teach in content areas.

In addition to providing opportunities for the examination of attitudes and feelings, teacher education programs offer various avenues to learn about and explore the teaching of content areas, including methods courses. Although mathematics methods courses in teacher education programs may reduce mathematics anxiety for many preservice teachers (Alsup, 2004; Bintas, 2008; Gresham, 2007; Rule & Harrell, 2006; Salinas, 2004; Sloan, 2010; Vinson, 2001), few studies were found that included any type of support during preservice teachers’ final internship and their classroom experiences in teaching elementary mathematics.

In order to better understand the experiences of preservice teachers as they learn to teach mathematics in a classroom, it is important to learn more about the nature of the experiences that a preservice teacher, self-identified as having mathematics anxiety, has as she plans and implements mathematics instruction during her final internship.
Purpose

Limited research has focused on preservice teacher planning and implementing mathematics instruction during a final internship. Even less research has focused on preservice teachers who self-identify themselves as having mathematics anxiety. Through this study, I intend to add to the body of knowledge in this area of research in teacher education. Therefore, the study focuses on the nature of a preservice teacher's experiences, self-identified as having mathematics anxiety, as she plans and implements mathematics instruction during her final internship.

Research Questions

1. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she plans for mathematics instruction during her final internship?

2. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she implements mathematics instruction during her final internship?

Rationale and Significance

The Council of Accreditation of Educator Preparation (CAEP) states that education is a practice profession; therefore, preparation for careers in education must create nurturing opportunities for aspiring teacher candidates (preservice teachers) to “develop, practice, and demonstrate the content and pedagogical knowledge and skills” that promote learning for all students (CAEP, 2013, p. 6). One of the ways preservice teachers develop these skills is through a culminating internship experience. Darling-Hammond (1990) defines internship as a structured experience by means of which a candidate for teaching receives the “supervision, opportunity for guided practice, assessment, and feedback needed to acquire and demonstrate the teaching knowledge, skills, and dispositions required for responsible, independent practice” (p. 32).
Internship experiences can also help preservice teachers make connections between the “world of the university and the world of the classroom” (Ebby, 2000). In addition, internship experiences provide opportunities for preservice teachers to practice what they have learned in teacher education courses.

Making connections between what is learned and what is taking place in the classroom may be more difficult for preservice teachers due to their own fears and self-efficacy in teaching mathematics. Swars, Daane, and Giesen (2006) conducted a study to investigate perceptions of preservice teachers’ skills and abilities to teach mathematics effectively as well as how their mathematics anxiety may have affected these perceptions. Results indicated mathematics anxiety had a negative relationship with preservice teachers’ beliefs in their skills and abilities to be effective mathematics teachers. Swars et al. (2006) called for further research on the influence of mathematics anxiety and teaching efficacy upon elementary teachers’ instructional practices. They suggested additional studies that involve observations of preservice teachers as their clinical experiences might shed more light on the actual enactment of effective teaching strategies in mathematics.

In sum, internship experiences are a vital part of preservice teachers’ growth in learning to be a teacher. The internship provides opportunities for preservice teachers to connect their college coursework to practical classroom experience. Preservice teachers with mathematics anxiety may have doubts in their own skills and abilities to be effective mathematics teachers. This study has the potential to fill gaps in the research and shed light on the influence of mathematics anxiety in the decision-making processes during planning and implementing mathematics instruction.
Definition of Terms

There are several terms used in this inquiry that have varied meanings. In order to prevent confusion, I present the operational definitions of key terms used in the study.

**College Supervisor (CS)**

A full-time or part-time professional education faculty appointed by a college to supervise preservice teachers in their field experiences and clinical practice (Inlow, 1959).

**Cooperating Teacher (CT)**

An active teacher working in a district school who allows a preservice teacher from a college of education to do field work in her classroom as a student teacher at the request and under the supervision of the college (Borko & Mayfield, 1995).

**Internship Experience**

A student teacher’s internship experience is one that provides preservice teachers with an intensive and extensive culminating activity where they are provided opportunities to develop and demonstrate competence in the professional role for which they are preparing (Darling-Hammond, 1990).

**Mathematics Anxiety**

A feeling of helplessness, tension, or panic when asked to perform mathematical operations or problems (Gresham, 2007, p. 182).

**Limitations of the Inquiry**

This case study is specific to one preservice teacher, self-identified as having mathematics anxiety, as she plans and enacts mathematics instruction in the spring semester of 2015. Case study research is not considered generalizable, but rather the findings will be transferable to other settings and will inform the field of teacher education.
Organization of the Remaining Chapters

In subsequent chapters, I review current literature on what we know about preservice teachers learning to teach in general then move to learning to teach mathematics with specific information regarding coursework and field experiences including the support roles of both the cooperating teacher and the supervising teacher. Learning to write lesson plans and standards and guidelines that impact learning how to teach mathematics are then described. I also present literature defining and looking at the possible causes of mathematics anxiety. Finally, I review the literature on what we know about preservice teachers and mathematics anxiety. In Chapter Three, I offer a detailed explanation of the study's methods. In Chapter Four, I set the stage for understanding Kelly's journey of learning to teach using weekly stories to help the reader better understand the preservice teacher’s internship experience. In Chapter Five, I unpack the themes discovered and in chapter Six I present assertions based upon each research question. Finally, Chapter Seven concludes with the discussion, implication, and future research ideas.
CHAPTER TWO: REVIEW OF THE LITERATURE

According to the National Center for Education Statistics (2014), as of 2012, there were approximately 49.5 million students enrolled in K-12 schools in the United States. Each student in a public school is required to take a standardized mathematics assessment during the school year. As reported in one state in 2014, over 600,000 elementary students in grades three, four, and five took the state standardized mathematics assessment. Results showed that only 59% of students in grades three, four, and five achieved a passing score. The results from the standardized assessments are used to place students in classrooms, evaluate teacher performance, and formulate school grades. With such important decisions hanging on the results of student assessment in mathematics, the need for highly skilled teachers to instruct students is obvious.

The purpose of this study addresses how teacher education programs can better prepare future teachers of elementary mathematics by studying the experiences of a preservice teacher as she plans and implements mathematics instruction during her final internship. Specifically, the research questions guiding this study include:

1. What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she plans for mathematics instruction during her final internship?

2. What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she implements mathematics instruction during her final internship?

This literature review will first situate the study in teacher preparation today. Next, it will provide a description of existing research related to what we know about the process of preservice teachers learning to teach and the outcomes of preservice teacher learning in general.
Then, the chapter will review existing research focused on what we know about preservice teachers learning to teach mathematics with specific information regarding coursework and field experiences including the support of both the cooperating teacher and the supervising teacher. Learning to write lesson plans and standards and guidelines that impact learning how to teach mathematics are then described. Although mathematics teacher education faces significant challenges, an additional barrier to elementary teacher preparation is mathematics anxiety. The chapter will illustrate the research related to mathematics anxiety including definitions and possible causes of mathematics anxiety in preservice teachers. The chapter will conclude by describing the gaps in the literature and how those gaps connect to this study.

**Situating the Study in Teacher Preparation Today**

Linda Darling-Hammond discusses teaching and learning to teach in her book *Powerful Teacher Education: Lessons from Exemplary Programs* (2006). She explains that most people think that teaching is represented by someone knowing something and then explaining it to others. If this is true, then teachers should just need to know the subject matter and have some “tools of the trade for presenting the information to students” (p. 8). However, according to Darling-Hammond, most of the time, this is not the way it works. The reality of effective teaching is much different:

Successful teachers link what students already know and understand to new information, correcting misimpressions, guiding learners’ understanding through a variety of activities, providing opportunities for application of knowledge, giving useful feedback that shapes performance, and individualizing for students’ distinctive needs (Darling-Hammond, 2006, p. 8).
Effective teaching requires teachers to know a wealth of interrelated knowledge and apply it in classroom situations meeting individual student needs. Teacher education attempts to provide both information and experiences that enable preservice teachers to become effective teachers.

Effective teaching is vitally important to elementary student education because the quality of teaching influences student learning (Biggs, 2012; Boaler, 2002; Sztajn, Confrey, Wilson, et al., 2012). Darling-Hammond (2006) explains that a child’s teacher can make a bigger difference to his or her educational success than most other school variables. For this reason and many others, teacher education has become an area under enormous scrutiny by policy makers and the public alike (Cochran-Smith, Piazza, & Power, 2013; Furlong, Cochran-Smith, & Brennan, 2013; Wiseman, 2012). As a result, research has investigated the qualities of effective teacher education and the structural components of quality teacher education programs (Darling-Hammond, 2012; Goodlad, 1990; Hanson, 2008). Still others have studied what preservice teachers should know and what makes a “highly qualified” teacher (Darling-Hammond & Youngs, 2002; Shulman, 1986, 1987; Stronge, 2007; Wayne & Youngs, 2003). Given this current teacher preparation context, the field has begun to identify what we know about learning to teach.

**What do we Know about Learning to Teach?**

Learning to teach is a complex process (Darling-Hammond, 2006). The process is complex because teachers need to not only know the subject area in depth, but know how to teach the content and facilitate student learning in alternate ways that diverse students can understand and demonstrate mastery (Shulman, 1987). Shulman (1986) also argues that knowledge of subject matter for teaching, referred to as “pedagogical content knowledge,” is of great importance. As stated before, teachers need to know not only the content of the discipline
they are teaching, but also know how to best represent that content to diverse learners. To do this well requires knowledge of curriculum materials, common pupil difficulties with the content, the context of learning, and the goals of the enterprise (Shulman, 1987). Hill, Rowan, & Ball (2005) confirm that differences in teacher knowledge of teaching particular subject matter, which involves substantive subject knowledge, produces differences in student learning.

To help address what teachers need to know in order to teach, the National Academy of Education Committee on Teacher Education (2013) adopted a framework that is organized using three intersecting knowledge types: (1) knowledge of learners and how they learn and develop within social contexts including knowledge of language development, (2) understanding of curriculum content and goals, including the subject matter and skills to be taught in light of disciplinary demands, student needs, and the social purposes of education, and (3) understanding of and skills for teaching, including content, pedagogical knowledge and knowledge for teaching diverse learners. Each of these areas is informed by an understanding of assessment and how to construct and manage a productive classroom (Darling-Hammond, 2006). Deep understanding of learning and learning differences for constructing curriculum has not always been a part of teacher education (Darling-Hammond, 2006). However, with diverse learners in today’s classrooms, understanding student learning differences is a vital part of learning to teach. Without knowing deeply how people learn, and how different people learn differently, teachers lack the foundation that can help them “figure out what to do when a given technique or text is not effective with all students” (Darling-Hammond, 2006, p. 303). Knowledge of learners, understanding of the curriculum, and understanding skills for teaching diverse learners all contribute to the complexity of learning to teach.
Learning to teach is further complicated by the fact that preservice teachers are sometimes unclear about “what school and teaching are ‘supposed’ to be” (Darling-Hammond, 2006, p. 35). Darling-Hammond (2006) explains that learning to teach requires attention to three basic obstacles. First, learning to teach requires preservice teachers to understand teaching in ways that are different from their own experiences as students. Lortie (Lortie & Clement, 1975) refers to this as the “apprenticeship of observation” describing the learning that takes place while being a student for many years in a traditional classroom setting. According to Lortie, the images of teaching, learning, students, and subject matter that are formed during an individual’s own schooling provide a basis for interpreting and assessing ideas and practices which a preservice teacher encounters during his or her teacher preparation. Unfortunately, these experiences lead many preservice teachers into believing that they know more about teaching than they actually do and can prohibit some from acquiring the teaching skills needed for the classroom because they feel that they already possess them (Lortie & Clement, 1975). Preconceived ideas of teaching are the first obstacles that preservice teachers must overcome.

The second obstacle in learning to teach is learning to “think” and “act” like a teacher (Darling-Hammond, 2006). Preservice teachers need to learn to do many things simultaneously. Kennedy (1999) calls this the “problem of enactment” (p.71). Problems of enactment are the behaviors associated with specific situations in the classroom. Various situations occur in any given school day and preservice teachers must have the knowledge of how to handle these situations. Psychologists refer to this as “situated knowledge” or knowledge that is understood through specific situations (Kennedy, 1999, p. 71). Darling-Hammond (2006) describes the problem of enactment as being able to apply knowledge to practice. She describes the types of enactment that must take place in the classroom on a daily basis:
Preservice teachers must not only understand how people learn and what teaching strategies may help them; they must also learn to present information clearly, lead discussions that really get at the ideas under study, manage discourse of many kinds, organize groups for learning and give them useful tasks they can do, manage student behavior, weigh difficult dilemmas and make quick decisions, plan well and alter plans for unforeseen circumstances, respond to children, and respond to questions about the material they are teaching (Darling-Hammond, 2006, p. 37)

Learning to handle the specific situations or problems of enactment is an area that preservice teachers must experience when learning to teach.

The third obstacle in learning to teach is learning to respond to many different aspects of the classroom, including juggling academic and social goals that may frequently change (Darling-Hammond, 2006). Teachers’ days can be very non-routine and change in a variety of ways. Lampert (2001) further explains this intricacy:

One reason teaching is a complex practice is that many of the problems a teacher must address to get students to learn occur simultaneously, not one after another. Because of this simultaneity, several different problems must be addressed in a single action. And a teacher’s actions are not taken independently; there are interactions with students, individually, and as a group. (p. 2)

Balancing the various aspects of the changing classroom, including both academic and social goals make learning to teach very non-routine.

All told, Darling-Hammond’s work indicates that three basic obstacles: (1) understanding teaching different ways, (2) learning to “think” and “act” like a teacher, and (3) learning to respond to many different aspects of the classroom are influences on the learning to
teach process. Preservice teachers must overcome each of the obstacles to become effective teachers.

Darling-Hammond's frames for understanding learning to teach are complemented by Feiman-Nemser's perspectives. According to Feiman-Nemser (2008), learning to teach can be conceptualized around four broad themes: (1) learning to think like a teacher, (2) learning to know like a teacher, (3) learning to feel like a teacher, and (4) learning to act like a teacher. The first theme, learning to think like a teacher, means moving beyond the belief that teaching is easy and learning involves the “simple transfer of information from teacher to student” (p. 698). It means linking the ends to the means and learning to place the activities of teaching and learning in a pedagogical framework (Feiman-Nemser & Buchman, 1985; Lortie & Clement, 1975). Developing the capacity to “think on one’s feet, reflect on, and adjust one’s practice” (Feiman-Nemser, 2008, p. 698) is also included in the first theme, learning to think like a teacher.

The second theme, learning to know like a teacher, includes the different kinds of knowledge that a teacher must have, including the knowledge teachers generate in practice. According to Feiman-Nemser, teachers need to know a lot in order to “enhance the academic learning of all students” (Feiman-Nemser, 2008, p. 699). The third theme, learning to feel like a teacher, focuses on teaching and learning to teach and embeds teaching and learning to teach into the teacher’s emotions, identity, and intellect (Feiman-Nemser, 2008). How do teachers negotiate the difference between who they want to be as a teacher and the realities and challenges they face as a teacher? (Hammerness, 2006) The fourth and final theme, learning to act like a teacher, suggests a teacher needs a “suitcase” full of skills, strategies, routines, and judgment to figure out what to do and when to do it (Feiman-Nemser, 2008). The “normal busyness” of classrooms requires the establishment of routines to make teaching manageable. This "busyness" requires
teachers who are “constantly absorbing new information and using it to decide what to do next” (Feiman-Nemser, 2008, p. 699-700). Acting like a teacher requires preservice teachers to be quick to make informed decisions and manage the routines of the day, an immense task that requires strategies, routines, and sound judgment.

As indicated, learning to teach is an enormous and complex task. The complexity occurs as preservice teachers learn about content knowledge, how to teach, and how to respond to various situations in the classroom, both academic and social. It involves learning new information and new skills, learning to think and act like a teacher, and then applying it in a classroom full of diverse learners who each bring their own set of needs and dispositions to the classroom. If learning to teach is such a complex task, preservice teachers must navigate through those complex tasks as they learn to teach. As a result, researchers in the field have identified what we know about preservice teacher learning.

What do we Know about Preservice Teacher Learning?

In recent years, a shift has occurred in preservice teacher education that places more emphasis on preservice teacher learning within the K-12 classroom. Combining coursework and classroom experience coordinates opportunities for preservice teachers to learn new ideas and practices, as well as to reflect and receive feedback on their teaching (Ball & Forzani, 2009; Putnam & Borko, 2000). The combined coursework and fieldwork experiences help connect theory to practice and provide experiences that allow preservice teachers to learn using “authentic activities” (Putnam & Borko, 2000, p. 4). The enhanced emphasis on linking preservice teacher coursework and fieldwork provides a vehicle for preservice teachers to begin implementing what they have learned as they develop as teachers.
In addition, the link between coursework and fieldwork create important opportunities for preservice teachers' learning. Feiman-Nemser proposed a learning continuum identifying the central tasks that should be a part of preservice teacher learning. Feiman-Nemser (2001) asserted that preservice teachers go through multiple growth stages. The stages include: (1) examining beliefs critically in relation to vision of good teaching, (2) developing subject matter knowledge for teaching, (3) developing an understanding of learners, learning, and issues of diversity, (4) developing a beginning repertoire of teaching tools and instructional strategies, and (5) developing the tools and dispositions to study teaching.

In stage one, the beliefs that preservice teachers bring to their teacher education program “serve as filters for making sense of the knowledge and experiences they encounter” (Feiman-Nemser, 2001, p. 1016). These beliefs may mislead preservice teachers and make it more difficult for them to form new ideas and new habits of thought and action. Before they can embrace new visions of teaching, preservice teachers need opportunities to critically examine their beliefs. Unless these entering beliefs are examined and allowed to change, they may continue to wrongly shape the preservice teachers' ideas and future practices (Feiman-Nemser, 2001).

Stage two of the continuum requires preservice teachers to be responsible for the subject matter they are learning to teach. Preservice teachers must develop a firm grasp of both content knowledge and pedagogical knowledge in order to effectively learn to teach (Feiman-Nemser, 2001). This emphasis on content supports Shulman’s (1987) reasoning that preservice teachers must have a deep understanding of the content they are teaching as well as knowing their subjects from a pedagogical perspective. Preservice teachers must develop an understanding of what students might find confusing or difficult and have alternate explanations, models, and
analogies to represent concepts and processes (Feiman-Nemser, 2001). It means developing an understanding of how "core concepts and processes connect across fields and how they relate to everyday life" (Feiman-Nemser, 2001, p. 1018).

The third stage of the continuum requires that preservice teachers develop understandings of learners and learning (Feiman-Nemser, 2001). Preservice teachers need to learn what students are like at different ages and how they make sense of their physical and social worlds. This helps to provide the necessary frameworks for "understanding students, designing appropriate learning activities, justifying pedagogical decisions and actions, and communicating with parents, students, administrators, and colleagues” (Feiman-Nemser, 2001, p. 1018). In an effort to show change of preservice teachers’ conceptions of teaching and learning toward a focus on student learning, Swinkels, Koopman, and Beijaard (2013) conducted an exploratory mixed-methods study using a small sample of preservice teachers. The findings indicated that it is possible to change preservice teachers’ conceptions of teaching and learning from transmissive (standing in front of the class, delivering information) to a focus on student learning.

Focusing on student learning includes, among other things, knowledge about curriculum materials and design. Beyer and Davis (2012) used mixed methods to find out preservice teachers’ knowledge and beliefs about curriculum materials and their confidence level in curriculum design by analyzing lesson plans and applying their PCK in curricular planning. Findings revealed that most preservice teachers demonstrated some strength in their application of PCK by demonstrating knowledge of instructional strategies for establishing a sense of purpose within a lesson. However, preservice teachers also expressed limitations in their knowledge of content curricula – especially the design of curriculum materials. For example, some preservice teachers assumed that learning goals and assessments were automatically
connected to the standards. Preservice teachers’ view of curriculum and instruction through the lens of student learning is vital in their development as a teacher as they progress on the continuum through stage three.

Stage four of the continuum entails preservice teachers developing a beginning repertoire of teaching skills. Good teaching includes knowledge of a “range of approaches to curriculum, instruction, and assessment” (Feiman-Nemser, 2001, p. 1018). Preservice teachers should become familiar with good curricular materials, learn several different models of teaching, and explore multiple types of assessment in which student understanding can be demonstrated (Feiman-Nemser, 2001). Teachers must learn to adapt curriculum materials such as texts, activities, and assessments as part of effective teaching for student learning. Davis (2006) conducted a research study to investigate what criteria preservice teachers use to critique and adapt curriculum materials for instructional use. The preservice teachers used lesson plans and suggested curriculum materials and applied criteria such as inquiry and investigation, communication, questioning, and real-world applications and connections. Preservice teachers were provided with scaffolding to help “draw out their own criteria and apply those criteria in systematic ways” (Davis, 2006, p. 352). Findings revealed that the participating preservice teachers’ critiques of the curriculum depended upon the scaffolding present or absent in the assignments and on the features of the instructional materials. Preservice teachers should be encouraged to critique instructional materials and then adapt them so the resulting instruction is aligned with content standards and meets individual student needs as they move through stage four on the continuum.

The final stage of the continuum for developing preservice teachers is that of forming habits and skills to continue to learn to teach. Preservice teachers must realize that learning is an
integral part of teaching and that “serious conversation about teaching is a valuable resource in developing and improving their practice” (Feiman-Nemser, 2001, p. 1019). Continued learning as a teacher is frequently accomplished by attending professional development workshops or sessions. Guskey (2002) postulates that what attracts teachers to professional development is the belief that the professional development will, in some way, “expand their knowledge and skills, contribute to their growth, and enhance their effectiveness with students” (p. 382). Guskey proposed that growth and change in teachers’ beliefs and attitudes result from professional development that produces changes in teachers’ classroom practices which bring about changes in student learning outcomes. It is important that preservice teachers cultivate a desire for continued learning that will influence their practices as teachers. As the last stage of the continuum, a desire for continued learning will help to ensure that preservice teachers will remain knowledgeable in their field and impact student learning.

All told, as preservice teachers learn about teaching and move forward on the learning continuum, they begin to view teaching using a different lens. While once viewed as just standing in front of a classroom and sharing information, preservice teachers learn that teaching involves knowing the deep content knowledge needed for teaching and an understanding of learners and learning. The multiple growth stages of preservice teachers (Feiman-Nemser, 2001) provide a framework continuum of how preservice teachers learn to become effective teachers. As preservice teachers move through the continuum, they develop a sense of what it means to be an effective teacher. Effective teaching in content requires specific knowledge in that content area. Given that we know that learning to teach mathematics requires special mathematical knowledge, researchers have identified what we know about preservice teachers learning to teach mathematics.
What do we Know about Preservice Teachers Learning to Teach Mathematics?

Although learning to teach, broadly conceived, is complex, learning to teach mathematics, like other content areas, involves several additional levels of knowledge. Shulman (1986) stated that content knowledge was imperative and postulated three categories of content knowledge: subject matter content knowledge, pedagogical content knowledge, and curricular content knowledge. Subject matter content knowledge becomes essential to understanding a variety of questions that help us understand learning to teach mathematics including: Where do teacher explanations come from? How do teachers decide what to teach, how to represent it, how to question students about it? How do teachers deal with misunderstandings? Teachers know the answers to these questions based upon their subject content knowledge.

The second type of knowledge needed for teaching, pedagogical content knowledge, goes beyond subject content to subject content knowledge for teaching (Shulman, 1986). Hill, et al. (2004) further expanded upon Shulman’s original definition of pedagogical content knowledge to include the mathematical knowledge needed for teaching (MKT) and referred to this as “specialized content knowledge needed for teaching” (p. 13). Pedagogical content knowledge (PCK) and MKT are believed to be the types of knowledge that effective teachers need for the classroom (Hill, et al., 2004; Shulman, 1986, 1987; Wilson, Shulman & Richert 1987). Both PCK and MKT are types of knowledge that support better mathematical teaching.

The third type of knowledge Shulman described as essential to effective teaching was curricular content knowledge. Curricular content knowledge includes knowledge of the curriculum and its associated materials (Shulman, 1986). Knowing when and how to use appropriate teaching tools within the curriculum such as alternative texts, software programs, or visual materials are essential to learning to teach. An effective teacher must know the content he
or she is teaching (subject content knowledge), know how to effectively use the curriculum and associated materials (curricular content knowledge), and know how to teach the specialized area of content (pedagogical content knowledge) to skillfully implement subject specific knowledge in the classroom.

To further explore the connection between mathematical content knowledge and mathematical knowledge for teaching, Hill et al. (2005) conducted a study using linear mixed-model methodology in which first and third graders mathematical achievement gains were tracked. Researchers collected surveys and student achievement data from students and teachers in 115 elementary schools over a three-year period. Findings showed that teachers’ content knowledge for teaching mathematics was a significant predictor of student gains at both grade levels (Hill et al., 2005). This study further confirmed Shulman’s (1986) work focusing on the importance of pedagogical content knowledge by showing that specialized knowledge and skills used for teaching mathematics positively impacts student learning.

In addition to Shulman's discussion of the role of subject specific knowledge, and Hill et al. (2005) connection to student achievement, scholars have investigated, "What does good mathematical teaching look like?" This is important to preservice teacher education because preservice teachers come into teacher education programs with ideas about teaching, good or bad, based upon their own experiences (Lortie & Clement, 1975). Teacher education programs allow preservice teachers to study and emulate effective mathematics teachers by looking at good mathematics teaching. In the recent International Handbook of Mathematics Teacher Education, Schoenfeld and Kilpatrick (2008) discussed their ideas on proficient—or good—mathematics teaching. They developed seven ideas into a working framework for proficiency in teaching mathematics. Many of their ideas were also found in the National Council of Teachers
of Mathematics documents (NCTM) (2000a) detailing effective mathematics teaching. These ideas include: (1) knowing school mathematics in depth and breadth, (2) knowing students as mathematical thinkers, knowing students as mathematical learners, (3) crafting and managing mathematical learning environments, developing classroom norms and supporting classroom discourse as part of teaching for mathematical understanding, (4) building relationships that support mathematical learning, and (5) reflecting on one’s practice.

In addition, NCTM (2014) also detailed principles of “what is needed to realize the potential of educating all students” (p. vii). NCTM (2014) presented guiding principles for school mathematics: (1) teaching and learning, (2) access and equity, (3) curriculum, (4) tools and technology, (5) assessment, and (6) professionalism. As described by NCTM (2014), teaching and learning must engage students in “meaningful learning through individual and collaborative experiences” that assist them in making sense of mathematical ideas and reason mathematically (p. 5). Access and equity in mathematics requires that all students have access to “high-quality” mathematics curriculum, teaching and learning (NCTM, 2014, p. 5). The curriculum used in effective mathematics programs must develop mathematics along “coherent learning progressions” and develop connections between mathematics and the “real world” (NCTM, 2014, p. 5). NCTM (2014) also states that a strong mathematics program integrates the use of mathematical tools and technology as resources for student learning (p. 5). Assessment must also be used as an “integral part of instruction”, providing “evidence of proficiency” with mathematics content and practice. The data collected through the assessments allows teachers to give feedback to students and inform their instructional decisions. Professionalism in mathematics education requires teachers to “hold themselves accountable for the mathematical success of every student” and continue their own professional growth towards effective teaching
of mathematics (p. 5). By putting the aforementioned principles into action, teachers can create effective classrooms and learning environments that positively impact student learning (NCTM, 2014).

Schoenfeld and Kilpatrick’s (2008) ideas continue to emphasize strong mathematical content knowledge, knowing how students think, knowledge of how they learn, and how to engage and manage a classroom environment (Wasserman, 2011). Hersh (1986) stated that a teacher’s view of how teaching should take place is based on the teachers’ understanding of the mathematics, not on what he or she believes are the best ways to teach. Therefore, one’s conception of mathematics and his/her mathematical content knowledge are integral attributes of good mathematics teaching.

Ball and Forzani (2010) expounded on the idea that what teachers know and how they teach it (good or bad) really does matter. They explained that learning to design appropriate lessons and enact instruction does not come naturally and must be learned. They also believe that there are three key domains of professional preparation for mathematics instruction: (1) teachers’ preparation in the area they will teach; (2) the curriculum of practice essential for beginning teaching; (3) and the approaches and settings best suited for “effective professional learning” (p. 10). Together, these domains encompass content, curriculum, and pedagogy which are essential for effective mathematical teaching preparation.

Mathematical teaching preparation was recently studied by Ball and Forzani (2009). They explained the connection between mathematics teacher preparation courses and classroom teaching by discussing a practice-focused curriculum for learning to teach. They postulated this type of curriculum includes significant attention not just to the knowledge demands of teaching but to the actual tasks and activities involved in the work. A practice-focused curriculum
includes foundational knowledge, but is designed and developed differently by specifying the content (what teachers need to learn to do) and unpacking it for learning. Ball et al, (2001) also proposed that learning to teach mathematics included designing mathematical tasks, selecting textbooks, predicting trouble areas for students, and in determining what children know. The subject of mathematics must be a part of an elementary preservice teacher’s knowledge base. Knowing subject matter and being able to use it is “at the heart of teaching all students” (Ball, 2000, p. 243). There is an assumption that someone who knows content for himself/herself is able to use that knowledge in teaching. This is not always the case (Shulman, 1987). Shulman’s (1987) pedagogical content knowledge (PCK) is a knowledge that links content and pedagogy. Included in PCK is knowledge of what is typically difficult for students, of representations that are most helpful for teaching a specific idea or procedure, and ways to develop a particular idea (Ball, 2000). The knowledge of teaching and content (PCK) is of extreme importance in the mathematical preparation of preservice teachers as it allows them to understand students’ needs and how to best meet those needs with mathematical instruction.

In an international study related to the mathematical preparation of future teachers entitled Teacher Education and Development Study in Mathematics (TEDS-M), Tatto and Senk, (2011) designed an international comparative study of primary and secondary mathematics teacher education. TEDS-M examined how different countries have prepared their teachers to teach mathematics in primary and lower-secondary schools. TEDS-M surveyed 15,163 future primary teachers, 9389 future secondary teachers, and 4837 teacher educators currently teaching in teacher preparation institutions (Tatto & Senk, 2011). The questionnaires for both primary and secondary future teachers included a common set of questions about their backgrounds, opportunities to learn, and beliefs about mathematics, teaching, and learning. In addition, each
questionnaire had items to assess mathematics knowledge for teaching (defined as mathematics content knowledge and mathematics pedagogical knowledge) appropriate for that level (Tatto & Senk, 2011).

Assessing mathematics content knowledge, TEDS-M had two anchor points in which participants performed various computations in mathematics. Anchor points were defined as “specific values on each score scale that are used to develop descriptions of what examinees at or near that point on the scale know and can do” (Tatto & Senk, 2011, p. 125). Anchor point one included computations with whole numbers, properties of operations, fraction computational problems, visualizing and interpreting standard two-dimensional and three-dimensional geometric figures, and solving simple expressions and equations. Anchor point two included successfully completing the mathematical tasks at anchor point one and using fractions to solve story problems, recognizing examples of rational and irrational numbers, finding the least common multiple of two numbers, determine areas and perimeters of simple figures, reasoning about factors multiples and percentages, problems involving coordinate geometry, and some familiarity with linear expressions and functions. Across all program groups and within each participating country, future teachers’ scores on the mathematical content knowledge scale varied widely. In the United States, more than 90% of future teachers reached anchor point one, whereas only about 50% reached anchor point two. This study offered great insight into mathematical teacher education around the world. Specifically, the study’s findings revealed that knowing mathematical content at deep levels is important in learning to teach mathematics. If the quality of mathematics education for every child is to be improved, the education of teachers “needs to be taken seriously” (Tatto & Senk, 2011, p. 134). Tattoo and Senk explained that effective mathematics teaching is related to mathematics preparation courses. The development
of competent mathematics teachers is the goal of teacher education programs; however, teaching mathematics is more than knowing mathematics. Lampert (1998) states that teaching mathematics is a thinking practice that integrates reasoning and knowing the content with action in teaching. In mathematics teacher education, there are usually two parts to learning the content and putting it to action: coursework and field experience.

**Coursework**

Although coursework is an essential part of learning to teach mathematics, Ball, Sleep, Boerst, et al. (2009) explain that a major problem in mathematics education is that there is no shared professional curriculum to prepare teachers to teach mathematics. Faculty in colleges and universities design coursework for preservice teachers. For the past several years researchers have been working to conceptualize the knowledge required for teaching (Ball & Bass, 2003; Hill, et al., 2004; Shulman, 1986). Knowing the content well enough to explain it, working with students in practicing it, and addressing misconceptions that may develop in it is crucial for learning to take place in the classroom (Ball, et al., 2008). Elementary mathematics is no exception. Without ample mathematical content knowledge, teachers lack in explanations, knowing how to illuminate the concepts, and have difficulty with the problems of misunderstandings (Shulman, 1986). Preservice teachers begin to develop this knowledge in their teacher education program coursework.

What is important for preservice teachers to learn in a mathematics methods course? Answers may vary depending upon the institution and instructor; however, we know mathematical knowledge for teaching is important for preservice teachers to develop as it can lead to higher student achievement (Hill et al., 2005). We also know that a positive mathematics
teaching efficacy leads to stronger beliefs in the ability and skills to be an effective mathematics teacher (Swarz, et al., 2006).

To investigate changing preservice teachers’ self-efficacy and their changing beliefs with current reform in mathematics education (NCTM, 2000), Wilkins and Brand (2004) investigated the relationship of an elementary mathematics methods course and changing preservice teachers’ beliefs. The Mathematics Belief Instrument (MBI) was used as an evaluation tool in pretests and posttests. The mathematics methods course was designed to develop preservice teachers’ understanding of mathematics, mathematics pedagogy and children’s mathematical development and to “cultivate a positive disposition toward teaching mathematics” (Wilkins & Brand, 2004, p. 227). Findings suggested that after completing the mathematics methods course most preservice teachers’ ratings were in agreement with current mathematics reform. However items associated with efficacy were less consistent after taking the mathematics methods course. After completing the methods course, seventy-six percent of the total of preservice teachers in the study agreed they would be very good at teaching mathematics. However, of the preservice teachers who indicated that they were not good at learning mathematics on the pretest, only 41% agreed that they would be very good at teaching mathematics. Some of the responses indicated that preservice teachers thought that being good at mathematics was not absolutely necessary to be a good teacher of mathematics. One of the participants reflected that she knew that she had a lot more to learn about mathematics, but had more confidence in her ability to teach it after completing the mathematics methods course. This study provided insight in preservice teachers’ beliefs that mathematical content knowledge may not be essential for effective mathematical teaching. Some preservice teachers believed that even after taking the mathematics methods
course they still lacked knowledge in some areas of elementary mathematics but would still be a
good mathematics teacher.

Coursework, as described by Batchelor (2012) could be the “defining moment in
preservice teacher education” by allowing preservice teachers to “explore, practice, reflect, and
engage in conversation” as they learn about teaching (p. 245). Batchelor suggests five
components that she believes are essential in methods coursework: (1) implement reflective
practice, (2) develop a community of practice, (3) make theory-to-practice connections, (4)
understand the role of curriculum, and (5) engage in social justice. Methods courses may help
preservice teachers confront their own understandings of what good teaching is and help them
make connections between what is learned in the course and what they should practice in the K-
12 setting.

All told, coursework is essential to the development of preservice teacher learning in that
it provides time for learning about pedagogical content knowledge and mathematical knowledge
for teaching. It also allows preservice teachers to increase their efficacy in teaching mathematics
through activities such as peer teaching and designing lessons. To connect coursework to the
classroom, many teacher education programs include field experiences.

Field Experiences

Field experience refers to any authentic context which allows a preservice teacher to
apply the theory of teaching (Cooper & Nesmith, 2013). Also called “internship,” “field work,”
“practicum,” and “student teaching,” John Dewey (2004/1916) stressed that the role of field
experience in teacher education was vital and that preservice teachers should have intensive,
focused opportunities to experiment in their practice and learn from it. Putting what preservice
teachers have learned into practice is key to developing good teachers of elementary mathematics.

Most coursework and field experiences are built upon standards that preservice teachers need to demonstrate to successfully complete the course. Zeichner (2012) proposed that the standards and indicators must be translated into activities and routines that teachers can learn to enact and realize the purpose of the standards. Putting the standards into practice through a connected field experience helps link academic and practitioner knowledge to support preservice teacher learning (Zeichner, 2010). Helping preservice teachers understand the importance of both academic and practitioner knowledge is an essential part of a valuable field experience.

Quality field experiences in teaching mathematics have the potential to develop and advance multiple benefits for participants (Cooper & Nesmith, 2013). Among those benefits is that of enabling preservice teachers to practice skills presented in their mathematics methods coursework within real world contexts (Henry, 1983; McIntyre, Byrd, & Fox, 1996; McLoughlin & Maslak, 2003; O’Brian, Stoner, Appel, et al., 2007). Research has shown how context (placement) in field experiences makes a difference. Cooper and Nesmith (2013) studied how contextual variances in mathematics field experiences influence preservice teachers growth and development as inquiring, reflective mathematics educators. The study included 33 preservice teachers all enrolled in a mathematics methods course with an accompanying field experience, a math camp. Reflective journals submitted by all participants served as the primary data source for this qualitative analysis. The researchers chose to conduct an analysis of the data by employing the categories of self, contextual features, cooperating teacher/college supervisor, and students. Each researcher independently coded all participant responses and a coding guide was developed which included category names, definitions for coding assignments, and an additional
field for coding notes and questions (Cooper & Nesmith, 2013). Findings in the study included participants’ focus on the teaching process. The preservice teachers who taught at the mathematics camp made specific statements regarding the manner in which student responses guided the instructional decisions. Those who were in the traditional classroom made statements regarding the importance of different instructional strategies - mostly enacted by cooperating teachers. The results of this research highlight the importance of field experience context on the development of preservice teachers’ understanding and application of mathematics pedagogy.

Conclusions and implications of Cooper and Nesmith’s (2013) study revealed that field experiences need to be places where preservice teachers can practice teaching and reflect upon their own learning as one entering the profession:

All field experiences should include multiple opportunities for preservice teachers to teach from lessons they have prepared, and there needs to be opportunities to reflect upon it these teaching experiences in light of how they compared to the lessons the preservice teachers personally experienced in school. Participating in multiple field experiences will allow preservice teachers to gain insights into the influence of personal mathematics history and the resulting impact of this history on their development as a mathematics teacher. (Cooper & Nesmith, 2013, p. 182)

Additionally, Cooper and Nesmith (2013) stated that teacher education programs must recognize the importance of situating mathematics field experiences within actual classroom settings as well as considering multiple campus and multiple classroom placements so that preservice teachers may experience the complexities and realities of school settings.

As previously indicated, mathematics field experiences are vital to the development of preservice teachers in that they provide opportunities to connect coursework and theoretical
learning to real-world K-12 classroom settings. A part of mathematics field experiences, specifically final internships, is that of support from a classroom cooperating teacher and a college supervising teacher. Both individuals provide support essential to preservice teachers learning to teach mathematics in the field experience.

**Support from Cooperating Teachers**

In addition to the importance of classroom settings, support during preservice teachers’ field experiences is crucial to their development as teachers. According to Butler and Cuenca (2012), a key component for preservice teacher learning during field experiences is the guidance of cooperating teachers. Due to the lack of definitional clarity of the roles and responsibilities of cooperating teachers, Butler and Cuenca described three major conceptions of the cooperating teacher as (1) instructional coach, (2) emotional support system, and (3) socializing agent.

Cooperating teachers who view themselves as instructional coaches assist preservice teachers in developing the skills needed to teach (Butler & Cuenca, 2012). In addition, cooperating teachers who are instructional coaches observe and evaluate instructional practice and provide constructive feedback aimed at “improving the methods and techniques of preservice teachers” (Butler & Cuenca, 2012, p. 299). Instructional coaches also advance preservice teacher knowledge by helping preservice teachers “develop their own strengths and improve their weak areas according to their own personality character and ability” (Kwan & Lopez-Real, 2005, p. 285).

Secondly, cooperating teachers who provide emotional support help preservice teachers who have uncertainties about what it means to be a teacher move past those fears (Butler & Cuenca, 2012). According to Abell, Dillon, Hopkins, et al. (1995), supportive cooperating teachers believe their purpose in preservice teacher development is “to be helpful rather than
evaluative; to be there for an intern who, it [is] assumed, might have difficulties adjusting to the new role of teacher” (p. 179).

Last, cooperating teachers who act as socializing agents can either have a positive or negative effect on the preservice teachers’ educational views (Butler & Cuenca, 2012). Preservice teachers look toward their cooperating teachers for guidance and the cooperating teachers may be the first educators to help make sense of the formal and informal requirements and resources involved in teaching (Odell, 1986). Depending upon the educational views that cooperating teachers hold, preservice teachers may find themselves supported by cooperating teachers who “interpret their job as socializing preservice teachers into the status quo of schools or into the cooperating teacher’s own practices” (Wilson, Floden, & Ferrini-Mundy, 2002, p. 196). This is certainly an important point as some research suggests that cooperating teachers exert the main influence on preservice teachers’ practice (Frykholm, 1996; LaBoskey & Richert, 2002; Vacc & Bright, 1999). Although cooperating teachers play important roles in preservice teachers’ final internships, studies have revealed a disconnection between cooperating teachers’ actions and the goals of college teacher education programs (Koskela & Ganser, 1995). Particularly for preservice teachers who teach mathematics, the need to support their transformation of mathematics education reform ideas into practice can only be accomplished by closing the gap between university/college programs and K-12 schools (Frykholm, 1996, 1998; Blanton, Berenson, & Norwood, 2001).

In sum, the concept of cooperating teachers as instructional coaches, providing emotional support, and socializing preservice teachers gives direction as to the type of support preservice teachers need in the K-12 classroom. Since both cooperating teachers and college supervisors are essential in the support and development of preservice teachers, when they work together,
preservice teachers of mathematics may be able to better connect mathematics education and classroom practice.

**Support from College Supervisors**

The college or university supervisor is one element of preservice teachers’ field experiences intended to build a bridge between the university program and K-12 schools (Fernandez & Erbilgin, 2009). Preservice teachers regard field experience and work with supervisors as the two most important elements of their professional preparation (Clarke, & Jarvis-Selinger, 2005; Haigh & Ward, 2004). Research suggests that the nature of the supervision affects the role of the college supervisor in the preservice teacher’s internship experience. Blanton et al. (2001) found that the college supervisors’ use of “educative” supervision, an approach that puts the preservice teacher as an active constructor of his or her knowledge about teaching mathematics, resulted in the college supervisor being able to support a preservice teacher’s development in ways “consistent with the mathematics teacher education program” (Fernandez & Erbilgin, 2009). In Frykholm’s (1998) study on feedback given to preservice teachers, mathematics preservice teachers accepted their college supervisors’ feedback because they felt the college supervisors knew their classroom environments. The preservice teachers stated that the cooperating teachers and the supervising teachers differed in their feedback. They thought the college supervisors provided more feedback related to mathematics. To better understand the type of feedback that cooperating teachers and college supervisors give preservice teachers of mathematics, Fernandez and Erbilgin (2009) conducted a qualitative study of post-lesson conferences led by both cooperating teachers and college supervisors.

As part of their investigation Fernandez and Erbligin (2009) studied two mathematics preservice teachers, their cooperating teachers, and the college supervisor working with both
preservice teachers. Data were collected through field notes of lessons, audiotaped post-lesson conferences, electronic communications asked of the cooperating teachers by the college supervisor, and reflective journals kept by the student teachers. Findings revealed that the college supervisor and cooperating teachers demonstrated different approaches to the supervision of the student teachers. The college supervisor tended to use open ended questions related to observed classroom experiences and explored the student teachers’ thinking, particularly related to mathematics pedagogy and mathematics in order to help them learn from experiences in their own classroom. The cooperating teachers’ communications used a more evaluative supervision approach. Their evaluations were mostly positive and affirmed to the preservice teachers that they were doing well. Fernandez and Erbligin (2009) ascertained that the preservice teachers may have further benefited if the cooperating teachers’ messages were more in line with those of the college supervisor. In one case, the preservice teacher received overwhelmingly positive communication from the cooperating teacher which seemed to suggest to the preservice teacher that she did not have any particular areas to work on in the future. Even though cooperating teachers and college supervisors play different roles with the preservice teacher, by working together, they can influence the growth of mathematics preservice teachers.

While cooperating teachers are in the classroom on a more day-to-day basis with preservice teachers, college supervisors observe lessons, though sometimes less frequently than cooperating teachers, and provide opportunities for learning through discussion of the lessons. According to Butler and Cuenca (2012), the primary objective of supervision is the gradual development of the preservice teachers’ skills through discussions with the college supervisor. It’s through both the cooperating teacher’s and the college supervisor’s feedback and support that preservice teachers gain valuable insight into learning to teach. Research suggests that
preservice teachers have more successful experiences when both their college supervisors and cooperating teachers share similar messages with them (Vacc & Bright, 1999; LaBoskey & Richert, 2002).

All told, mathematics field experiences where preservice teachers can work with students are essential for preservice teacher learning as they provide real-world learning in the classroom. Preservice teachers have opportunities to practice what they have learned in mathematics methods coursework as well as learn new ideas from cooperating teachers with whom they work in field experiences. Cooperating teachers who provide assistance with preservice teachers’ instructional needs, emotional support, and socialization help preservice teachers develop as classroom teachers. College supervisors also play a role in helping to develop preservice teachers by giving feedback based upon the preservice teachers’ needs. However, it is important that the preservice teacher receive consistent and similar feedback from both the cooperating teacher and the college supervisor to provide optimum growth during the field experience. Part of the support given by the cooperating teacher and college supervisor is that of lesson planning (Butler and Cuenca, 2012).

**Lesson Planning**

Learning to plan effective lessons is a vital part of mathematics teacher education and is a part of mathematics methods coursework and field experiences. Lesson plans are “intended curricula” that reflect teachers thinking about how lessons should be taught (Clark & Yinger, 1987; Remillard, 1999; Stein, Remillard, & Smith, 2007). Yet, some teachers believe that they do not need to devote much time to lesson planning (Sardo-Brown, 1990). Some elementary teachers believe that detailed lesson plans will hinder their ability to make connections across subjects and prohibit their teaching flexibility (Kagan & Tippins, 1992). Although the length of a
lesson plan does not necessarily reflect its quality, Charalambous (2010) suggests that a brief outline cannot adequately prepare teachers to “unfold tasks” (p. 251) during classroom instruction. The author maintains learning to write effective mathematics lesson plans can be a struggle for preservice teachers and some teachers in the classroom.

In order to learn more about mathematics teachers’ lesson plan design, Ding & Carlson (2013) recently studied a group of thirty-five elementary teachers’ learning to construct high-quality lesson plans that fostered student understanding of fundamental mathematical ideas. The conceptual framework for this study came from the Institute of Education Sciences (IES) recommendations (Pashler et al., 2007) including using worked examples and practice problems, connecting concrete and abstract representations, and asking deep questions to elicit student self-explanations (Ding & Carlson, 2013). The first recommendation from IES included worked examples which are appropriate and should be included in their lesson plans (Ding & Carlson, 2013). Because worked examples typically contain unexplained actions, effective teaching through worked examples involves more than showing procedures and telling solutions (Chi, Bassok, Lewis, et al., 1989). When teaching a worked example, teachers need to consider how to effectively engage students thinking and facilitate their explanations (Ding & Carlson, 2013). Interweaving examples with problem-solving is one way to benefit student learning (Sweller & Cooper, 1985). The second IES recommendation used concrete representations to support initial learning. Resnick, Cauzinille-Marmeche, and Mathieu (1987) assert that the use of concrete representations support initial learning because they provide familiar situations the students can draw on to construct meanings for abstract ideas. The final IES recommendation involved the use of deep questions. These types of questions target underlying principles, structure, and causal relationships (Craig, Sullins, Witherspoon, et al., 2006). Both the National Council of Teachers
of Mathematics (NCTM, 2000b) and the American Association for the Advancement of Science (AAAS, 1993) strongly recommend that students communicate, explain, and justify their mathematical thinking (Ding & Carlson, 2013). Planning for questions and designing examples before the lesson is taught allows the teacher or preservice teacher to support student learning by targeting the mathematical concept desired. Boaler & Staples (2008) concluded that when teachers wrote questions before teaching a lesson they formulated specific strategies for drawing students’ attention to key mathematical ideas. Using the recommendations from the IES, Ding and Carlson (2013) conducted a research study on how teachers write lesson plans.

Ding and Carlson (2013) set out to explore how elementary teachers could be supported to learn to use the IES recommendations and what challenges might they face in learning these components during lesson plan development. The teachers in the study took a two week intensive summer course and focused their time and efforts on three mathematical topics: (a) the concept of equivalence denoted by the equal sign (=), (b) the inverse relations between addition and subtraction in between multiplication and division, and (c) the basic laws of arithmetic including commutative, associative, and distributive properties (Ding & Carlson, 2013). During this course, teachers were asked to design their own lesson plans using a textbook page as their basis. Instructor feedback was given and then the plans were revised. The teachers developed a final project, the end of course lesson plan, which was independent work. Pre-and post- surveys were also used to better understand the changes in teachers’ conceptions of lesson planning. The teachers were asked, “What are the important factors that you consider during lesson planning?” (Ding & Carlson, 2013, p. 368). Survey results indicated that the teachers’ awareness of incorporating the IES recommendations in their lesson plans increased. There was also an overall improvement in lesson planning abilities. At the beginning of the study, most teachers’ plans
were insufficient because “the examples were brief and relied only on abstract or semi-concrete representations” (Ding & Carlson, 2013, p. 379). However with the guidance of the IES recommendations, many teachers situated worked examples in rich story situations. The results of the study also revealed that teachers’ challenges are mainly related to connecting concrete to abstract, asking deep questions, and anticipating deep explanations. Ding & Carlson (2013) also revealed that some teachers continued to struggle with lesson planning despite two rounds of planning for the same lesson and detailed feedback from the instructors. One concern that was raised from the teachers in the study was that they do not have time to design the detailed lesson plans because mathematics is only one of the many subjects they teach. The independent lesson plan revealed another challenge: the need to enhance teachers’ domain specific knowledge so they can recognize underlying ideas and plan appropriate representations and questions (Ding & Carlson, 2013).

Ding and Carlson’s (2013) findings that teachers sometimes struggle to write effective lesson plans supports Charalambous’s (2010) research that learning to write effective lesson plans can be a struggle for preservice teachers and teachers alike. Preservice teachers need to carefully plan tasks and questions before a lesson. This allows preservice teachers to formulate specific strategies for drawing students’ attention to key mathematical concepts. According to Li, Chen, and Kulm (2009), lesson planning can be taken as the link that connects what is given in the curriculum guides and textbooks with what is enacted in the classroom.

All told, learning to write lesson plans is a skill that preservice teachers need to develop. When writing lesson plans, they must think through the objective, instructional strategies, and student learning that is desired. Writing detailed lesson plans will assist preservice teachers in learning exactly what they need to know in order to effectively teach the lesson. One of the most
important parts of the lesson plan is the standard or objective for the lesson (Charalambous, 2010). Most states, as of the time of this study, have adopted the Common Core State Standards and preservice teachers must learn how to effectively use the standards in their lesson planning and implementation.

**Standards and Guidelines that Impact the Learning of Mathematics in Teacher Education Programs**

The recent adoption of the Common Core State Standards for Mathematics (CCSSM) by the majority of states provides another opportunity for preservice teachers to focus and improve their mathematics content knowledge and pedagogical practices. The CCSSM offers the foundation for the development of “more rigorous, focused, and coherent mathematics curricula, instruction, and assessments that promote conceptual understandings and reasoning as well as skill fluency” (NCTM, 2013). The standards encourage the development of new instructional resources and assessments, but do not tell teachers and others what to do (Leinwald, Huinker, & Brahier, 2014). Standards "set the bar for what students should learn, but it is the teachers who do the teaching” (p. 516).

To provide support for the implementation of the CCSSM, the National Council for Teachers of Mathematics published a recent book to assist teachers. In *Principles to Actions* (2014), NCTM provides direction in filling the gap between the adoption of CCSSM and what is required for successful implementation (Leinwald et al., 2014). Appropriate teaching practices are essential to learning to teach mathematics. NCTM gives eight mathematics teaching practices that they believe need to be consistent and essential components of every mathematics lesson: (1) establish mathematics goals for focus learning; (2) implement tasks that promote reasoning and problem-solving; (3) use and connect mathematical representations; (4) facilitate
meaningful mathematical discourse; (5) pose purposeful questions; (6) build procedural fluency from conceptual understanding; (7) support productive struggle and learning mathematics; and (8) illicit and use evidence of student thinking. The Standards for Mathematical Practice help teachers link standards (what students should be able to do) to practice (how the students should do and think with mathematics; Leinwand et al., 2014) and provides support for teachers of mathematics.

As indicated, mathematics reform is a part of mathematical teaching as the new CCSSM standards have been adopted in most states. The teaching practices set forth by NCTM helps teachers make instructional decisions that complement the learning of the standards. It is important that preservice teachers learn to effectively plan using the common core standards and the set of eight mathematics teaching practices in order to strengthen the teaching and learning of mathematics in their future classrooms. Lesson planning and implementing lessons are included what preservice teachers do to learn how to be an effective mathematics teacher.

Being an effective mathematics teacher presents challenges for some preservice teachers. For preservice teachers who suffer from mathematics anxiety, learning to become a mathematics teacher may offer additional challenges. Thus, it is important to know what researchers have identified in the field of mathematics anxiety.

What is Mathematics Anxiety?

Researchers have studied the attitudes of students and teachers towards mathematics, as well as the origin of mathematics anxiety since the 1950s (Ashcraft & Moore, 2009). The term mathematics anxiety is a broad term for a number of symptoms occurring in students, teachers, and the general population throughout their everyday life. According to Richardson & Suinn (1972), Mathematics anxiety exists among “many individuals who do not ordinarily suffer from
any other tensions” (p. 551). Throughout the years, researchers have used a variety of explanations and characterizations in their studies to begin to define mathematics anxiety more specifically and scientifically. Gough (1954) states, “Mathmaphobia needs no defining as the term is self-definitive” (p. 290). Dreger & Aiken (1954) did not attempt to define mathematics anxiety; however, through their research they rejected the idea that it is a merely a result of low intelligence. The conclusions in their study showed that number anxiety (mathematics anxiety) does not appear to be related to intelligence; however, persons with high number anxiety were more likely to have lower grades in mathematics. Number anxiety was determined to be “the presence of a syndrome of emotional reactions to arithmetic and mathematics” (p. 344).

Mathematics anxiety causes such emotional stress that it influences a person’s ability to perform mathematical tasks.

As research on mathematics anxiety evolved, so did its definition. Richardson & Suinn (1972) define mathematics anxiety as “feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations” (p. 551). Richardson & Suinn go on to say that many persons suffer from anxiety as “stimulated by mathematic cues” (1972, p. 373). Brady & Bowd (2005) define mathematics anxiety as a state of anxiety, which appears in specific situations, with “symptomatic behavior including being uncomfortable in performing mathematical tasks in a non-formal, classroom situations, avoiding formal mathematical instruction whenever possible, poor test performance, and the utilization of remedial instruction to little effect” (p. 38). Recent researchers, such as Ashcraft & Moore (2009), define mathematics anxiety as “a person’s negative affective reaction to situations involving numbers, mathematics, and mathematics calculations” (p. 197). Hoffman (2010) points out that mathematics anxiety is “the state of
nervousness and discomfort brought upon by the presentation of mathematical problems” (p. 276). As solving mathematics problems is used in testing situations, it is sometimes difficult to distinguish mathematics anxiety from test anxiety because many times a test is used to detect mathematics anxiety.

In order to separate mathematics anxiety from general text anxiety, Kazelskis, Reeves, Kersh, et al. (2000) examined the relationship between the two. Their research found that mathematics anxiety and test anxiety may be different from one another but further research needed to be done in the field. It is possible that the measurement tools used to determine mathematics anxiety are the key. Gleason (2008) argues that the various instruments designed to measure mathematics anxiety influenced the “development of the construct of mathematics anxiety rather than the other direction” (p. 40). Mathematics anxiety is linked to mathematics text anxiety; however, researchers have noticed other factors that contribute to mathematics anxiety.

In some cases it has been suggested that a poor attitude towards mathematics has been attributed to mathematics anxiety. Tobias (1993) believed that people suffer from poor performances and attitudes in mathematics “not [as] a failure of intellect, but a failure of nerve” (p. 9). She goes on to say that for most people, mathematics is more than a subject, it is a relationship between themselves and a discipline “purported to be ‘hard’ and reserved only for an elite and powerful few” (Tobias, 1993, p. 9). Mathematics anxiety can manifest itself in a poor attitude as well as other negative expressions towards mathematics.

Other negative expressions of mathematics anxiety include a state of discomfort which occurs in response to situations involving mathematical tasks which are perceived as threatening to self-esteem and can often create a negative attitude toward the subject (Burns, 1998; Zettle &
Raines, 2000). Recently, Gresham (2007) described mathematics anxiety as a feeling of helplessness, tension, or panic when asked to perform mathematical operations or problems. Mathematics anxiety can also be described as a lack of applied understanding and an irrational dread of mathematics (Bursal & Paznokas, 2006; Gresham, 2004). Mathematics anxiety may result in the development of low self-esteem that promotes a self-fulfilling prophecy of academic failure (Gresham, 2007). This concept is especially important for preservice teachers as it may cause them to carry a low self-concept with regard to academic failure in mathematics into the elementary mathematics classroom.

All told, mathematics anxiety has many definitions that have developed over the years. However, researchers agree that mathematics anxiety produces uncomfortable feelings of fear of doing mathematics and may result in low self-esteem with regards to mathematics. But what causes mathematics anxiety? A number of research studies have been dedicated to finding the causes of mathematics anxiety.

**The Causes of Mathematics Anxiety**

There are several studies focused on the causes of mathematics anxiety. Greenwood (1984) postulated the causes of mathematics anxiety as teaching methods that do not support creative thinking and deep understanding. Norwood (1994) suggested mathematics anxiety could be caused by skipping school, feelings of insufficiency, and lack of coping skills. Hadfield and McNeil (1994) separated the causes of mathematics anxiety into three categories: environmental, intellectual, and personality factors. Environmental factors included negative experiences in the classroom, parental pressure, insensitive teachers, and non-democratic or non-supportive classroom environments. Intellectual factors were described as negative attitudes, low persistence, self-doubt, and lack of confidence in one’s own mathematical ability. Personality
factors included reluctance to ask questions due to shyness, lack of self-respect, and gender bias (Hadfield & McNeil, 1994). Jackson and Leffingwell (1999) believed that the beginning of mathematics anxiety could be seen as early as elementary school (specifically grades three and four). The discovery of mathematics anxiety at grades three and four was partly due to the difficulty in the level of the mathematics and the students’ perceptions of their instructors as insensitive and uncaring. When mathematics anxiety develops in the elementary classroom, it can continue through the secondary level and even into college.

To explore this subject further, Bekdemir (2010) conducted a study on the causes of mathematics anxiety in preservice teachers. The focus of the study was to examine whether the worst experiences and most troublesome mathematics classroom experiences affected mathematics anxiety in preservice elementary teachers and to find out how the causes of their anxiety relate to these negative experiences. Three different instruments were used to collect data in this mixed methods study. Two provided quantitative information and one provided qualitative information about ten selected participants. The Mathematics Anxiety Scale (MANX) designed by Erol (1989) for Turkish students and the Worst Experience and Most Troublesome Mathematics Classroom Experience Reflection Test (WMTMCERT), taken from Jackson and Leffingwell (1999) were used with 167 total participants.

The MANX was administered during the sixth week of the semester and used for determining preservice teachers mathematics anxiety scores. The MANX scores were used to assign preservice teachers into four groups: low mathematics anxiety group, moderate mathematics anxiety group, anxious mathematics anxiety group, and high mathematics anxiety group. The WMTMCERT consists of three open ended questions and was administered to all participants in the eighth week of the semester. Participants were asked to answer the questions
individually and reflect freely and anonymously on paper. The preservice teachers were asked to consider their most embarrassing mathematical moments when answering the questions.

Data in WMTMCERT were analyzed using content analysis techniques and were carried out by grouping the responses based on participants’ worst mathematics experience and most troublesome mathematics class experience. Responses were formed into nine groups of anxiety factors and coding schemes for each of the nine groups were created. Interviews were used to obtain further information about past negative experiences which led to mathematics anxiety. Semi-structured interviews were conducted with the ten preservice teachers who had the highest mathematics anxiety levels. Two sample questions from the interviews were “Do you think you have mathematics anxiety?” and “How do you think your mathematics anxiety influences your mathematics achievement?” Interviewees’ records were transcribed and confirmed by the participants in the study and data were analyzed using thematic coding.

The analyses of MANX scores revealed 53% of the participants needed to be placed in the moderate mathematics anxiety category, while 6% were placed into anxious or high anxious categories. This finding was in agreement with previous studies which concluded that mathematics anxiety is persistent in numerous elementary classroom teachers (Bekdemir, 2007; Harper & Daane, 1998). It is important to note that some elementary preservice teachers had high levels of math anxiety as Wood (1988) questioned whether preservice teachers with high mathematics anxiety would transfer their anxieties to future students, forming a cycle of anxiety. Qualitative analysis of WMTMCERT and interviews indicated that the majority of the participants with mathematics anxiety were characterized by teachers’ negative behavior and ineffective teaching approaches.
Bekdemir’s (2010) study revealed that harmful experiences in the past may create mathematics anxiety that perpetuates itself as the individual progresses through the school system, even into higher education. Preservice teachers who have had negative past experiences with mathematics may enter teacher education programs having mathematics anxiety. Knowing that prior negative experiences can produce mathematics anxiety in preservice teachers, researchers in the field have begun to identify the nature of mathematics anxiety in preservice teachers.

**What is the Nature of Mathematics Anxiety in Preservice Teachers?**

Research has shown that a disproportionately large percentage of preservice teachers experience significantly high levels of mathematics anxiety (Battista, 1990; Burns, 1998; Bursal & Paznokas, 2006; Gresham, 2004; Kelly & Tomhave, 1985; Singh, Granville, & Dika, 2002; Sloan, Daane, & Giesen, 2002; Sovchik, Meconi, & Steiner, 1981; Vinson, 2001; Zettle & Raines, 2002). This leads to doubts as to their potential effectiveness in teaching mathematics to children (Burns, 1998; Sovchik, 1996). Many educators agree that teachers may inadvertently transmit their avoidance and fear of mathematics to their students (Furner & Berman, 2005; Hembree, 1990; Kelly & Tomhave, 1985; Lazarus, 1974; Sloan et al., 2002; Tobias, 1998; Vinson, 2001; Zettle & Raines, 2002). As preservice teachers discuss mathematics or attempt to instruct students using mathematical algorithms, mathematics anxiety may cause them to forget facts and lose their confidence in their ability to perform mathematical functions (Tobias, 1993). Emenaker (1996) and Wood (1988) contend that preservice teachers have poorer attitudes toward mathematics than the general college population, and have greater mathematics anxiety when the subject is, or is perceived to be, under evaluation.
One meta-analysis helped to illuminate the mathematics anxiety issue in preservice teachers. Hembree (1990) analyzed 151 studies of mathematics anxiety to determine the relationships in common. Over 80% of the studies involved college-level students and using meta-analysis, Hembree concluded that elementary education majors displayed the highest level of mathematics anxiety of any college major. To make matters worse, the most highly mathematics anxious students were less inclined to take additional mathematics courses that might support their mathematical understanding and lesson their anxiety. Hembree (1990) determined that preservice teachers with high levels of mathematics anxiety were not prepared to teach elementary mathematics due to weak mathematical backgrounds and negative views towards mathematics.

To help preservice teachers reduce the amount of mathematics anxiety they have, researchers have tried therapeutic treatments such as desensitization and conceptual learning in mathematics methods courses (Wadlington, Austin, & Bitner, 1992). Using an experimental study with treatment and control groups, pre-and post-testing, and randomly assigned matched pairs, Wadlington et al. (1992) used desensitization to reduce math anxiety in 78 preservice teachers taking a mathematics methods course. The treatment focused on the use of desensitization techniques such as relaxation and imagination of low mathematics anxious situations. The research showed that the students in the treatment group reported significantly lower scorers (p < .01) on the Mathematics Anxiety Rating Scale (MARS) than in the control group. However, Hembree (1990) also found that the mean score reported by the preservice elementary teachers on the MARS was much higher than that of normal groups (based on general college students). This study revealed that although preservice teachers may have higher levels of mathematics anxiety than other college students, treatments can help to alleviate some
of the anxiety. Finding ways to reduce mathematics anxiety may allow preservice teachers to overcome their fears and develop a more positive attitude towards mathematics.

In addition to developing a positive toward mathematics, having confidence to teach mathematics is important. In a 2006 study on mathematics anxiety and self-efficacy in preservice teachers, Swars et al. studied 28 elementary preservice teachers which were enrolled in an elementary mathematics methods course and involved in clinical experiences in which they spent a total of 24 days in local elementary schools. During the last week of classes, the preservice teachers completed both the MARS and the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI). The MARS was designed to measure the degree of mathematics anxiety, and the MTEBI measured the level of mathematics teacher efficacy. Interview protocol was also used to gather information on the participants’ perceptions of their skills and abilities to teach mathematics effectively as well as how their mathematics anxiety may have affected these perceptions. Four participants were chosen to participate in the interviews - the two who scored the highest on the MARS and the two who scored the lowest on the MARS. The results from the surveys indicated that the preservice teachers with high self-efficacy in mathematics possessed, in general, lower degrees of mathematics anxiety (Swar, et al., 2006). The results of this study seemed to suggest that mathematics anxiety, in general, has a “negative relationship with a preservice teacher’s belief in his or her skills and abilities to be an effective mathematics teacher” (p. 312). Interestingly, this study also indicated no relationship between mathematics anxiety and preservice teachers’ beliefs that effective teaching can bring about student learning of mathematics regardless of external factors.

To further investigate mathematics anxiety in preservice teachers, Gresham (2007) conducted a study on mathematics anxiety in preservice teachers and discovered that negative
attitudes toward mathematics “surfaced very quickly in those preservice teachers with the highest levels of mathematics anxiety” (p. 26). The study investigated early childhood /elementary preservice teachers’ levels of mathematics anxiety and whether this mathematics anxiety can be reduced after participation in a mathematics methods course. There were 246 preservice teachers participants in the study. The Mathematics Anxiety Rating Scale (MARS) was used as a pretest and posttest with preservice teachers participating in a mathematics methods course. During the mathematics methods course preservice teachers participated in discussion sessions, journal writing, teacher directed large and small group activities, literature based mathematical activities, student group presentations involving hands-on manipulatives, implementation of hands-on approaches to teaching mathematics content that involve preservice teachers with the use of various concrete materials commonly utilized in mathematics teaching, and a 12 week field experience practicum in the K-6 classroom.

After comparing group means for the pretest and posttest scores, it was found that the overall preservice teacher's mathematics anxiety was reduced (p < .001) from the start of the course to the end. Informal interviews, questionnaires, discussions, and journals produced several themes. These included: (1) attributing the reduction in their mathematics levels to the use of manipulatives implemented throughout the course, (2) the personality of the professor and inviting environment as produced by the professor, and (3) the use of journal writing throughout the study. Two hundred thirteen students attributed their mathematics anxiety reduction to the methodology and use of manipulatives to teach the subject content. Eleven students attributed their lowered mathematics anxiety levels to the enthusiasm of the professor and inviting atmosphere of the course. Sixteen students thought their mathematics anxiety levels were reduced by a combination of implemented methods including the methodology and use of
manipulatives throughout the course, the professor’s enthusiasm, and journal writing. Six students experienced an increase or no change in mathematics anxiety.

During the interviews and discussions in Gresham’s (2007) study, the preservice teachers revealed that they preferred doing mental math or working with others to solve problems and indicated more stress and a lack of understanding in working with manipulatives because they had never been introduced to them before. Two students in the study who had extremely high levels of mathematics anxiety explained they struggled with developing their own lesson plans, having to teach those lessons, and understanding the mathematical content (p. 28). This study shows that mathematics teacher educators can have an impact upon preservice teachers’ mathematics anxiety levels. Finding ways to address mathematics anxiety is vital to the development of preservice teachers as it can influence their mathematics teaching efficacy (Hoffman, 2010).

Recent studies further indicate that there is a significant negative relationship between mathematics anxiety in preservice teachers and their mathematics' teaching efficacy (Gresham, 2008, 2009; Hoffman, 2010). The higher the level of mathematics anxiety in preservice teachers, the lower the mathematics' teaching efficacy. Hoffman also found that there was a significant negative relationship between mathematics anxiety in preservice teachers and their self-efficacy; therefore, the higher the mathematics anxiety, the lower the self-efficacy, and vice versa. The reverse is also found to correlate. Hoffman’s study built upon Swars et al.’s (2006) research revealing that the lower the mathematics anxiety generally resulted in higher efficacy, and stronger beliefs in ability and skills to become effective mathematics teachers.

In Hoffman’s 2010 study, 70 preservice teachers from two universities were given the Mathematics Anxiety Scale (MAS) to measure the extent of their mathematics anxiety. This
instrument was chosen because of its suitability in measuring the construct of worry, the component of anxiety which is been shown to be offset by perceptions of self-efficacy (Hoffman, 2010). As part of the study, the preservice teachers were given math problems to mentally solve. As the number of digits in the problems increased, the problem was considered a more complex problem. There were no time restrictions on the test but the participants were urged to answer each problem “as quickly and accurately as possible without making mistakes” (Hoffman, 2010, p. 278). Results indicated that the self-efficacy of the preservice teachers was a significant predictor of their problem-solving efficiency for less complex problems as evidenced by greater accuracy and reduced problem-solving time. In the study, anxiety developed as the problems became more complex. This suggests that self-efficacy was a variable that compensated for anxiety when problems were perceived as easier. However, once the complexity exceeded the preservice teacher’s level of perceived competence or ability, he/she may not have been able to utilize positive self-beliefs or may have relied on time consuming strategies to solve the problems (Hoffman, 2010). Those preservice teachers with higher levels of self-efficacy seem to have enhanced problem-solving efficiency without increased problem-solving time.

In sum, mathematics anxiety in preservice teachers is a topic that continues to be studied. Mathematics methods course were found to help reduce mathematics anxiety in some cases but not all. Since teachers with mathematics anxiety are less confident in teaching mathematics and can pass the anxiety to their students, it is important that preservice teachers determine to work through their anxiety in order to gain confidence in teaching mathematics.

**Summary**

In this chapter, literature was reviewed demonstrating a large knowledge base on learning to teach, mathematics teacher education, and mathematics anxiety including studies of preservice
teachers with mathematics anxiety. The literature revealed that teacher education programs provide opportunities for preservice teachers to learn how to teach as teaching does not come naturally (Ball & Forzani, 2010). Learning to teach mathematics has its own difficulties in that there is so much specialized knowledge and mathematical knowledge for teaching that preservice teachers need to know. If preservice teachers have had negative experiences in mathematics in the past, they may have developed mathematics anxiety which can influence efficacy in teaching mathematics.

Missing from the literature is an understanding of the nature of preservice teacher learning to teach experiences, particularly preservice teachers who are self-identified as having mathematics anxiety. In Gresham’s (2009) study on preservice teacher mathematics anxiety, preservice teachers had a negative belief about their ability to be an effective teacher. In addition, Tschannen-Moran & Hoy (2006) and Bandura (1986) asserted that the most powerful influences of development of teachers’ self-efficacy are experiences that preservice teachers encounter during their internship. Swars et al., (2006) suggested future research involving observations of preservice teachers in their clinical experiences and how their mathematics anxiety and teaching efficacy are related to the actual enactment of effective teaching strategies in mathematics. This study extends the work of these scholars by exploring the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she designs her own lessons and enacts them during the final internship. This will provide the field of teacher preparation an understanding of the nature of her learning to teach mathematics experiences.
CHAPTER THREE: METHODOLOGY

The previous chapter oriented readers to scholarship helpful in understanding what we know about learning to teach and preservice teacher education in general. Research continued with preservice teachers learning to teach mathematics with specific information regarding coursework and field experiences including developing teacher identity and support from both the cooperating teacher and the supervising teacher. Learning to write lesson plans and standards and guidelines that impact learning how to teach mathematics was then described. The literature review also illustrated the research related to mathematics anxiety including definitions and possible causes of mathematics anxiety in preservice teachers. The research revealed how many elementary education preservice teachers have mathematics anxiety and how those with mathematics anxiety may doubt their potential effectiveness in teaching mathematics to children. The present study is concerned with gleaning understanding of the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she enacts mathematics instruction during her final internship. This chapter makes clear how qualitative design, specifically, case study, is an appropriate approach for studying and describing the nature of the experiences of the preservice teacher. I also explain how the theoretical perspective and epistemological stance correspond with the research design and its constituent parts. The chapter demonstrates the alignment of the study’s rationale, research questions, and all facets of the research methodology.
Research Questions

1. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she plans for mathematics instruction during her final internship?

2. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she implements mathematics instruction during her final internship?

Theoretical Perspective

My own wonderings and research questions helped to shape my interpretivist perspective. An interpretivist perspective is one in which the researcher is interested in how people communicate about lived experiences and make meaning as a way to “deal with” those experiences (Crotty, 2004, p. 66). The interpretivist perspective fits this study because, as the researcher, I wanted to better understand the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she described and made meaning of the way she enacted mathematics instruction during her final internship. According to Bogdan and Biklen (1992), a growing number of researchers have embraced interpretivism as the philosophical base from which to ask their questions. To borrow from Harry Wolcott’s (1992) description, my “posture” as an interpretivist researcher is one that best fits my interests and beliefs about teacher education, my way of framing ideas and questions about learning, and my talents and tendencies as a working researcher and writer.

As an interpretivist, I center myself in this research as a constructivist. Constructivism is a theory that offers an explanation of the nature of knowledge and how human beings learn (Ultanir, 2012). The real understanding is only constructed “based on learners’ previous experience and background knowledge” (p. 195). Individuals create their own understandings or knowledge through the interaction of what they already believe and the ideas, events, and
activities with which they come into contact (Ultanir, 2012). Crotty (2004) explained that meaning, or truth, comes into existence as one engages with the realities in one’s world. This study’s aim was to describe the nature of the experiences of a preservice teacher who declared that she was uncomfortable with teaching mathematics because of her lack of content knowledge and her own poor experiences as a student in mathematics classrooms. The meanings that she made as she enacted mathematics instruction during her final internship may play a part in shaping her future attempts to teach mathematics in her own classroom (Schon, 1987).

All told, the interpretivist perspective allowed me to better understand the experiences of the preservice teacher as she communicated about her lived experiences and made meaning of those experiences. As an interpretivist, my stance is that of constructivism, believing that the ideas, events, and activities in this study will help create understanding of the case.

Case Study Design

Several research studies have addressed the use of pre- and post- mathematics anxiety assessments, pre- and post-interviews, or the use of lesson plans mostly with the intervention of a mathematics methods course (Alsup, 2004; Bintas, 2008; Gresham, 2007; Rule & Harrell, 2006; Salinas, 2004; Sloan, 2010; Vinson, 2001). For this study, I wanted to be involved with the research itself by going into the field, observing what was happening, talking to the participants, and then trying to put all of the puzzle pieces together and make sense of what I had studied. Stake (2010) said it best when he described qualitative researchers:

Clearly, in designing our studies, we qualitative researchers do not confine interpretation to the identification of variables in the development of instruments before data gathering and to analyze and interpret for the report. Rather, we emphasize placing an interpreter in the field to observe the workings of the case, one who records objectively what is
happening but simultaneously examines its meaning and redirects observation to refine or substantiate those meanings. (p. 9)

By observing and interviewing the participants in this study, I created meaning and better understood how the preservice teacher learned to teach mathematics during her final internship. Of particular interest was how the mathematics anxiety influenced her decision making in planning and implementing mathematics instruction.

According to Stake (1995), researchers who have a genuine interest in a particular case should use the case study approach when the intent is to better understand the case. Yin (2003) claimed that using a case study is the preferred strategy when (1) how or why questions are being used, (2) when the researcher has little control over events, and (3) when the focus is on a contemporary phenomenon within real-life context. Merriam (1998) explained case studies can be used to gain an in-depth understanding of a situation and its meaning, including intensive descriptions and analyses of a single unit and bounded system, such as an individual, program, event, group, or community. The purpose of the case study was to understand a case by gathering comprehensive, systematic, and in-depth information (Patton, 2002). According to Merriam (1998), case studies are designed to bring out the details from the perspective of the participants in the study through the use of multiple data sources. In this study, the single unit and bounded system were within the nature of the experiences of the preservice teacher.

As explained, through a qualitative case study, using interviews, observations, artifacts, and audio recorded journals for data collection, I was able to describe and understand the experiences of the preservice teacher in her final internship as she planned and implemented mathematics instruction.
Participants

This study employed single case study methodology with a small number of participants. I purposefully selected the participants in this study based on the nature of the case (Patton, 2002). The participants were purposefully selected in order to develop an in-depth case study of the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety. This type of selection method is distinguished from quantitative methods, which typically depend upon large samples randomly selected to control for objectivity and generalizability of findings (Patton, 2002). By studying one preservice teacher self-identified as having mathematics anxiety as she planned and enacted mathematics instruction during her internship, I was able to thoroughly apply qualitative research practices, such as observing and interviewing, and interpret the data in a rich descriptive format. It was my intention to gather information and provide an interpretation based upon the uniqueness of this case. As suggested by Patton (2002), purposeful sampling can provide good interview subjects and information-rich examples for a study. The purposeful sampling of participants included the preservice teacher, the cooperating teacher, and the college supervising teacher.

The Preservice Teacher

I purposefully selected the preservice teacher based upon my experience as her instructor of the elementary mathematics methods course at the college. From the first day she walked into my class, Kelly (pseudonym) expressed a negative attitude towards her knowledge of mathematics, her ability to teach mathematics, and mathematics in general. During the semester Kelly was enrolled in the course, I worked with her several times learning to use manipulatives, understanding concepts, and writing lesson plans. Kelly was also enrolled in a field study experience during the same semester. The field study experience was not directly connected to
the elementary mathematics methods course; however, Kelly was required to teach at least one mathematics lesson to the students. I was not aware that she was teaching the mathematics lesson, nor what the content was, until she came to class the day after she taught the lesson. Kelly told of her experience and was visibly upset as she described the “awful lesson.” She went on to say that she made some students cry because she could not help them understand. I observed Kelly’s struggles in understanding elementary mathematics content and enacting pedagogical practices throughout the activities designed in the course.

Kelly’s difficulty with mathematics did not begin in the mathematics course. She distinctly remembered a time in sixth grade when her math teacher told her that she was not good at math. From that moment on, Kelly’s aversion and fears about mathematics continued to grow. Entering into the teacher education program, Kelly knew that she would struggle with teaching mathematics because of her own lack of content knowledge and anxious feelings about the subject. As she began teaching in her field experiences, Kelly developed a love for intermediate grades and knew that she wanted to teach at that level. She said that she knew that teaching math was “going to be a problem” (PST initial interview).

Kelly’s previous field experiences included several different grade levels. Each level of field studies increased in the amount of teacher responsibilities required of her. At each level, Kelly was required to teach three lessons, either small group or whole group; however college supervisors evaluate preservice teachers with their level of expected competence in connection with the level of the field experience. In each of the field experiences, Kelly received satisfactory ratings. Despite successfully passing each of the field experiences, Kelly continued to struggle with mathematics and stated that she was not confident in teaching mathematics.
Kelly’s admission of having mathematics anxiety and my observations of the difficulties she experienced in understanding mathematical content and pedagogical practices cultivated my interest in studying her experiences in teaching mathematics during her final internship. I discussed the study with the Kelly and she willingly volunteered to participate in this dissertation research.

The Cooperating Teacher

Mrs. Mills had five years of experience as a teacher at the time of this study. She began teaching as a long-term substitute in kindergarten and then was hired as a fourth-grade teacher for one year. After that she moved to fifth grade and remained at that grade level. Teaching was not her first career choice, but entered education after substituting in several classrooms. Mrs. Mills thought mathematics instruction for fifth graders was important stating that it needs to be rigorous and “very concrete” (CT initial interview). She said that the students “need as much reinforcement as you can give them” (CT initial interview). Mrs. Mills previously hosted three field-study preservice teachers. The field-study experiences were one day each week for 13 weeks. Kelly was Mrs. Mills’s first full-time intern. All of her previous experiences were positive, and she believed that she and Kelly had formed a good relationship during the prior field experience.

Because of the positive experience Mrs. Mills and Kelly had in a previous field study experience, Mrs. Mills requested that Kelly complete her final internship with her. I met with Mrs. Mills to discuss the study and she willingly volunteered to participate.

The College Supervisor

Mrs. Perez (pseudonym) had supervised interns at the college level for four years at the time of the study. She began at a large university as part of her role as a hybrid educator and
partner resource teacher. This was her first year at the private college Kelly attended. Mrs. Perez also had experience as an elementary classroom teacher and as a classroom coach. She felt like working as the classroom coach had really prepared her for the role of supervisor by helping her to provide valuable feedback to preservice teachers to help them improve their instruction. When Mrs. Perez was assigned to supervise Kelly in her final internship, I discussed my research study with her. Mrs. Perez willingly volunteered to participate in the study.

**Locating Myself in the Research**

Since my earliest recollection, I always wanted to be a teacher. I remember playing “school” with all of my stuffed animals and dolls, creating a classroom layout, designing lesson plans, actually teaching lessons, creating a grade book, and distributing report cards. I graduated with a bachelor’s degree in elementary education in 1985 and began my career as a teacher with 12 students that were classified as “at risk.” I took pride in working with them by providing differentiated instruction to ensure that they learned everything they possibly could. I learned a lot that year, including that I did not know everything and that I could not possibly teach everything. But I remember that I had a great mentor teacher that took me under her wing and encouraged me during the three years that I was employed at that school. I changed schools three more times during my 20 year employment working as a fifth-grade teacher at the same school during the last 13 of those years.

As I developed as a teacher, I also developed as a teacher trainer and began delivering professional development workshops for the district in both reading and mathematics instruction to teachers at all levels including elementary, middle, and high school. During that time, I enjoyed working with several preservice teachers in both field studies and final internship experiences. I also became a district trainer in clinical education, in which I trained other
teachers as to how to best observe and give effective feedback to preservice teachers in their field studies and internship experiences.

In my years of working with both teachers and preservice teachers, I noticed several expressed a negative attitude about mathematics. Teachers frequently made statements that they would not teach above the third grade because they felt uncomfortable with upper-level mathematics. The preservice teachers that I worked with in my classroom sometimes had difficulty teaching the mathematics curriculum, and I observed that many times it was because they did not understand the content. Other times they seemed to understand the content but did not know how to teach it or express it in such a way that students could learn.

My experience as a classroom teacher, a cooperating teacher, and a teacher educator cultivated a deep interest in teacher education especially in the subject of elementary mathematics. My interest in preservice teachers and teachers’ aversions to teaching mathematics led me to design a case study for this research.

**Connections to the Research Study**

As a former elementary teacher, a former district trainer in mathematics best practices, and a current college instructor of the elementary mathematics methods course, I had a tremendous interest in this case. My background in teaching, teacher training, and working with approximately 15 field-study students and students in their final internship during my classroom experience helped to support my understanding of preservice teachers growth and development. My background also fostered my research interest in mathematics anxiety and the connections it has with learning to teach elementary mathematics.

It was not only my interest in mathematics anxiety and teaching mathematics that led me to design this project; it was also my experience at the college at which I teach. Having
connections to the college also connects me to the preservice teacher and the college supervisor. I have known Kelly for two years as a student in the school of education at the college. I was her instructor for three courses including the mathematics methods course. I also know the college supervisor as we work in the same department at the college. Separating myself as a non-participant observer is important in order to gather the data needed to fully understand the experiences of the preservice teacher. For this research study, I played the role of non-participant observer while collecting data for my study during the spring semester 2015.

**Context of the Study**

**The College**

The preservice teacher in the study attended a small private college located in the southeastern United States. In the current year (2015), the college had an enrollment of approximately 2500 students representing 45 states and nearly 50 foreign countries. The education department had approximately 130 active students and was accredited by the Southern Association of Colleges and Schools, state accredited, and as of the time of this writing, seeking national accreditation. The small private college, with a diverse student population connected the preservice teacher and the college supervisor to me as the preservice attended the college and the college supervisor and I were employed by the college at the time of this study.

**The Mathematics Methods Course**

There was one mathematics methods course offered to elementary education majors at the college during the time of the study. It was a required course and is usually taken in the preservice teachers’ junior year. The course was designed around three major components: (1) elementary mathematics content, (2) elementary mathematics pedagogy, and (3) elementary mathematics misconceptions. Preservice teachers participated in whole group instruction, small
group activities and discussions, designing their own activities using manipulatives, creating lesson plans, and designing mathematics units built on state standards. As the preservice teachers learned to create mathematics lessons, they were taught to begin with the state standard, create an objective question, and then design instruction that would lead students to mathematical understanding of the objective. Special attention was given as to how the mathematics instruction aligned with the Standards for Mathematical Practice (CCSS, 2014) and would lead the students to mathematical problem-solving and higher-order thinking. Student engagement and manipulatives were stressed as a way to help students learn mathematical concepts. As each mathematical concept was taught, possible student misconceptions were discussed. Preservice teachers were encouraged to find misconceptions in sample student work or discuss possible misconceptions that could occur during the mathematical instruction. In addition to creating lesson plans, and learning to use manipulatives, preservice teachers also took a mid-term and final exam designed around the three components of the course.

The mathematics methods course was a requirement for all elementary majors and included mathematics teaching in the areas of content, pedagogical practices and common mathematical misconceptions. Course assignments aligned with the CCSSM and NCTM’s Standards for Mathematical Practice. The syllabus for the course is included in Appendix A.

The School District

The study was conducted in a school district located in the southeastern United States. The district was one of the largest in the state both in terms of geography and number of students with just over 96,000. Buses transported approximately 49,000 students traveling 53,000 miles daily. The district included 66 elementary schools as part of its 163 school sites and centers and was the largest employer in the county with over 13,000 employees with more than half of those
employed as teachers. The diversity of the student body was 46.2% white, 21.1% black, 27.2% Hispanic, 1.6% Asian, 0.6% American Indian or Alaska native, 3.1% two or more races and 0% native Hawaii and or other Pacific Islander. There were more than 15,000 students whose primary language was other than English. The district earned a grade of “C” six out of the last ten years, never earning above a “B” or below a “C” (Office of Program Policy Analysis and Government Accountability, 2013).

The large school district where the study took place accommodated a diverse population of students with about 16% who first language was not English. The district consistently received a state grade of a “B” or “C” over the past ten years. Many elementary schools were considered suburban or rural in their demographics.

The Elementary School

In the year before the study took place, the elementary school where the preservice teacher completed her internship served about 550 students, had an 85% low socioeconomic population with a minority rate of 45%, and received Title One funding. According to the latest school accountability report, 40% of all students tested at this elementary school received a satisfactory or above score on the mathematics state standardized assessment. In comparison, the district score was 50% and the state score was 59%. The latest fifth-grade state mathematics assessment scores revealed that 45% of the students scored a satisfactory or above in comparison to 49% for the district and 56% for the state.

The elementary school which served as the context for this study was considered a low socio-economic area school receiving Title I funds. The school’s grade, as reported by the state, had substantially declined over the past year, but was protected from dropping more than one letter grade according to the state education policy. Less than half of the previous year’s fifth
Six fifth graders earned a score of satisfactory or above on the statewide mathematics assessment. During the time of this study, the school was being monitored by the state Department of Education due to low student performance on the state examinations.

The Classroom

The classroom in which the study took place had 22 students, gender balanced with 11 girls and 11 boys. The classroom appeared to be well organized and included technology such as internet access, a smart board and a document camera. There were several spaces that students could use as work areas such as desks, a carpet area, and a table used for small groups. Student work was posted around the room, and a student-of-the-week poster featured one of the boys explaining his interests, likes, and dislikes. There were a few academic posters and papers on the walls including the NCTM’s Standards for Mathematical Practices with diagrams illustrating each one.

The classroom was well organized and appealing with posters and student work on display. Students were seated in small groups which facilitated easy peer discussions. There was ample technology for both student and teacher use and students seemed comfortable using the computers and Smart boards for educational purposes.

Data Sources

Data collection began in the fourth week of Kelly’s internship experience. By collecting data during the seven week period towards the end of the internship, I was afforded the opportunity to focus on instruction rather than the typical challenges of classroom management that preservice teachers typically face at beginning of internship. Data collection consisted of semi-structured interviews, observation notes, audio journals, and artifacts (see Appendix B).
Semi-Structured Interviews

An initial interview was conducted with the preservice teacher to obtain background information. During the study, semi-structured interviews were completed after each observation with the preservice teacher. The interviews focused on her lesson plans and pedagogical decisions for the observed lesson. A total of seven interviews focused on the reasoning behind the decision making for the mathematics instructional strategies chosen in the lesson planning and the pedagogical practices used in delivering the lessons during the final internship. Two additional interviews were done after observations on lessons the preservice teacher implemented as a full-time substitute teacher. The interviews were designed to help me understand the realities of the experiences of this case (Stake, 1995). The interview protocols are included in Appendix A. The unique information that I hoped to gain from the preservice teacher included the decision-making process in designing and enacting instruction for the elementary mathematics lessons (Stake, 2010). As I observed each lesson, I created additional questions for the interview.

Even though some questions were planned in advance, they were discussed more as a topical conversation with probing, open-ended questions (Patton, 2002; Stake, 2010). Open ended responses permit one to “understand the world as seen by the respondents” (Patton, 2002, p. 21). Some of the interview questions were developed as exhibit questions which allowed me to ask the preservice teacher to respond to something that I observed or read. I used the lesson plan to provide me with information on the plan of the instruction and activities used in the lesson. The lesson plan also allowed me to see the materials that the preservice teacher planned to use in the lesson, whether it was manipulatives, textbooks, worksheets, or any other choice she made. It also told about the classroom organization of the lesson. For example, she used whole
group instruction and then broke up into small groups for centers. Also, the lesson plan provided information on the differentiation the preservice teacher planned to use with the students in the class. It contained the plan for scaffolding and support for those students who struggle and the extended-learning activities for more advanced students. It also told me her plan for opportunities for higher-level thinking for all students. The information gathered from the lesson plan helped to inform the semi-structured interview questions that were used after the implementation of the mathematics instruction. The exhibit questions allowed me to better understand the thinking process that the preservice teacher used as she planned for the mathematics lessons.

By using exhibit questions, the preservice teacher helped me understand specific statements, actions, or artifacts (Stake, 2010). During the enacted instruction, I collected quotes of the preservice teacher in order to help capture her emotions and thoughts. Direct quotations are a “basic source of raw data in qualitative inquiry, revealing respondents’ depth of emotion, the ways they have organized their world, their thoughts about what is happening, their experiences, and their basic perceptions” (Patton, 2002, p. 21). Using these quotes as part of the interview after the lesson helped the preservice teacher to remember a certain situation or a certain emotion that she was having at the time and enabled her to shed light on her experience as it was happening. I also used stimulated recall (Calderhead, 1981) with the preservice teacher by showing her pictures of examples she used with the students and student work in order to remind her of exact moments so she could better recall her emotions and thoughts. A final interview was conducted with the preservice teacher, focused on her experiences of the mathematics instruction that she chose to use over the semester and how, if at all, her mathematics anxiety connected to the decisions and actions that she chose to make. In total, I
interviewed the preservice teacher 11 times (initial interview, nine interviews after observing lessons, and a final interview). It was expected that the interview questions would change over time as the internship unfolded. The semi-structured questions remained the same; however, as the semester progressed some questions changed as the preservice teacher became more experienced with planning and implementing mathematics lessons.

Additionally, interviews were conducted with the cooperating teacher to help with understanding the context in which the preservice teacher will be teaching and to discuss the progress of the preservice teacher. Four total interviews were conducted with the cooperating teacher (initial interview, week four interview, week five interview, and final interview). Four interviews with the college supervisor were conducted (initial, week four, week six, and final interview). Observations of the post-conferences with the college supervisor were equally important (week 1, week six, week seven) to gain insight into how the preservice teacher was being evaluated during her final internship. All interviews were audio recorded and transcribed for the purpose of this study only.

Interviews were a prominent source of data for this case study research. Interviews were conducted with the preservice, the cooperating teacher, and the supervising teacher over the course of the ten week study. Interview questions included both semi-structured questions and exhibit questions in order to help the participants recall certain events, documents, or situations.

**Observations**

Observations of the elementary mathematics lessons taught by the preservice teacher were conducted once each week for a period of nine weeks for a total of nine observations. Although this was a ten-week study, week eight was testing week, so the preservice teacher only provided an audio journal of the happenings of week. The preservice teacher’s internship took
place in a departmentalized situation where she taught two different classes the same mathematics lesson each day. For consistency and to keep within the scope of this inquiry, I only observed the first mathematics class each time I visited. This helped to eliminate confusion between the two classes either by the preservice teacher or myself, and allowed for continuity in time and makeup of students. Since the two classes were made up of completely different students, the possibility existed that the preservice teacher would instruct the two groups in a different way. Another possibility was that the preservice teacher would make adjustments in her instruction between the two classes based upon something that happened or did not happen during the first class. Although this would have been interesting and might have led to important information on how teachers reflect and adjust their instruction, it was beyond the scope of this study.

Field notes were recorded during the lesson observations and used for coding purposes and exhibit interview questions. My responsibility as the observer was to know what was happening—by seeing it and hearing it, and to try to make sense of it (Stake, 2010). As I was sitting in the classroom observing the lesson, I looked for what was happening starting with the preservice teacher, the instruction of the lesson, the interaction between the preservice teacher and the students, the interaction between the preservice teacher and the cooperating teacher, and the activities that the students were engaged in to learn the mathematics lesson. Multiple observations allowed me to get a representative coverage of the relationships for this particular case (Stake, 1995). The observations allowed me to be fully immersed in the complexity of the situation, the elementary mathematics classroom. According to Becker and Geer (1957), observation may be one of the best research methods:
The most complete form of the social logical datum, after all, is the form in which the participant observer gathers it: an observation of some social event, the events which precede and follow it, and explanations of its meaning by participants and spectators, before, during, and after its occurrence. Such a datum gives us more information about the event under study than data gathered by any other sociological method. (p. 133)

One of the pieces of the observation that I did was observe “what did not happen” (Stake, 1995). My experience in teaching elementary mathematics and as the instructor of the elementary mathematics methods course helped me to understand what might occur during the elementary mathematics lessons. Stake (1995) suggested that the absence of some particular activity or factor may be noteworthy and calls for judgment, common sense, and experience. In his words:

One of the principal qualifications of qualitative researchers is experience. Added to the experience of ordinary looking and thinking, the experience of the qualitative researcher is one of knowing what leads to significant understanding, recognizing good sources of data, and consciously and unconsciously testing out the veracity of their eyes and robustness of their interpretations. They require sensitivity and skepticism. Much of this methodological knowledge and personality come from hard work under the critical examination of colleagues and mentors. (pp. 49-50)

By thinking about what did not happen during the mathematics instruction, I was able to construct questions to ask the preservice teacher during the weekly interview. Also, after each observation, I used the notes to construct a narrative of the mathematics lesson while it was fresh in my mind. I was able to take what I wrote down in approximation and improve upon it because I did not allow much time to elapse between the actual observation and the written narrative description (Stake, 2010).
In addition to the classroom observations, the post conference observations helped me understand the support that the supervising teacher provided to the preservice teacher. It also informed me as to the questions or problems that the preservice teacher had during any given time in her internship as she shared the concerns with the supervising teacher.

All told, observations were very important to understanding the experiences of the preservice teacher. Lesson observations allowed me to note how the preservice implemented mathematics instruction and inform my interview questions. Observations and audio recordings of the post conferences between the preservice teacher and the supervising teacher gave me information on the support offered by the supervising teacher and the preservice teacher’s concerns about her internship experience.

**Preservice Teacher Audio Journal**

The preservice teacher audio recorded her thoughts and feelings about her lessons, teaching sessions or anything pertaining to her classroom teaching. The audio recordings took place any day of the week and at any time; it was at the preservice teacher’s discretion. I chose audio recordings instead of written journal reflections to help the preservice teacher save time in recording her thoughts and also in hopes that by recording her thoughts in a spontaneous fashion, she might feel freer to express her thoughts and feelings from the experiences of the day. In Chandra and Batada’s (2006) study with adolescents, the use of audio journals was a benefit to the participants, since the approach gave them an opportunity to “share their thoughts in their own words without the potential bias introduced by an interviewer,” (p. 3). Additionally, audio journals foster oral communication skills. Dantas-Whitney (2002) explained that the use of spoken journals can allow for more spontaneity and free expression on the part of the learner, since oral language is not “bound by the same strict rules of coherence and cohesion as written
journals” (p. 545). The requested timeframe was at least one journal recording per week; however, the preservice teacher was instructed to use this form of journal record keeping any time she wished. The audio recordings were emailed to me for transcription and coding purposes only.

The audio journals allowed me to gain additional information about the preservice teacher’s lessons, interactions with others, and emotions that she was feeling at the time of the recording. The spontaneity of the recordings permitted the preservice to provide documentation free of worries of incorrect grammar or misspelled words. It also gave the preservice teacher freedom to speak as she wished.

Documents and Artifacts

Lesson plans (see Appendix C), pictures, classroom worksheets, and observation notes were used as documentation for this study. One of the things of particular interest to me was how the lesson plan matched what was taught in the classroom. Pictures of student work and teacher written explanations allowed me to document specific events in the enacted instruction and use them to stimulate recall of the events of the lesson during the weekly interviews. The pictures enabled me to compare and contrast the lesson plan with the enacted instruction. Each of the artifacts provided important data used in exhibit questions in the weekly interviews. By using artifacts as part of my data collection, I gained a more in-depth understanding of the nature of the experiences of the preservice teacher’s choice and enactment of mathematics instruction.

Data Analysis

Content and thematic analysis were used to find core meanings through the interview transcriptions, audio journal transcriptions, observation notes, post conference transcriptions, artifacts, and lesson plans (Patton, 2002). Each week I began by reading the lesson plan for the
mathematics instructional lesson that was observed. After observing the enacted mathematics instruction and looking at the lesson plan, I wrote exhibit questions that were used in the interview. After interviewing the preservice teacher and transcribing both the interview and the audio journals for the week, I wrote a contact summary of the week’s data points to help in the synthesizing process. Then, I read through each transcript and looked for patterns in the content of the interviews. As each week progressed, I continued to look for patterns in the content of the transcripts, observations, and lesson plans. As these patterns began to emerge, I noticed some commonalities between the patterns and began to group them based upon the commonalities.

Just as there were commonalities, there were also unique experiences that stood out. These unique experiences were not ignored, but were used to help inform the overall experience of the preservice teacher. I recorded the instances of the commonalities and unique situations on a spreadsheet; and, as each week’s lesson plans, observation notes, and transcripts were analyzed, I continued to add the information to the spreadsheet. From these commonalities I began to see themes emerge that encompassed the experiences the preservice teacher had while planning and enacting mathematics instruction.

As the themes emerged, I used additional spreadsheets to record instances, situations, experiences, and quotes that fit within a particular theme. Then, I categorized the themes based upon my research questions. Using this type of analysis allowed me to make sense of the data collected and attempt to identify core consistencies and meanings. Data were analyzed on a weekly basis, searching for new or reoccurring themes. Each week I coded for themes and brought those themes into the following week’s data in order to check for commonalities. New themes were also generated as they were discovered. The themes helped me to interpret the data and to answer my research questions.
My interpretation of the data came directly from the information that I kept in the spreadsheets as they were organized into themes based upon their commonalities and/or uniqueness. Table 1 connects the research questions with what data was used to gather information for analysis purposes. Examples of content and thematic coding are included in Table 2, while Table 3 shows the research plan for the dissertation study. Each week of the study is listed, along with what data was collected and what research was completed that week.

Table 1.

Research Questions and Descriptions of Data Sources from the Study Participant.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she plans for mathematics instruction during her final internship?</td>
<td>Lesson Plans Interviews Audio Journal</td>
</tr>
<tr>
<td>What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she enacts mathematics instruction during her final internship?</td>
<td>Observations Interviews Audio Journal</td>
</tr>
</tbody>
</table>

Table 2.

Descriptive Coding Examples.

<table>
<thead>
<tr>
<th>Level of Instruction</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>All teaching in small group is with an algorithm. Whole group instruction of the live line plot contains no higher order thinking questioning. Students gather according to their favorite sport and discuss how many are in each category.</td>
<td>1</td>
</tr>
<tr>
<td>Higher order thinking – PST thinks that students making up their own problems challenges them more. The whole group assignment was for the students to create a chart and choose objects around the room to estimate the length in either millimeters, centimeters, or meters. The students seemed to have no idea how large each unit was and didn’t use any type of measurement tool.</td>
<td>2</td>
</tr>
<tr>
<td>When in small groups Kelly had the students make up their own problems “I thought that maybe if they created their own problems, they would maybe think about it deeper and see it more by doing it themselves.” The problems that were created were very simple such as 4/6 – 3/6.</td>
<td>3</td>
</tr>
<tr>
<td>The whole group lesson was about converting within linear metric units. Kelly demonstrated this by “jumping” the decimal and by using the power of ten. There was no conceptual basis for the size of each unit. The whole group activity was weighing a bowl of ice cream before and after adding toppings. The unit of measure was ounces and the students were instructed to convert this to pounds using division. There was no connection between the lesson and the activity and no instruction about the relative size of ounces or pounds.</td>
<td>4</td>
</tr>
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</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>Level of Instruction</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly drew two triangles, one of them bigger than the other and asked the question &quot;Do the angles in both of these triangles add up to 180?&quot; When asked about this, she said that some students don't understand that an angle is an angle no matter how big or small the shape is. She wanted them to see that just because one triangle is bigger than the other doesn't mean the total degrees change.</td>
<td>5</td>
</tr>
<tr>
<td>The lesson was on volume and a manipulative was used, but it was only used as a visual not as a conceptual map. The focus was still on the procedure of using the formula to find volume.</td>
<td>6</td>
</tr>
<tr>
<td>The lesson was conceptual this week with students having to figure out how many packages of granola bars can fit in a large box. Many of them used the formula but some were using estimation by laying the packages of granola bars on the box. The discussion in each group varied with some focusing on the algorithm and some trying other ways to estimate such as laying one granola bar down on the box and using it to measure around the box.</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 3.

*Research Plan for Dissertation Study.*

<table>
<thead>
<tr>
<th>Week</th>
<th>Data</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Initial Interview with preservice teacher</td>
<td>1. Wrote background information on preservice teacher</td>
</tr>
<tr>
<td>February</td>
<td>2. Initial classroom observation</td>
<td>2. Wrote information on classroom observation</td>
</tr>
<tr>
<td>2-6</td>
<td>3. Collected math lesson plan for observation</td>
<td>3. Wrote next week’s interview questions</td>
</tr>
<tr>
<td></td>
<td>4. Observed math lesson</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Interviewed preservice teacher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Collected preservice teacher audio journal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1. Collected math lesson plan for observation</td>
<td>1. Transcribed interview notes and audio journal</td>
</tr>
<tr>
<td>February</td>
<td>2. Observed math lesson</td>
<td>2. Wrote next week’s interview questions</td>
</tr>
<tr>
<td></td>
<td>4. Collected preservice teacher audio journal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1. Collected math lesson plan for observation</td>
<td>1. Transcribed interview notes and audio journal</td>
</tr>
<tr>
<td>February</td>
<td>2. Observed math lesson</td>
<td>2. Wrote next week’s interview questions</td>
</tr>
<tr>
<td>16-20</td>
<td>3. Interviewed preservice teacher</td>
<td>3. Continued coding process</td>
</tr>
<tr>
<td></td>
<td>4. Collected preservice teacher audio journal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1. Collected math lesson plan for observation</td>
<td>1. Transcribed interview notes and audio journal</td>
</tr>
<tr>
<td>February</td>
<td>2. Observed math lesson</td>
<td>2. Wrote next week’s interview questions</td>
</tr>
<tr>
<td></td>
<td>4. Collected preservice teacher audio journal</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1. Collected math lesson plan for observation</td>
<td>1. Transcribed interview notes and audio journal</td>
</tr>
<tr>
<td>March</td>
<td>2. Observed math lesson</td>
<td>2. Wrote next week’s interview questions</td>
</tr>
<tr>
<td>2-6</td>
<td>3. Interviewed preservice teacher</td>
<td>3. Continued coding process</td>
</tr>
<tr>
<td></td>
<td>4. Collected preservice teacher audio journal</td>
<td></td>
</tr>
</tbody>
</table>
Table 3 (continued)

<table>
<thead>
<tr>
<th>Week</th>
<th>Data</th>
<th>Research</th>
</tr>
</thead>
</table>
| 6 March 9-13 | 1. Collected math lesson plan for observation  
2. Observed math lesson  
3. Interviewed preservice teacher  
4. Collected preservice teacher audio journal | 1. Transcribed interview notes and audio journal  
2. Wrote next week’s interview questions  
3. Continued coding process |
| 7 March 16-20 | 1. Collected math lesson plan for observation  
2. Observed math lesson  
3. Interviewed preservice teacher  
4. Collected preservice teacher audio journal | 1. Transcribed interview notes and audio journal  
2. Wrote next week’s interview questions  
3. Continued coding process |
| 8 March 23-27 | 1. Collect math lesson plan for observation  
2. Observe math lesson  
3. Interview preservice teacher  
4. Collect preservice teacher audio journal | 1. Transcribe interview notes and audio journal  
2. Write next week’s interview questions  
3. Continue coding process |
| 9 April 6-10 | 1. Collect math lesson plan for observation  
2. Observe math lesson  
3. Interview preservice teacher  
4. Collect preservice teacher audio journal | 1. Transcribe interview notes and audio journal  
2. Write next week’s interview questions  
3. Continue coding process |
| 10 April 13-17 | Final Interview with Preservice teacher | 1. Transcribe interview notes  
2. Continue Coding Process |

The timeline was modified during the study due to Kelly moving from an internship to a full-time substitute position at the end of week seven. Little data was collected in week eight because the students were taking their state standardized tests. There is a gap of time between weeks eight and nine because the students and teachers were on spring break. Weeks nine and ten focused on data collected in Kelly’s fourth grade class where she finished the school year as a full-time substitute. Table 4 represents the revised plan beginning at week seven.
Table 4.

**Revised Research Plan for Dissertation Study.**

<table>
<thead>
<tr>
<th>Week</th>
<th>Data</th>
<th>Research</th>
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<tbody>
<tr>
<td>7 March 16-20</td>
<td>1. Collected math lesson plan for observation</td>
<td>1. Transcribed interview notes and audio journal</td>
</tr>
<tr>
<td></td>
<td>2. Observed math lesson</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Interviewed preservice teacher</td>
<td>2. Continued coding process</td>
</tr>
<tr>
<td></td>
<td>4. Collected preservice teacher audio journal</td>
<td></td>
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<tr>
<td></td>
<td>5. Conducted final preservice teacher interview</td>
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<td></td>
<td>6. Conducted final cooperating teacher interview</td>
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<td></td>
<td>7. Conducted final supervising teacher interview</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2. Continued coding process</td>
</tr>
<tr>
<td>9 April 6-10</td>
<td>1. Collected math lesson plan for observation</td>
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<td></td>
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</tr>
</tbody>
</table>

Each week after the classroom observation, I created a narrative based on the observation notes. In addition, I wrote a contact summary of all data points within each week. The contact summary contained pertinent information such as the participant and date the data was obtained, as well as brief notes from the data sessions. Using the contact summaries, observation notes, narratives, interview transcripts, and audio journals, I wrote the weekly stories.

As the data was collected and analyzed, my own voice was used to tell the stories and discuss the findings. Although I am the main voice, I created a composite of the voiced of the preservice teacher, the cooperating teacher, and the college supervisor in the stories and findings.

**Credibility and Trustworthiness**

As the qualitative researcher, I considered constructing trustworthiness. This was especially important since the primary data collection and analysis instrument was me. What I see emerging from the data is from my own interpretive lens (Merriam, 1998). Consequently, I
used certain techniques to establish the trustworthiness of the inquiry. In this study, trustworthiness was established through peer review, methodological triangulation, member checking, and the clarification of researcher bias.

**Peer Review**

I used a peer reviewer to debrief my notes and ask me questions about my data collection and methodology. I utilized a peer reviewer in order to limit biases and increase the trustworthiness of my findings (Onwuegbuzie & Leech, 2007). Merriam (2009) suggested that the purpose of the peer reviewer was to ensure the discoveries are plausible. Michelle (pseudonym), my peer reviewer, was a doctoral candidate in curriculum and instruction with a focus in elementary education at the university. As a doctoral student, she had studied qualitative research one and qualitative research two and gained experience coding data within qualitative research in her own studies.

Before beginning the study, I asked Michelle to read over the interview questions for clarity and in order to see if she had any suggestions as to what additional questions would allow me to better understand the experiences of the preservice teacher. After the first observation and interview, I independently coded the transcripts for content and emerging themes and then asked Michelle to do the same. This allowed us to compare the codes to be sure that I was not missing any important information that would inform the study. Also, Michelle reviewed the questions I created for week two based upon week one. She gave me suggestions on creating questions based upon the previous week’s information and assisted me in developing questions that helped me better understand the experiences of the preservice teacher. I continued to code the transcripts and observation notes for each week. For convenience, I created a Google document folder that Michelle and I shared, which included the transcripts, codes, and records of instances that fit the
codes. Michelle reviewed the information I coded and gave feedback in three face-to-face meetings as to any other codes that I needed to think about or to clarify the codes and themes I used. Michelle spent approximately 30-60 minutes reading the observations, transcripts, and checking for codes. Our face-to-face meetings took place at a local restaurant, where we met for about two hours during weeks four, seven, and ten.

Methodological Triangulation

I used more than one method of data collection and inquiry to increase confidence in assertions, see multiple meanings, and perhaps disconfirm data. I observed mathematics lessons and took nonparticipant observation notes, interviewed the preservice teacher once each week, transcribed post-conference discussions, and used artifacts such as lesson plans, pictures, and audio recorded journals from the preservice teacher.

Triangulation represents the usage of multiple sources of data in order to obtain a better substantive picture of reality and to strengthen reliability and internal validity (Merriam, 1998). I collected data from multiple sources such as interviews, non-participatory observation notes, lesson plan artifacts, and audio recorded journals from the preservice teacher. Each piece of data was used to establish triangulation. For example, I asked questions during the interviews to validate or better understand what I observed and recorded in field notes in the classroom. I made observations focusing on information I gathered from the interviews to confirm that what the preservice teacher said during the interview was actually practiced in her teaching.

Member Checking

I sent the participants all transcribed documents in which they participated including the interview transcripts, observation notes, lesson plan notes, post-observation conference transcripts, and audio journal transcripts for their review. Lincoln & Guba (1985) described that
member checking is the most crucial technique for establishing credibility. It allows the researcher to test data, interpretations, categories, and conclusions with the participant. The quality of case study is the researcher’s reconstruction of the participant’s reality. Consequently, its accuracy must be verified by the participant (Lincoln & Guba, 1985). To establish member checking, I shared the interview transcripts, field notes, initial findings and interpretations with the participants to verify the accuracy of the data.

Using written directions, I asked all three participants to read over the text and verify for accuracy. It was estimated that the cooperating teacher and the supervising teacher would spend about 10-15 minutes reading over each document. It was also estimated that it would take the preservice teacher about 20-30 minutes to read each transcript for accuracy. In addition, the preservice teacher and I met briefly (approximately 20 minutes) once each week after her senior seminar to clarify any information on the transcripts and set the time for the following week’s observation and interview.

**Personal Background**

I stated my personal background so the reader understands my position and beliefs.

**Confidentiality**

Since I knew the preservice teacher well, it was important that she trusted what I was doing in the classroom was not used for evaluation purposes. I was careful not to discuss any findings with the cooperating teacher or the college supervisor. I also stored documents and artifacts, interview transcripts, nonparticipant observation notes, and transcripts from the audio recorded journals and post lesson conferences on my locked and password-protected computer. Any paper files were housed in a locked filing cabinet in my office at the college where I was employed. They will remain in my locked filing cabinet for five years and then be shredded.
Summary

Since there is limited research on preservice teachers planning and implementing mathematics instruction during the final internship, I continued to add to the body of knowledge on the research in teacher education by focusing on the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she planned and implemented mathematics instruction during her final internship.

To conduct this study, I investigated the experiences of the preservice teacher as she planned lessons and enacted instruction in a fifth-grade classroom during her final internship. Through looking at lesson plans, observation notes, interview transcriptions, post conference transcriptions, and audio-journal recordings, I gained insight and a deep understanding of the mathematics instruction the preservice teacher designed and implemented in the classroom setting. I observed a minimum of one lesson a week for nine weeks as the preservice teacher taught elementary mathematics, conducted one interview each week with the preservice teacher, and collected lesson plans and audio recorded journals created by the preservice teacher. I also interviewed the cooperating teacher for contextual information and progress and interviewed the college supervisor to gain more insight into how the preservice teacher was evaluated and what type of feedback was being given while teaching mathematics during the internship. In order to analyze the data these methods produced, I employed content and thematic analysis to find core meanings through the interview transcriptions, audio journal transcriptions, observation notes, and lesson plans. To establish trustworthiness, methodological triangulation, member checking, peer reviewing, and background of the researcher was utilized.
CHAPTER FOUR: STORIES

The purpose of this study is to describe the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she plans and implements mathematics instruction during her final internship. The research questions guiding the study are:

1. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she plans for mathematics instruction during her final internship?

2. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she implements mathematics instruction during her final internship?

This chapter sets the stage in order to contextualize the study. First, I introduce each of the three participants to help the reader understand the "characters" that emerge within the narrative. Second, I provide weekly stories to paint a literary picture of the preservice teacher's experiences. At the conclusion of each weekly story, I wrap up by giving my interpretation of the week’s events. Finally, I propose a summary, the form of a table, which gives a clear picture of the behaviors that impacted Kelly’s implementation of mathematics instruction.

Participants

Although the focus of my study is on Kelly, participants also included her cooperating teacher (pseudonym Mrs. Mills), and her college supervisor (pseudonym Mrs. Perez).

Kelly, the Preservice Teacher

During the time of this study, Kelly was a senior in her final internship experience. At the small, private college where she was enrolled, Kelly consistently earned A or B grades in all of her education courses. However, Kelly admittedly disliked math and did not think that she was
good at it. That said, as she began teaching in her field experiences, Kelly developed a love for intermediate grades and discovered she wanted to teach at that level. Kelly stated that she “knew that teaching math was going to be a problem” (PST initial interview). During the mathematics' methods course, she had often discussed her feelings of mathematics anxiety with the instructor and asked for advice when teaching mathematics lessons during her field study experiences. One of Kelly’s prior field study experiences was in a fifth grade classroom with Mrs. Mills as the cooperating teacher. Kelly struggled with teaching mathematics lessons during the field experience; however since the field experience took place in a self-contained classroom, Kelly taught lessons in all subjects. She explained she felt successful in teaching all subjects with the exception of mathematics. Kelly expressed that she wanted to teach in the upper elementary grades so she wanted to learn how to be a better mathematics teacher. Kelly knew that she was placed in a departmentalized situation for her final internship, and the primary subject was math. She stated that she felt teaching math all day long might help her overcome her anxious feelings and make her a better teacher. Based on this description, Kelly appeared to be ready for the challenge of teaching mathematics most of the day during her final internship, despite her feelings of mathematics anxiety. She hoped the internship experience would help her overcome the feelings of anxiety and build her confidence in the subject of mathematics.

**Mrs. Mills, the Cooperating Teacher**

Mrs. Mills’ five years’ teaching experience was all at the same school, and most of it, in fifth grade, her current teaching placement. This was a second career choice for Mrs. Mills but she enjoyed it and wanted to continue. Mrs. Mills did not attend a teacher education program, but with a bachelor’s degree and a passing score on the state teachers’ examination, she obtained a teaching certificate. Mrs. Mills began her teaching career in kindergarten, moved to fourth grade
for one year, then transferred to fifth grade where she remained at the time of this study.

Mathematics instruction, according to Mrs. Mills needed to be “rigorous and very concrete with a lot of reinforcement in order for students to learn” (CT initial interview). She chose not to use the mathematics teacher’s edition textbook for instructional purposes, but only the student edition as practice pages for students during small groups. Mrs. Mills explained the textbook was not properly aligned with the state standards; therefore she found her own resources for mathematics instruction. Mrs. Mills and Kelly developed a relationship when Kelly completed a previous field experience teaching one day a week in Mrs. Mills’ classroom. Although she had worked with Kelly in a previous field experience, this was Mrs. Mills’ first time as a cooperating teacher for a full-time intern.

Grounded on this description, Mrs. Mills appeared to be a novice as a cooperating teacher for a full-time intern, but was willing to mentor Kelly and work with her during the final internship. Having a previous relationship with Kelly seemed to be an important factor in Mrs. Mills wanting to host a full-time intern, as she specifically asked for Kelly to be placed in her classroom.

Mrs. Perez, the College Supervisor

At the time of this study, Mrs. Perez had supervised interns at the college level for four years. She had begun at a large university as part of her role as a hybrid educator referred to as a partnership resource teacher. This was her first year at the private college Kelly attended. As a former elementary teacher, Mrs. Perez taught fifth grade mathematics and expressed that mathematics needed to be taught in a way that “builds understanding of the concept first then moves to understanding algorithms and procedures” (ST initial interview). Mrs. Perez said that her experience as an elementary classroom teacher and a classroom coach prepared her for the
role of supervisor by “helping her to provide valuable feedback to preservice teachers to help them improve their instruction” (ST initial interview). She stated that supervision should be closely connected with the cooperating teacher and preservice teacher. Mrs. Perez believed that developing a relationship with the preservice teacher was an important step in support of the preservice teacher during the final internship.

Based on this description, Mrs. Perez appeared to have experience in both classroom teaching and preservice teacher supervision that would allow her to provide support to Kelly during the internship. Mrs. Perez’s classroom experience could help her make connections from her own experiences as a teacher to support Kelly as she learned to be a classroom teacher.

All told, the participants were Kelly (preservice teacher), Mrs. Mills (cooperating teacher), and Mrs. Perez (college supervisor). All brought unique experiences to this triad, coming together for one purpose – a successful learning experience in Kelly’s final internship.

**Weekly Stories**

Throughout the seven weeks of Kelly’s final internship story, many of the same instructional strategies, classroom discussions, and levels of activities assigned to students remained the same. Only in week seven, after the “crash and burn” of week six (details in week six’s story) and the lesson planning intervention of the college supervisor, did Kelly design a lesson that was truly aligned with the standards and had an appropriate level of critical thinking needed for conceptual understanding. Kelly stated that she knew that week seven’s lesson was much better, and she felt that the students really understood what volume was after that lesson. The following weekly stories illustrate the nature of the experiences of Kelly, a preservice teacher self-identified as having mathematics anxiety, as she planned and implemented mathematics instruction during her final internship.
Week One

When I walked in the door for the first week’s lesson observation, Kelly greeted me and handed me a printout of the lesson plan. Kelly later explained the plans were already done as she was in week six of her internship. The grade level planned ahead as a group and kept about one month ahead of teaching time. Kelly stated that she had not really done any real planning yet because the grade level teachers had already planned for the first few weeks in the beginning of her internship. “This is [sic] the plans they have already set so she (Mrs. Mills) gave them to me and told me I could change them, adjust them, things like that” Kelly said (PST week one interview). Kelly was supposed to start planning with the grade level in two weeks. The lesson plan was written in a template containing the week’s lesson information. However, there was little information in the plan. Only the whole-group activity was actually mentioned. From the initial classroom observation, I knew that small-group activities were a big part of each math lesson, but these were not included in the lesson plan. There was a brief description of the whole-group activity about a real-life situation using a line plot, explaining that the children would be taken to the hallway to complete a line plot on their favorite sport. There were a few vocabulary words, but no meanings, and a formative assessment of “students sharing their collaborations.”

As the math class was called to order, Kelly placed the lesson essential question (LEQ) under the document camera so that the entire class could see it. The LEQ was, “How do I create a line plot to display data using fractions of the unit and solve problems using the information from the graph?” (observation notes week one). Kelly reviewed line plots for a few moments and then took the students to the hallway where she had already placed masking tape on the floor. She asked the students to remember a survey they had taken the previous day about their favorite sport. She asked the class to form themselves into a line plot displaying information from the
survey. Kelly said that she found the idea for the lesson in Pinterest (PST interview week one). Kelly asked a few questions of the students about the human line plot and then took them inside for small-group activities. She stated that the reason why the activity seemed to be cut a little short was that she did not know what to ask the students to enhance their learning. Kelly explained, “It was kind of hard to ask them (students) probing questions while we were out there because I didn’t know what to ask them” (PST week one interview). The questions were not planned; she made them up as she stood in the hallway (PST interview week one).

The small groups included more explanation of mathematics, but the topic was not about line plots. Instead, Kelly reviewed how to add and subtract fractions. When the students made mistakes in their work, Kelly referred to her own misunderstandings of how to add and subtract fractions. She explained to the students that she often got confused when finding a common denominator for adding and subtracting and finding the least common multiple for simplifying fractions. She seemed to struggle with using math vocabulary as she showed the students how to do a particular skill. The students were working on finding equivalent fractions, but Kelly never called them “equivalent fractions” (observation notes week one). At one point, one of the students had difficulty simplifying a fraction. Mrs. Mills walked over and asked the student if the numerator and denominator were prime numbers in order to get the student to realize that the fraction was in its simplest form. The student answered “yes” and stated that if the numerator and denominator were prime numbers, then the fraction was in its simplest form (observation notes week one). Kelly did not seem to understand that if both the numerator and denominator were prime numbers, the fraction was already in simplest form. Kelly stated in the interview that she did use the correct vocabulary with the second math class of the day because Mrs. Mills reminded her of the correct terms. Kelly used the correct terminology because she connected the
vocabulary term ‘prime number’ with the fraction being in simplest form as a result of Mrs. Mills’s explanation.

All of the problems used in the small groups were algorithmic. It did not appear that Kelly had any type of answer key from which to determine if the students’ answers were correct or not and when asked about this, she stated that she had not worked the problems out in advance, nor did she have an answer key. At one point, Kelly made a mistake and a student corrected her. In one group, some students finished quickly; however, they did not solve the problem correctly. Kelly later referred to them as “lazy, because they want to be done quickly” (PST interview week one). Kelly stated that she preferred working with the high students in the small-group activities because she did not have to explain many things to them. She stated that she even learned some things from them like how to cross multiply to compare fractions. Kelly explained that when working with the higher level students, she sometimes thinks, “Yep, didn’t know how to do that one” when the students explain how to do a problem (PST week one interview). However, when working with the students who struggled with math, Kelly said that she identified with them because “I don’t believe in myself either” (PST interview week one).

**Week one interpretation.** In week one, it did not take long for me to figure out that Kelly’s lack of effective teaching was directly related to the lack of planning. The hallway line plot activity did not seem to have a real focus except to let the students out of the classroom in order to move around. Small groups did not seem to be well organized. Kelly had no answer key for any of the problems she asked the students to solve and seemed to stumble over her words when trying to explain how to do the problems. It appeared to me that Kelly’s lack of planning seemed to influence her ability to effectively teach or review mathematical concepts. Kelly’s belief that the lesson was "already planned” without worked examples, planned questions, and
completing an answer key demonstrated her limited understanding of planning and preparing to teach mathematics. Kelly relied on the brief outline of a lesson plan, and was not able to thoroughly think through each part of her lesson and make decisions about how to guide the students into what she wanted them to learn from the activities she planned. Given that she began our conversation by explaining that the planning was already done for her, evidence from this observation suggested to me that Kelly did not understand what planning for mathematics lessons entailed.

**Week Two**

I entered the classroom on week two of the study and greeted both Mrs. Mills and Kelly. They were talking with each other, but not about the math lesson. Kelly handed me the lesson plan, which was the same template as the previous week. It contained minimal information, only vocabulary words, a link to a video, and a link to Cpalms (a state website with the standards and lesson ideas for teachers). The lesson plan again did not include any instructions, questions to ask students, example problems, or directions.

As Kelly opened the lesson, she struggled to gain the students’ full attention. Finally, Mrs. Mills stepped in to calm down the students and redirect them toward the screen where Kelly displayed the lesson essential question for the day. The question was, “How can I solve real-world problems by graphing points on a coordinate plane?” (observation notes week two). It was apparent by the students’ responses that they were confused about how to graph, using a coordinate plane, in real-world situations. The examples given seemed to be more closely connected to plotting a line graph. For example, one of the students stated that he would plot points on a graph showing that as the number of pizzas he ate increased each week, the more weight he lost. Kelly applauded the student for his example and then directed the students to
copy down the essential question and predict an answer. Kelly started a video about a four quadrant graph. The video explained how to use absolute value to calculate distances between points. Kelly explained that she found the video for the lesson through Google (PST interview week two). When asked if she had watched the video ahead of time, Kelly said she had watched the video to help her understand how to teach graphing coordinate points. But she still felt unsure of how to "best explain it" (PST interview week two), so she used the video to explain it to the class. “I think that videos are great and it does a better job of explaining it than I do”, Kelly stated. Periodically, she stopped the video to ask questions about the points that were plotted. All of the questions were low level asking the students to give the coordinate points of a certain picture on the graph. Kelly said that she asked the questions because she wanted to make sure the students were actually watching the video.

The video posed a problem on the four quadrant graph and asked “How far is the school from the pond?” (observation notes week two). Kelly paused the video and asked the students to answer the question. One of the students answered “five” (observation notes week two). She asked the students turn to one another and talk with a partner about the question. After the partner talk, she started the video again without addressing the answer to the problem. The video stated that the answer to the problem was “seven” and then explained, using absolute value, how the answer was derived. Kelly said that the reason why she had the students talk with a partner and then went right back to the video was because she did not know the correct answer nor did she know how to explain it so that the students could find the correct answer. Kelly said that being unsure of how to do that problem made her very nervous. She was afraid that the students would make a comment about her lack of knowledge in mathematics. She remembered that she had made a mistake earlier in the week and that a student had commented, “Sometimes I think
I’m better at this than you are” (PST interview week two). Kelly explained, ”I know that the students don’t mean what they say in a hurtful way” (PST interview week two). The anxiety Kelly had about what students might say to her created a fear of trying to solve problems in front of them and made her question her ability to teach math.

Kelly explained that Mrs. Mills did not consistently look at her lesson plans each day. In fact, Kelly didn’t know if Mrs. Mills looked at the plans on a weekly basis. Kelly further indicated that she and Mrs. Mills had not planned this lesson together. Kelly was in charge of all of the lesson plans and was to complete them on the template provided by Mrs. Mills. Kelly stated that Mrs. Mills could go in to the template and “look at the lesson plan at any time” (PST interview week two).

While working with one of the small groups, Kelly reviewed plotting on a coordinate plane using a whiteboard. She created a one quadrant plane and had the students make up points for her to plot on the graph. The students did not practice plotting the points themselves; they just made up the points for Kelly to plot. When asked why she did this, Kelly explained that these were the students who struggled with math and that she wanted them to feel successful. She expounded that she tried to give them problems that she knew they could solve so that they would feel successful:

I didn’t want to push them. I guess this is bad, but I don’t want to challenge them, even though I need to. I don’t want to make them feel like they’re not smart enough when they don’t get it right. (PST interview week two)

Kelly likened this to her own experience in learning math. She said that she had never felt successful and had told the students as much. Kelly continued to explain that she thought that if
she gave them questions they could answer, they would “be more confident in themselves, even though it might be too easy” (PST interview week two).

In one of the small groups, Kelly asked one of the higher level students to solve a few fraction problems and then teach the group how to solve the problems. When asked why she did that, she said that when the students teach, it makes them think about what worked and not just rush through the problem. She also stated that she thought she learned how to solve the problems by watching the students solve the problems in different ways. Kelly explained that she learned how to do the math problems as the students taught each other. She continued by saying that she watched the students and thought, “I didn’t know you could do it that way.” Kelly said she did not tell the students that she did not know how to do the problems; she just told them that they did a good job (PST interview week two).

On another day this week, while teaching a math lesson, the principal walked in and sat down for an informal observation. Kelly stated that she was using popsicle sticks with the students’ names on them to call on students randomly while soliciting answers for math problems. When doing one particular problem in which Kelly was not confident, she pulled a popsicle stick with the name of a student. Kelly explained that she changed the name and called on someone who she knew would get the right answer so she “would not have to explain the problem while the principal was in the room” (PST audio journal week two).

**Week two interpretation.** Week two really shed light on Kelly’s lack of confidence in teaching mathematics and the lack of lesson plan support provided to Kelly by Mrs. Mills. It appeared to me that without lesson plan support from Mrs. Mills on a daily basis, Kelly lacked direction in choosing appropriate mathematics instructional strategies and seemed to continue to lose confidence in her own ability to teach mathematics. Kelly used a video to teach the lesson
on coordinate graphing, even though the video exceeded the scope and sequence of the standard she was teaching. She relied on students to teach the mathematics in the small group because she did not know how to solve the problems, and she wanted to learn from them. Kelly did not seem to be listening for student explanations as to what they knew for use as formative assessments as much as she was listening to help her understand how to do the problems. Kelly’s decision to give easier mathematics problems to the students in order to allow them to get the problems correct and feel encouraged actually minimized the students’ opportunities to learn. By not challenging the students and helping them to learn how to successfully solve problems, Kelly denied the students the opportunity to learn and improve their mathematical skills. Lastly, Kelly intentionally called the name of a student whom she knew would solve a mathematics problem correctly so she would not have to explain it while the principal was in the room. It was apparent to me that Kelly’s lack of confidence was related to her lack of knowledge in mathematics because of the support she used while teaching; namely, the use of the video and students to explain solutions to mathematics problems.

**Week Three**

The lesson this week was about converting among the different size standard measurement units and using the measurement units to solve problems (lesson plan week three). There was little information on the lesson plan that included a whole-group activity with only a link to a video. The guiding question for the lesson was, “How can I measure how long something is?” (observation notes week three). In the interview, Kelly explained that when she taught this lesson in a prior field studies experience, it did not go well. “I bombed it; it was terrible,” Kelly explained. As a result of the experience of teaching a poor lesson, she attempted
to teach herself how to convert within the metric system for this lesson in order to teach it to the students.

Since this was the first day of the new unit for this class, Kelly asked the students to copy the essential question in their notebooks and write a prediction for what they thought the answer might be. After a few minutes, the students shared their predictions giving answers such as “using a ruler or measuring tape” (observation notes week three). Kelly accepted every answer that a student gave whether it pertained to measuring length or not. Kelly explained that she didn’t want to discourage any of the students from trying to answer a question so she did not correct them if the answer was wrong. She then started a video that was supposedly about measurement conversions. The video was actually on elapsed time. Kelly later explained:

It was the wrong video. I don’t know what happened with the link, and so I tried to work with it and come up with other ways for them (students) to discuss it and not realize that it was the wrong video (PST interview week 3).

The video played for about four minutes until Kelly paused it and asked the students if time was a unit of measurement. She told the students to turn to their shoulder partners and list all the ways they could measure. Mrs. Mills walked around the room to listen to the groups’ discussions and interact with the students. Kelly went over to the computer and began working – it seemed like she was searching for something. After Kelly called the class back to order, she returned to the video which was now on metric length conversions. The question on the video called for the students to convert 37 centimeters to meters. Kelly paused the video and asked the students to predict what that answer would be. One student answered, “3.7 m” (observation notes week three). Kelly told him that was a “pretty good prediction” (observation notes week three). Mrs. Mills then asked the class if anyone knew what “centi-” meant (observation notes week three).
Students talked for a moment and seemed a bit puzzled. Mrs. Mills drew their attention to a dollar and asked how many cents were in a dollar. Kelly commented that she thought it was a “good way to think about that” (observation notes week three) and pressed play on the video. The video continued to do the instruction with Kelly stopping it occasionally to ask a question about what was happening on the screen.

After the video concluded, Kelly instructed the students to stand. She turned to Mrs. Mills and commented that she wanted Mrs. Mills to help her because “units may not be my favorite” (observation notes week three). Kelly used motions for various units of measurement integrating both metric and customary with no differentiation between them. She held up her index finger and said, “Centimeter” (observation notes week three) and held up her thumb, bending it at the knuckle, and said “inch” (observation notes week three). With each symbol, Kelly turned to Mrs. Mills for reinforcement to make sure she was using the correct one. She continued for foot, yard, meter, and kilometer. The students did not seem to understand that Kelly was making reference to the relative size of the unit. Instead, the motion became a symbol for the word. When asked about this, Kelly didn’t realize that she didn’t make connections between the symbols and the relative size of the measurements.

After the motions activity, Kelly told the students that they would be walking around the room in partners finding five objects in the classroom. They were to choose the best way to measure the object using millimeters, centimeters, or meters. The students created a chart to fill in the name of the objects and a place to fill in the estimation of the length of the classroom objects. Kelly demonstrated what she wanted the students to do by pointing to the computer screen and asking a student about how many centimeters wide the computer screen was. When the student paused, Kelly told the student to just guess because “it doesn’t have to be right”
(observation notes week three). The student guessed 14 cm and Kelly replied, “Good!” (observation notes week three). Kelly later explained that she did not want to discourage the students, so she accepted every answer. “I think it goes back to me wanting them to actually try and not be afraid to try and not be afraid that they’re going to be wrong”, Kelly said (PST interview week three). Mrs. Mills assigned the pairs for the activity and, as the students walked around the room filling in their charts, their estimations did not seem to be based upon any relative size. Kelly later commented that the students did not seem to make any connection at all between the size and the unit. In addition, they made no connections to the motion activity that Kelly previously completed with them. Later Kelly explained that the students failed to make connections between the motion and the relative size because she did not tell them that the motion indicated the size of the unit (PST interview week three). After about ten minutes of that activity, Kelly asked the students to return to their seats.

Kelly asked each team to share one thing that they estimated while walking around the room in pairs. One student said that his group estimated that the door was about 72 cm tall and that would equal six feet. Mrs. Mills asked the student to explain his thinking, and the student explained that there are 12 inches in one foot. Mrs. Mills clarified that they were working with centimeters not inches. A few more students shared their estimations, but the estimations were never verified; any answer was accepted as a correct answer. After the whole-group activity was completed, the students moved into their small groups, and the first group met with Kelly at the back table. She told them that they were going to review addition, subtraction, multiplication, and division of fractions.

She asked the students to make up their own problems and try to solve them. She told the students not to be “too easy on yourself” (observation notes week three). Kelly later explained
that the reason she had the students make their own questions was because it would lead them to “higher order thinking” (PST interview week three). After giving the students a few minutes, Kelly asked them to share a problem that they had completed. She called on student A. Student A wrote $\frac{8}{6} + \frac{8}{12}$ on his whiteboard. Kelly asked him why he started with a “mixed number” (observation notes week three). He replied that he thought he just did it wrong. Kelly continued to plod through the problem asking what the common denominator would be. Student A gave the answer of 12. She helped the students make equivalent fractions and complete the addition.

She asked another student to share the subtraction problem she had created. The problem was $\frac{4}{6} - \frac{3}{6}$. The student shared that all that needed to be done was subtract the top number.

The groups were changed, and another group came back to Kelly’s table. She gave everyone a sheet of paper and pencil and wrote $5.2 \times 10.3 = _____$ on the whiteboard. The students worked on the problem. After a few moments, Kelly gave a student her whiteboard to do the problem for the rest of the group. She asked the student to explain it to everyone as she solved it. Kelly did not have the problem solved in order to check the answer, but instead relied on the student’s answer to be correct (PST interview week three).

Kelly gave the students another problem to solve using decimals and order of operations: $12.25 + 3.05 \times 0.06$. The students worked on that for quite some time and shared their answers with each other. There was a discrepancy about where to put the decimal, and Kelly stumbled over her words. Mrs. Mills walked over and told the students that when they added or subtracted decimals, they always had to line up the decimals. Kelly explained, “I had to ask her because I was working it out and getting the wrong answer and I didn’t know why” (PST interview week three). Kelly concluded the groups with that problem, and the students returned to their seats.
This week, Kelly’s college supervisor, Mrs. Perez, did a walk-through observation while Kelly was teaching. Mrs. Perez indicated that she looked at Kelly’s lesson plan and stayed for about 15 minutes, observing the lesson. Mrs. Perez was concerned that the plans were surface level including just a basic list of what to do (CS interview week three). She believed that Kelly was not comfortable enough with the content for surface level plans. Kelly told Mrs. Perez that Mrs. Mills was not planning with her other than when the grade level planned together. Mrs. Perez stated that she wanted to see Mrs. Mills do some in-depth planning with Kelly (CS interview week three).

Later in the week, an observation team from the state visited the school. Kelly was asked to cover another teacher’s class and teach a science lesson while that teacher conducted a tour of the school with the state team. While Kelly was teaching the science lesson, the state team, including several principals from other schools, walked in to the classroom and observed her teaching a science vocabulary lesson. Kelly said that she had the students “visualize” vocabulary words and share what they thought the meaning of the words were (audio journal week three). Kelly was later told by the principal of the school at which she was interning that on a rating scale of 1-6, with six being the highest, the state team scored Kelly a six. Kelly stated that the principal said she was a “natural” and that she was making a difference (PST audio journal week three).

**Week three interpretation.** Week three presented a challenge for Kelly because of her perceived failure in teaching a similar lesson on the metrics system a year ago. Kelly explained that she used online resources to “teach herself” how to convert within the metric system (PST interview week three). However, the lesson plan contained no information or helpful hints to assist Kelly while teaching (lesson plan week three). Even with the anxiety that Kelly felt about
teaching the metrics system again, the lesson plan did not offer any support. Kelly’s brief time with another classroom teacher learning the symbols for the relative size of measurement units did not adequately prepare her to teach the symbols to the class. It appeared to me that the acceptance of incorrect answers as the students predicted how to convert within the metric system demonstrated that Kelly did not transfer what she learned about misconceptions from the mathematics methods course to the classroom.

Mrs. Mills supported Kelly throughout much of the lesson by interjecting questions and explanations about metric units; however, Mrs. Mills only spoke up when Kelly asked for help or could not answer a student’s question. Mrs. Mills did not correct Kelly or offer any type of explanation as Kelly gave the symbols for the measurement units mixing customary with metric. By my accounts, Kelly’s idea of higher order thinking coming from students creating their own problems was weak because the problems the students created were both simple and algorithmic in nature, with procedures being the most important part of the problem. It seemed to me that Kelly’s lack of preparation for the small-group instruction caused her to rely upon the students to work the problems and explain how to do them to the other members of the group. Kelly’s confidence was boosted later in the week when she was observed by a state team who rated her classroom teaching the top possible score that could be given.

Mrs. Perez’s visit to Kelly’s classroom allowed her to witness Kelly’s lack of planning with a different mathematics lesson. However, Mrs. Perez didn’t meet with Kelly to discuss the importance of lesson planning and did not require Kelly to do any type of reflection on her teaching. Kelly didn’t seem to realize that she needed to take responsibility for her own learning and preparation of lessons or how she taught lessons to the students. It appeared to me that lack
of reflection and making improvements based upon the reflection contributed to Kelly’s continued poor planning and implementation of mathematics lessons.

**Week Four**

As I walked in for the lesson observation, Kelly told me that the school principal had called her the previous night and offered her a full-time substitute job. She was to take over a fourth-grade classroom for a teacher going on maternity leave. Kelly told me that, if she accepted the position, she would only have three more weeks in her internship. Kelly seemed excited about the opportunity to teach in her own classroom. As I sat down, I noticed that Mrs. Mills was not in the classroom. According to Kelly, she was going to administer testing to another group of students for a few days.

Kelly gave me the lesson plan, and I noticed it was longer than in previous weeks. It contained the essential question, an opening problem to use as a formative assessment, a question to ask the students, the links for the materials, vocabulary words with no definitions, and small-group activities including the students’ names in each group, the standard the group would work on, and a page number and problem numbers for the groups. Kelly explained that the principal had told the teachers that they needed to add more “rigor” so that was why the plans were more detailed (PST interview week four). The lesson plan contained more planned questions which Kelly used during her instruction. However, the extended plan did not help Kelly with content or differentiated instruction. The essential question for the day was “How can I convert among different sized standard measurement units and use them to solve problems?” (observation notes week four).

While the students were passing out the notebooks for the lesson, Kelly asked the class if anyone knew what a shot put was. A few students called out their ideas, and one suggested that it
was a sport in the Olympics that would test strength and ability. As a class, Kelly brought them to the conclusion that it was a heavy ball and asked how much they thought the ball would weigh. Students answered by giving random numbers, and Kelly moved on to the next question, “How would we measure how far someone threw a shot put?” (observation notes week four). A student answered, “Kilometers?” (observation notes week four). Kelly replied that the unit of kilometers would be too far for a shot put to be thrown, but did not offer any other unit as a correct example. Another student raised his hand and related a Scottish game that he saw on a cartoon to throwing the shot put. The cartoon conversation distracted both Kelly and the class. Kelly never redirected the students back to how far a shot put could be thrown and what unit of measure should be used. Kelly turned on the video and the students watched a clip that lasted approximately one minute showing a female athlete throwing a shot put. The video did not show the distance that the shot put was thrown.

At the conclusion of the video, Kelly asked the students, “What number is 100 times larger than the 60?” (observation notes week four). There was no transition or explanation as to why she moved on to another mathematics topic. One student replied, “6000, because there are two zeros in 100” (observation notes week four). Kelly replied, “Good, now what is 1/10 of 70?” (observation notes week four). She told the students to remember this was “reverse - take away the zero” (observation notes week four). A student said, “Seven” (observation notes week four). When asked how the students knew to connect converting between metric units to powers of ten, Kelly responded that she should have made the connection for the students so they would understand, but she didn’t make the connection (PST interview week four). “..I didn’t know it until just now when you asked,” Kelly stated (PST interview week 4).
Kelly called out a few more similar problems and then asked the students how they knew which direction to move the decimal when doing powers of ten. A student replied that it should be moved “to the left when it is getting smaller and you move it to the right when it is getting bigger” (observation notes week four). Kelly confirmed his explanation and asked for the students to give her a “thumbs up” if they all had a “good understanding” (observation notes week four). Most of the students responded with a thumbs-up signal but a few did not do anything. Kelly moved on and asked the students to create their own question about powers of ten in their notebooks. Kelly walked around the room and discussed the students’ problems with the groups.

After reviewing the powers of ten, Kelly put a chart on the screen and asked the students to copy it. The chart was for the next activity of weighing ice cream before and after adding toppings. The measure of weight was customary and included pounds and ounces; however, there was no transition or mention of changing from metric to customary. The students were asked to make a prediction as to how much their bowl of ice cream would weigh before toppings. Students called out, “five pounds,” “three pounds;” one even said, “24 pounds” (observation notes week four).

Kelly told the students they “would see” the weight when they actually weighed the ice cream (observation notes week four). She later explained that she had not used any type of manipulative to help the students realize what a pound or ounce actually felt like and no manipulatives were discussed in the lesson plan. Kelly later explained, “I should’ve done that (used manipulatives) because with them (students), I’ve noticed that they understand it (mathematics) a lot better when they can see it or feel it or touch it” Before weighing the ice cream, Kelly reviewed that 16 ounces were in a pound and asked the students to review how
many ounces were in three pounds. One student replied, “48 ounces” (observation notes week four). Kelly asked about how many ounces were in five pounds. Another student said, “80 ounces” (observation week four notes).

Kelly instructed the students that they were going to go to a table in the back of the room to get their ice cream and weigh it in a bowl on the scale. Further instructions indicated that after the students added their toppings, they were to weigh the ice cream bowl again and use that weight to convert the measurement into pounds. The first group went to the back table, Kelly scooped the ice cream into the bowl, and each student weighed the ice cream bowl on the scale. The weights were 3.3 oz., 3.4 oz., 3.7 oz., and 3.5 oz. Before leaving the table, one student asked “How do I convert to pounds?” (observation notes week four). Kelly told the student to think about it, then told him to go back to his seat and convert it because “it’s going to be graded” (observation notes week four).

Several other groups went to the back table to weigh their ice cream bowls. Others, who were finished, were trying to convert the ounce measurement into pounds at their seats. Everyone seemed to be struggling with it. A student walked over to Kelly and said that no one at his table “knows what to do” (observation notes week four). Kelly asked another student to help with the conversion from ounces to pounds.

After Kelly finished scooping out the ice cream to everyone, she walked around the room to see what the students were doing. She reminded the students that the answer was going to be a decimal or a fraction. Seeing a student who said he was finished with the problem, Kelly asked, “J, how did you do it?” He explained that he had divided 3.3 by 16 because there are 16 ounces in one pound. Kelly told him that he was correct and proceeded to work his problem on the board as an example. Kelly asked the student how many ounces his ice cream bowl weighed. He
indicated that it was 3.3 ounces. Kelly put the example on the board, but did the division incorrectly, as she did not put a zero in the quotient. She later explained that she did not know how to divide with zeros in the quotient. “I’ve been doing it wrong my whole life,” she said (PST interview week 4). Kelly’s answer to the problem was 0.264, but she read this as “two and 64 thousandths” (observation notes week four) of a pound. The students did not question the math, and Kelly told them that it was time for small groups.

Kelly transitioned the class to small-group activities where one group was with her at the back table working on algorithmic problems, one group did math on the computer, and two groups worked in their math textbooks at their seats. The first small group worked on place value and knowing which number was largest. For example, one problem was .034 compared to 3.4. The second small group worked on a worksheet sample test practicing addition, subtraction, multiplication, and division of larger numbers. There were no word problems, just algorithms.

While the students were working in small groups with Kelly, the others were working at their desk on an assignment written on the board that was in the math textbook. The students were confused, and several interrupted the small-group activity to ask Kelly to explain something to them. Kelly stated that she had not looked over the pages in advance, as Mrs. Mills chose those for the students to do. Each group that rotated to the table to work with Kelly was given either a worksheet with algorithmic problems or Kelly wrote a problem on the white board and the students worked it. Kelly did not have an answer key to check the problems.

**Week four interpretation.** Although the lesson plan this week was much longer with more questions for student discussion, it still lacked the complete support that Kelly needed to implement an effective mathematics lesson. The lesson plan included vocabulary words with no definitions, written questions, names of students in small groups, Cpalms link, and page numbers
for small group instruction. The implemented lesson followed the same format as previous weeks with no observable differences other than Kelly asked more questions. Kelly failed to make connections between the mathematics topics of metric conversions and powers of ten focused on student engagement rather than student understanding. The students appeared to be excited about the lesson, but they did not seem to understand the objective for the lesson. The real world situation using ice cream may have been a fun activity; but having the students convert from ounces to pounds created confusion for both the students and Kelly. However, even with the confusion of the lesson, Kelly managed the class well. The students followed her directions and the classroom was always orderly. In my view, Kelly’s success with classroom management masked the lack of student learning that took place during the instructional time.

**Week Five**

This week’s lesson was on categorizing the attributes of two dimensional figures. Kelly later explained that this lesson was supposed to have taken place the previous day when she was absent. She was not sure what had happened, but Mrs. Mills said that she did not do the lesson the previous day (PST interview week five). Kelly had not planned this lesson and said that she was not really prepared to teach it but that Mrs. Mills had told her that she needed to be the one to teach it that day. Kelly explained, “I wasn’t aware that they hadn’t learned any of it until I got there that morning” (PST interview week 5). Kelly said that she had felt rushed getting ready for the lesson and had about three minutes to think of what questions she would ask the students (PST interview week five).

Kelly began the whole-group instruction with a video showing different types of triangles. The video seemed to be focused on the concept that the sum of all of the interior angles of a triangle is $180^\circ$ and the sum of the interior angles of a quadrilateral is $360^\circ$. The questions
Kelly asked the students focused on the angles of a triangle adding up to 180° and the angles of a quadrilateral adding up to 360°. During the interview, Kelly said that because she was unable to plan for this lesson, the questions she asked were just “off the top of her head” (PST interview week five).

Kelly said that even though she didn’t plan the lesson, she felt comfortable because it was geometry. She explained:

I like geometry. I don’t really feel nervous about it. I feel comfortable with shapes because they’re shapes. What can be so scary about a shape? Nothing. And, it’s memorization. Acute is less than 90 degrees and obtuse is greater than 90 degrees. I can memorize that and know it. I can memorize things pretty good (PST interview week five).

However, even though Kelly felt more comfortable with the subject, she had difficulty teaching. Kelly returned to the video, which was now focused on congruent and similar figures. Kelly paused the video again and drew two triangles on the board, one smaller than the other, but both appeared to be isosceles triangles. Kelly asked if both of the triangles angles would add up to 180°. The students replied, “Yes,” and Kelly asked them why. A female student told her that all triangles angles add up to 180°. Kelly asked if the triangles were similar or congruent. A student replied that they were similar because they were not the same size. In the interview, Kelly stated that sometimes she used videos to teach because she wanted to sit back and relax. However, with this video she wanted to actually try and ask questions because it would benefit her to pay attention and also benefit the students, making sure they were paying attention (PST interview week five).
The voice on the video discussed rectangles, and Kelly paused to ask a question. She drew two shapes on the board: a rectangle and a trapezoid. She told the students that those were “types of rectangles” (observation notes week five). Not one student said a word. Kelly later explained that she had not realized that she had drawn a trapezoid. She thought that it was a “rhombus or a parallelogram” (PST interview week five). Kelly asked how two similar triangles could both have angles that are 35°. She asked the students to turn to a partner and discuss the question. After a few moments to think, students began to raise their hands. One student said that she should just measure the angles. Another student referred back to all of the angles adding up to 180°. Finally, a student answered that they could both be 35° because he was not looking at the size of the triangle, but looking at the size of the angle. Kelly told him that he was correct.

At the end of the video, Kelly passed out a vocabulary worksheet and had the students look over the words. Sample words included: equilateral triangle, acute triangle, obtuse triangle, and quadrilateral. Kelly asked the students to discuss the vocabulary words for a few minutes. While the students were talking to each other about the meanings of the vocabulary words, Kelly circled around the room and went to several different groups asking for characteristics of the various shapes in the vocabulary list. She brought the class back together as a whole and asked about the difference between two-dimensional and three-dimensional shapes. One student commented that two-dimensional shapes had half as many sides and angles as three-dimensional. Kelly replied, “Good” (observation notes week five). When asked about this, Kelly laughed and explained that she really did not know what to say:

I didn’t know how to extend upon that. I know that if it’s three dimensional it’s more than if it’s two dimensional. Like a cube, I don’t know exactly how many squares,
but I know it’s more than one square. I knew that, but I did not know how to extend upon that, so I just said ‘good’ (PST interview week five).

Kelly changed the subject and reviewed some of the vocabulary terms that were on the sheet by writing the words and the definitions on the board. One of the terms that Kelly addressed was the word “polygon.” One of the boys in the class spoke out and said that a circle was a “non-example of a polygon” (observations notes week five). That seemed to catch Kelly off-guard, and she stood still for a moment, looking at the boy. At that point Mrs. Mills spoke up and directed the students to talk about a polygon. She asked them what “poly-“meant (observation notes week five). One student replied that it was a straight figure. Another said “shape” (observation notes week five). Mrs. Mills said that poly- meant “many” (observation notes week five).

Kelly continued by explaining that a polygon had many sides. One of the boys, who appeared to be looking at his phone, stated that the official definition for a polygon was “a many-sided figure” (observation notes week five). Kelly seemed a little frustrated and asked the boy if she just said the same thing. The boy answered that he was just trying to give the official definition. Kelly returned to writing on the board for the next term, which was reflexive angle. Kelly asked the students to turn to their partners and discuss the meaning of reflexive angle. While the students were discussing what they thought the meaning was, Kelly turned to Mrs. Mills and asked what a reflexive angle was (PST interview week five).

Kelly brought the class back together and discussed that a reflexive angle was more than 180°, but less than 360°. She quickly moved on to the next word, which was rotational symmetry. Kelly stood for a moment and then turned to Mrs. Mills and said that she thought it that it meant “there’s more than one line of symmetry?” (Week five observation notes). Mrs.
Mills confirmed what Kelly said and then added that the figure would have symmetry in more than one way. She gave the example of a circle having rotational symmetry. Kelly turned to the students and asked if triangles had rotational symmetry. The students replied, “No” (observation notes week five). Kelly explained that they were correct, but circles did have rotational symmetry. One of the boys in the class said that he thought certain triangles did have rotational symmetry and tried to describe it to Kelly. Kelly could not understand what the boy was trying to say and told him that they would look at it later. Kelly told the students that for the next day’s mathematics class they were going to cut apart the math vocabulary words and the definitions and play a matching game where they would walk around the room and find partners. She then dismissed them to go to their small-group rotations.

The first small group came back to the table, and Kelly asked them to copy the following word problem on their paper: “Michael is helping with the school play. He needs 9 m of fabric. He has 12 cm of fabric. How many more centimeters does he need?” (observation notes week five). After the students had copied the problem, Kelly asked what fractional part a centimeter was of a meter. One of the students answered that a centimeter was 1/100 of a meter. Kelly confirmed that answer and asked the students how they should solve the problem. One student said that they should divide. Another student asked if they could multiply. Kelly went back to the problem and tried to reword it as if trying to make sense out of it. Kelly picked up a small whiteboard and instructed the students to subtract 12 from 100 to see how many centimeters it would take to get to one meter. She then told the students to count up to two meters using 100 centimeters in its place, then to three meters using 100 centimeters in its place, and so on, until they reached 900 centimeters. She then added all of those numbers together and got the answer 888 centimeters, which was correct. The students seemed a little baffled as to how she came up
with the answer but did not question her. Kelly later explained that she had a hard time understanding the problem because she was not prepared for that day’s lesson and she had not worked the problems out in advance (PST interview week five).

After working the word problem, Kelly asked how much ten to the third power was and how the students would know this. A boy replied that the answer was 1000 because the exponent of three told him how many zeros to put. Kelly complemented him and moved on to the next question. She asked the students to solve ten to the second power times 5.2. One of the students asked if they should “add two zeros in the back” (Week five observation notes). Kelly told him no but instead he should “look at the exponent, which is two, and move the zero two places to the right” (observation notes week five). Kelly continued working problems with powers of ten for approximately 15 more minutes. When the group finished the fourth problem, Kelly collected their papers, and the students rotated groups.

Kelly began the next group with the same review of the powers of ten. She asked the same beginning questions and then told the students that the exponent represented how many zeros needed to be added to the one. Ten to the fifth power meant “one with five zeros after it” (observation notes week five). One of the students struggled with reading the number and Kelly helped him with it. She reminded him that the number he read resulted from multiplying ten five times. Kelly practiced a few more procedural type problems with the students and then posed this question: “What power of ten would you divide 523 by to get the answer of 52.3?” (observation notes week five). One of the girls answered that it would be ten to the first power because the decimal was only moved one place. Kelly told her that she was correct and asked if everyone understood, and they indicated that they did.
Kelly worked with one more group rotation that morning. A group of three boys worked on a math worksheet with six algorithmic problems. Kelly had them work the problems one at a time, waiting for each other, so that she could go over the correct answers with them. Kelly had one of the boys explain each problem so that each one would be responsible for two problems. Mathematics instruction concluded at the end of this small group rotation. The entire time that Kelly was working with small groups; there was always one group that was sitting at their seats working in the math textbook. Student after student came to Kelly while she was in the small group asking for assistance in completing the math book pages. Her response was always for them to do their best and work with each other, and she asked them to return to their seat. Kelly explained that she “did not ever pick the math textbook pages” (PST interview week five); Mrs. Mills did. Kelly said that she thought Mrs. Mills “just opens the book and picks them” (PST observation week five). Kelly said that she had not picked the page and had not seen it until the students began asking questions about it.

During the weekly interview, Kelly discussed an assessment that she had graded earlier in the week. The test was on converting units within the metric system, which Kelly had taught for the previous two weeks. Kelly explained that more than half the class had failed the test, and a few of the students had actually scored a zero with no questions right at all. Kelly said that she was going to use the test questions for small-group instruction the following week, and then the students were going to retake the test.

**Week five interpretation.** Although Kelly expressed that she was more confident in geometry because it was “just shapes”, it appeared to me that Kelly’s struggles with this lesson mirrored those of other weeks as she didn’t know the meanings of all vocabulary words, made up questions to ask the students as she taught the lesson, and did not have any answer key to check
students’ answers to small group problems (PST interview week six). Kelly said that she was not as prepared for this lesson as she could have been because she was not supposed to teach this lesson, and so she had not helped plan for it. Kelly struggled with some of the vocabulary words, so Mrs. Mills stepped in to help the students understand the meanings of the words. I observed that most of the questions Kelly asked were simple, asking for meanings or an answer to a problem. But at one point in the lesson, she asked a higher order thinking question about two similar triangles. It seemed that when Kelly got uncomfortable or did not know an answer to something, she just moved on to the next part of the lesson. Sometimes that meant leaving students’ questions unanswered. In small groups, Kelly continued to focus on algorithms and procedures, making few connections with mathematical concepts. In my view, this was probably due to her comfort with the algorithms and procedures, not the mathematical concepts. It was evident in the mathematics assessment Kelly administered that the students were lacking in conceptual knowledge when it came to the metric system, as many of the students failed the test. However, the fact that Kelly planned to reteach the metric system in small groups and then retest the students without any thought as to her lack of understanding, reflection, and responsibility indicated to me that she seemed to be confused as to the central role of a teacher and teaching in general.

**Week Six**

The lesson this week was also observed by the college supervisor, Mrs. Perez, as one of four evaluated observations. Since the college supervisor was doing an evaluation, Kelly was required to complete the lesson plan in the college template format. Although Kelly was asked to give the completed lesson plan to Mrs. Perez a few days in advance so that feedback could be
provided, Kelly had not done so. Instead, Kelly handed a copy to both Mrs. Perez and me as we entered the classroom. Kelly completed all the sections of the plan including instruction, guided practice, differentiated instruction, and formative assessments. However, the completed sections still lacked detail and understanding of the content. For example, Kelly constructed questions and listed them in the guided practice section, but she seemed confused on the difference between two and three dimensional shapes. One question was “Is it possible to find the volume of a square if all you know is the length, which is four feet?” (lesson plan week six).

The lesson was on volume, and the standard was to “recognize volume as an attribute of solid figures and understand concepts of volume measurement” (lesson plan week six). Kelly started the lesson by asking about the “attributes of three-dimensional shapes” (observation notes week six). One of the students said that length times width times height was an attribute (observation notes week six). Kelly confirmed that this was the right answer and then asked what the final unit would be if “I’m multiplying three different numbers” (observation notes week six). A student replied, “Cubes” (observation notes week six). Kelly again confirmed that the student was correct. She continued to ask about the attributes of three-dimensional shapes. One of the boys raised his hand and asked if he could use a tissue box as a prop. He stood in front of the class, using the tissue box, and described the box using the words “faces” and “edges” (observation notes week six). Kelly joined him at the front of the room and asked the rest of the class to guess the measurements for the length, height, and width of the tissue box. One of the students declared that the tissue box looked like it was “seven inches in length, two inches high, and four inches wide” (observation notes week six). Kelly asked the students to multiply those numbers in order to get the volume. Kelly explained that she did not have the students actually
measure the tissue box because she felt rushed as the whole-group lesson is “only supposed to be 20 minutes long” (PST interview week six).

After it was confirmed that the volume of the tissue box would be 56 in³, Kelly asked the students what they thought volume was (observation notes week six). The same boy who demonstrated with the tissue box said that he thought volume was density or mass. Kelly replied, “So, weight?” (observation notes week six). One of the other boys added that it was how much “space an object takes up” (observation notes week six). Kelly did not acknowledge the boy’s answer, but instead told the class to think of a problem in teams, write it down, and then they would “share” (observation notes week six). While the students were discussing and creating their group problem, Kelly turned to the board and began writing her own problem. She wrote, “Ms. Smith is building a fort from cardboard boxes. The length is two, the height is three, and the width is two. What is the volume?” (observation notes week six). The students quickly came up with the answer of 12, and Kelly asked for volunteers to share their group problems.

A boy volunteered his group’s problem and said that they have a box that is a square with the one side that measures four feet. He asked the others in the class to solve for the volume. Kelly asked if they could find the volume of a square and reminded the class that all the sides of the square are the same length. This caused some confusion within the class with some students saying that a square could be used in finding volume and some saying that it could not. Kelly explained to the students that if they know the length of one side of a square, they should know all three lengths. She turned to the board and wrote, “4 X 4 X 4” (observation notes week six). Kelly explained that an example of finding the volume of a square would be finding the volume of a trailer. She asked the students to find the volume of a trailer that measured 12’ x 4’ x 10’. She used the powers of ten in her multiplication example by first multiplying 12 times four to get
48, and then multiplying by ten to the first power to get the answer of 480 ft³. The students did not question finding the volume of a square anymore, so Kelly moved to another group to share the problem they created. Kelly later explained, “I confused a square and a cube” (PST interview week six). However, the question was included in her lesson plan as “square” (lesson plan week six).

Kelly asked for another example from a group and one of the group members said that their group discussed measuring a table that was 4” x 5” x 8”. Kelly instructed the class to figure out the volume of the table. After the students multiplied the three numbers together, Kelly asked for one more group to share. The group said that they discussed a large swimming pool that measured 56’ x 7’ x 7’. Kelly told them that it would be a very large pool and then turned to the class asking if everyone was “getting this” because this was “pretty easy stuff!” (observation notes week six). To conclude the whole group lesson, Kelly asked the students to brainstorm things around the classroom in which they could find volume. The students called out objects such as the file cabinet, trashcan, box of books, and the inside of a desk. Kelly then transitioned to a hands-on activity for learning about volume.

Kelly told the students that they were going to build their own three dimensional object and find the volume. She handed each group a large bag of connecting blocks and told the students to each reach in the bag and grab a handful of blocks to make their three-dimensional shape so they could find the volume of it. There were no specific directions about the kind of three-dimensional shape the students needed to make. The students began to connect the cubes to make various three-dimensional shapes and were sharing the shapes with each other so the noise level began to increase. Kelly seemed a little uncomfortable with this as she walked around the room looking at the various shapes that the students had made. The students did not seem to
make the connection as to the type of three-dimensional shape that would work best in finding volume. There were various shapes including one that looked like a capital L and one that looked like a tall tower. After giving the students time to make their three-dimensional shapes, but giving little constructive feedback as to what type of shape they should make, Kelly called the class to order to share their three-dimensional shapes.

Kelly first called on a young girl to show her tall tower style three-dimensional shape and asked her what the length, width, and height would be. The girl seemed confused so Kelly walked over to her, took the shape, and said that the three dimensions would be 1 by 1 by 20. The class began talking to each other about to the tower and about their own three-dimensional shapes. Kelly told them that they needed to pay attention or she would “take the blocks away” (observation notes week six). Kelly then turned to a boy who had created a flat shape of 16 connected cubes in a 4 x 4 pattern. She asked the boy what the volume of his shape would be. He also seemed confused, so Kelly took his shape and said the three dimensions would be 4 x 4 x 1. However, one of the teams created a cube and asked to share their explanation. Kelly asked a boy to come to the front of the room and explain the three dimensions of the cube. The boy talked about the length and the height of the cube but struggled with the width. Kelly helped him with the number and told him that he did a good job in his explanation.

Kelly instructed the students to put the cubes back in the bags as they would be transitioning to something else. There was no connection at all made between how many blocks were used in the three-dimensional shape and volume. Kelly later explained that she did not make the connection between volume and how many connecting cubes were used until the conference with Mrs. Perez (PST interview week six). “I didn’t even know that the volume of the cube would be the number of blocks in the cube. I had no idea,” Kelly stated. Kelly then
turned to Mrs. Mills and told her that she was finished with the lesson. She did this because she knew that Mrs. Perez wanted to conference with her discussing both strengths and weaknesses of the lesson.

During the time the students were sharing the three-dimensional shapes they had made, Mrs. Perez, the college supervisor, walked over to Mrs. Mills and had a short conversation. At the end of Kelly’s lesson, Mrs. Perez took her things and walked out of the room while Kelly walked over to the desk where Mrs. Mills was standing. Mrs. Mills whispered a few things to Kelly, and the look on Kelly’s face became sullen. Kelly later explained that Mrs. Mills told her that Mrs. Perez was trying to find things that she was “bad at” (PST interview week six) and wanted to know what areas Kelly needed to work on. Kelly said that the conversation she had with Mrs. Mills “changed my whole mindset” (PST interview week six) and made her feel like her lesson was a failure. Kelly picked up the things she needed for the post conference and walked out the door.

In the post conference, Kelly was exceptionally quiet telling Mrs. Perez that she felt like her lesson went well. Mrs. Perez directed the conversation to the student whose group made the three-dimensional cube as he attempted to explain how to find volume to the class. She said that the boy seemed confused about the measurements. Mrs. Perez used the example, “well this is the length and this is the height and this is um….” (PST and CS post conference week six). Mrs. Perez said that the boy hesitated because he had not “necessarily understood the concept of width” (PST and CS post conference week six). Kelly replied that the boy did not know width, which is how wide something is (PST and CS post conference week six). Mrs. Perez explained that it was not the measurement that he did not understand, but he did not even understand “what width is” (PST and CS post conference week six). Mrs. Perez went on to explain that the
students were able to multiply, but the lesson was not about multiplication; it was supposed to be about the concept of volume. Kelly explained that the connecting cube activity was to help them with the concept. Mrs. Perez continued to explain to Kelly that the students had not grasped the concept of volume because there were no connections made between the amount of cubes in the three-dimensional shape and volume. During the conversation, Kelly seemed down and did not make much eye contact with Mrs. Perez.

Mrs. Perez tried not to concentrate on the negative aspects of the lesson, but gave Kelly positive points as well. The positive pieces of the lesson seemed to focus more on management than content instruction. Mrs. Perez encouraged Kelly to teach herself the concepts of the mathematics before she attempted to teach them to the students. She also encouraged her to ask other teachers, including her cooperating teacher, for help in understanding mathematical concepts. Mrs. Perez said that every teacher needs to continue to learn and grow. Despite the encouragement from Mrs. Perez, Kelly finally broke down and cried. Added to her stress was the full-time substitute position that she had been offered and feeling like she “couldn’t back out of it” (PST and CS post conference week six).

**Week six interpretation.** Kelly seemed stressed this week probably because she was being observed and evaluated by the college supervisor, Mrs. Perez. Kelly’s lack of conceptual knowledge of volume showed as the lesson on volume was not conceptual but procedural. Kelly concentrated on the students’ learning length times width times height, or how to find volume, instead of the meaning of volume. Being that Kelly was already stressed about the lesson, the conversation she had with Mrs. Mills did not help the situation. Mrs. Mills seemed to think that Mrs. Perez was stressing the negative aspects of Kelly’s teaching. Neither Kelly nor Mrs. Mills seemed to view identifying problems of practice as something teachers do to improve their own
teaching. Instead, they framed identifying problems of practice as negative. When Kelly met with Mrs. Perez for the post conference, she seemed extremely down and eventually broke down and cried. Mrs. Perez gave Kelly feedback, stressing the importance of teaching the concept as well as the formula of volume and tried to assure Kelly that her role was to support Kelly in learning how to be an effective teacher.

**Week Seven**

This week was Kelly’s last official week of her internship as she had accepted a full-time substitute position in another grade level at the same school. This lesson was also observed by the college supervisor as it was the final lesson of four that the supervisor evaluated during the semester. Kelly again used the college lesson plan template, but this time she gave the lesson plan to Mrs. Perez about two days in advance and Mrs. Perez gave feedback to Kelly. Mrs. Perez’s feedback included using visuals to support the vocabulary instruction used to activate the lesson, written discussion questions, and helping Kelly design an engaging activity focused on learning the concept of volume.

The lesson this week was on volume and focused on the question “How can I measure volume using cubic units?” (observation notes week seven). To begin the lesson Kelly asked the students to do the normal prediction to the lesson essential question. The students referred to the formula length times width times height as their answer. Kelly explained that volume “takes up space” (observation notes week seven). She picked up a cube that she made before the lesson started and asked the students to look at it as she held it up. She asked for the dimensions of the three-dimensional shape. One student answered, “4 x 4 x 3” (observation notes week seven). Kelly confirmed that he was correct and helped the students reach the answer of 48. Then she asked how many connecting cubes the students thought were in the shape. The students began to
talk to one another, and a few of them answered that it must be 48. Kelly took the connecting cubes apart and showed the students that there were indeed 48 cubes in the three-dimensional shape, and that the formula of length times width times height helped them to figure out the volume. Kelly had the students review by asking them to talk with a partner and explain what volume meant. She walked around and listened to their responses, guiding them to the answer of volume is “how much space something takes up or how much can fit inside” (observation notes week seven).

To further review the concept of volume, Kelly created a PowerPoint that she went through as she reviewed the concept of volume. Kelly reasoned that she thought the PowerPoint helped the students be more engaged and “get them involved in the lesson” (PST interview week seven). One of the slides asked a question about where one might use “real world” (observation notes week seven). Kelly led a discussion and solicited answers such as filling a pool with water and building a house.

After the PowerPoint, Kelly told the students that they were going to participate in group activities finding the volume of a granola bar box, but they were not allowed to open the box. Prior to the class, Kelly opened each granola bar box and removed one granola bar package. She then sealed the box and, using a marker, blacked out anywhere that the students could read how many granola bar packages were in the box. She instructed the students that as a group they were to find how many granola bar packages would fit in the box. She told them that they could use any method they preferred, but she would provide them with a ruler in case they wanted to use it. As Kelly walked around the room to check on each group she kept reiterating that the students were to find the volume of the box. After about 15 minutes, she asked the students to be prepared to share their answers as a group.
Kelly called on several teams to share how many granola-bar packages they thought would fit in the box and to explain how they arrived at that answer. All of the teams used the ruler to measure both the package and the box; however, no team arrived at the same final answer for either the number of packages or the volume of the box. Kelly chose one team’s example to do on the board for the rest of the class. The numbers were very large and the final problem was 931÷35. Despite the answer to 931÷35 being 26.6, the group said that they estimated that 12 granola bar packages would fit in the granola bar box. Kelly accepted their answer of 12 and allowed the students to open the box to count the number of actual packages in the box. Kelly later explained that she did not know why she failed to ask the group how they had reached the answer of 12 (PST interview week seven). “I think they just guessed,” Kelly stated (PST interview week seven). The answer was indeed 12. Kelly told the students to put the granola packages back into the box, and they would be able to have them later in the day for a snack. She turned the class over to Mrs. Mills and followed Mrs. Perez out of the room for the post conference.

In the post conference, Kelly said that she thought this week’s lesson went better than last week because she felt more comfortable, and “more prepared since I planned it out like five days in advance” (PST and CS post conference week seven). Mrs. Perez agreed and said that she thought it was a very good lesson that involved problem-solving and engagement. Mrs. Perez and Kelly discussed the points of the lesson that were strong and those that Kelly needed to continue to work on. Mrs. Perez focused on the fact that Kelly spent a lot of time planning this lesson and it really showed. She commented that the lesson was much stronger than the last lesson “because I think you spent more time in the planning process” (PST and CS post conference week seven). Mrs. Perez discussed what the next day’s lesson might look like as
Kelly continued to teach the concept of volume. Mrs. Perez suggested starting with an activator and “say, ‘use numbers, pictures, and words and explain to me what volume is.’ Not ‘how do I find it’ but ‘what is it’” (PST and CS post conference week seven). The post conference closed with Mrs. Perez and Kelly discussing Kelly’s first days as a substitute teacher in a new classroom and what they might be like. Mrs. Perez offered to help Kelly set up the classroom and make it her own.

**Week seven interpretation.** In my view, Kelly’s lesson this week was much different than in weeks past. Mrs. Perez said that Kelly had sent her lesson plan to her several days in advance, and Mrs. Perez had been able to provide feedback that helped Kelly develop a thorough plan. Kelly’s lesson was on volume again, as the students had been working on it for about a week. She designed the lesson to concentrate on the concept of volume by having the students find ways to figure out how many granola-bar packages would fit inside of a granola-bar box. Although this was a great activity, it seemed to me that both Kelly and the students seemed to fall back on the procedure of multiplying length times width times height. Kelly admitted that this was probably due to her focus on the procedure with the students for so long. When Kelly asked the groups to share their estimations of how many granola-bar packages would fit into the granola-bar box, she worked through the division problem with the students; but when the answer was not reasonable, she did not know what to say so she just moved onto the next part of the lesson. This seemed to be a habit that she had formed due to her lack of pedagogical content knowledge. The post conference with Kelly and Mrs. Perez was different from the previous week’s conference. Kelly was upbeat and felt that her lesson was a success, and Mrs. Perez agreed with her. Mrs. Perez stressed that the reason why the lesson was better was because Kelly had spent more time in the planning process. Mrs. Perez’s suggestions for future lessons, both in
this classroom and in Kelly’s classroom as a new full-time substitute, gave Kelly ideas for effective mathematics teaching.

**Week Eight**

This was Kelly’s first week as a full-time substitute in a fourth-grade self-contained classroom. There was no observation this week because of state testing and, for the most part, Kelly did not do much teaching. When her students were testing, the principal was in the classroom acting as the Proctor for the test. Kelly said that the students were well behaved at those times, and they seemed to be focused on the test. However, when she was alone in the classroom with the students, it was a different story. Kelly’s strength through her entire internship, by her own admission as well as others, was classroom management. Yet, classroom management was her struggle this week. She later said that she was the seventh teacher that this fourth-grade class had had this year. Kelly said that she felt like she was “failing” the students (audio journal week eight). She said that she was trying to implement a rewards program and give the students incentives and tell them how much she believed in them, but she said they “just don’t care” (audio journal week eight). Kelly stated that one of the students kicked her and told her that she was not a “real teacher” (audio journal week eight). She said that it was frustrating to “go from a class where my kids are great to a class where there’s just no control, no structure” (audio journal week eight). Kelly also expressed frustration because it she felt like the students were low in mathematics. She expressed that she felt overwhelmed; yet, she had only just begun.

**Week eight interpretation.** In my opinion, Kelly’s frustration this week came partly due to classroom management having been her strength throughout the internship. Yet, she could not seem to get control of the fourth-grade class. She wanted them to believe that she cared about
them, but she was their seventh teacher that year. Kelly did not mention instruction or learning at all, but just wanted to get control of the class.

**Week Nine**

This was my first time observing Kelly in her own classroom. The lesson plan was the same brief plan that she used during her internship; however, she wrote a few more details in a spiral notebook as a reference for herself. She explained that as she wrote out the plans in the notebook, she thought through the lesson ahead of time. The details in the notebook were not content related, but included management practices that she wanted to include in the lesson such as passing out mathematics textbooks. The math lesson was much shorter than the lessons during the internship, partly because this was not a departmentalized situation. Kelly began the math lesson with “What’s my place, what’s my value?” and then moved to measuring angles using protractors (PST observation notes week nine). The mathematics lesson was constantly interrupted by students who were talking, yelling across the room, and getting out of their seat. Kelly addressed the inappropriate behaviors throughout the lesson, which caused the lesson to be choppy and disjointed.

Kelly posted a Frayer-model graphic organizer on the screen which had places for expanded form, numbers only, even or odd, standard number, and rounded number. She called on a student to make up a number, and together they wrote 11,476. This was put in the center of the graphic organizer as the standard number. The students then took about four minutes to fill in the rest of the graphic organizer on their own in their notebooks. When that was completed, Kelly went over the organizer explaining that “numbers only” meant to write it in words (observation notes week nine). When Kelly wrote the number in expanded form, she wrote 11,000 instead of 10,000+1000. Kelly later admitted that she knew she had messed up when
teaching this, but was confused about the process of rounding (PST interview week nine).

“That’s so weird that you leave it (the digit) the same because I didn’t learn it like that,” Kelly stated (PST interview week 9). When talking about rounding the number to the nearest thousands, she asked the students if they should round up or down. She asked the students to look at the number four and because it was not a five or higher, they were to round down. She told them that the answer would be 10,000. One of the students asked why the number did not stay 11,000. Kelly paused for a moment and then said that the answer could be 10,000 or 11,000. The student gave a saying that a previous teacher had told her, “five and above - give it a shove; four and below - let it go” (PST observation notes week nine).

From there, the lesson moved to measuring angles with a protractor. Kelly earlier explained that she did not have protractors for her class and did not know where they were kept for the grade level. She was the only fourth-grade teacher at school on that day so she did not know who to ask. She said they would just use the protractor that came on the Smart board. Kelly used the Smart-board lesson that was provided by the textbook publishing company and asked the students to open their books to follow along. However, the lesson was a little different than was in the book so the students seemed confused and had a difficult time following along.

The first angle the students were to measure together was an obtuse angle. When Kelly asked a student to look at the protractor to see how many degrees it was, the student answered “60°.” Kelly wrote this on the board and then asked the students to look at the bottom of the protractor for the degree number. They all said 180°. She proceeded to subtract 60° from 180° and wrote the answer 120° for the angle. Although this was not the easiest method to use, the students did not question her. She proceeded to go through a few more problems together with the students using the protractor on the board. The measurements were not precise due to Kelly
not lining the protractor up with the vertex on the angle. Kelly later said that she knew that she had not lined the protractor up right with some of the angles “because I was so flustered” (PST interview week nine). She said that she tended to “overcomplicate the problems that I don’t understand” (PST interview week nine).

The last problem was a word problem about someone in a wheelchair needing to build a ramp to enter their home. The ramp needed a 5° angle for the wheelchair to roll easily. Kelly drew a ramp on the board and then measured the drawn ramp using the protractor that she used for earlier problems. The angle on the ramp measured 30°. She then focused on how many degrees were needed to adjust the ramp to make it 5°. The entire focus of the problem turned to subtraction. The students talked about it with their partners and then came up with a solution of subtracting five from 30, which would leave them with 25. It was apparent that the students thought the answer to the problem was 25°, when the problem actually asked them to draw an angle of 5°. The students did not draw an angle of any kind.

Kelly ended the whole group lesson by reviewing measuring angles using fractions. She set up a proportion with \(\frac{2}{4} = \frac{x}{360}\). Together she led the students to the answer of 180°. Kelly never made the connection of \(\frac{2}{4}\) and \(\frac{180}{360}\) being equal to half of a circle. She ended the math lesson by having the students turn in their math workbooks and complete a set of workbook pages with a shoulder partner.

**Week nine interpretation.** Kelly’s frustration in her inability to manage the classroom was evident to me. It seemed to affect her confidence in her ability to both teach and manage the classroom. At times, she got upset with the students and just stood quietly at the board waiting for them to listen to her. In addition, planning still seemed to be an issue. The graphic organizer that Kelly used to begin the lesson was borrowed from another teacher, and Kelly did not quite
understand how to use it. In addition, Kelly did not have any protractors for the students to use in measuring angles. The only student that was able to practice with a protractor was the one who happened to be solving one of the example problems as Kelly worked through them. In my observation, the lack of engagement in the lesson was definitely a contributing factor to the students’ misbehavior.

**Week Ten**

This week, Kelly’s class looked like a different class. They were all seated in their seats and raising their hands when they wanted to speak. When a student forgot to raise his or her hand, another student would remind him or her. Kelly said that her frustration in managing the classroom brought her to talk to a few other teachers and one of her former professors. She implemented a suggestion of using a classroom “scoreboard” and providing incentives to the students such as ten minutes of free time at the end of the day or some sort of snack that she would provide (PST interview week ten). It was obvious that the scoreboard was working. Kelly’s lesson flowed smoothly due to fewer interruptions. The lesson plan was the same brief plan it had been for several weeks with little detail and no supporting content, questions, or worked examples. The lesson essential question was “How can I multiply multi-digit numbers?” (observation notes week ten). Kelly asked the students to take out their notebooks and write a prediction as to how they could multiply multi-digit numbers. The students had a hard time describing multiplication other than “you just multiply the numbers together” (observation notes week ten).

After the students shared their predictions, Kelly taught them how to use the “area model” to multiply a two-digit number times a two-digit number. Kelly shared later that until she used the textbook to prepare for the lesson, she had “never multiplied using a model” (PST
interview week ten). Kelly practiced several problems on the board as the students copied them into their notebooks. Kelly later explained that using the teacher's edition of the textbook provided the support she needed to learn how to do the area model before teaching it. Kelly explained, “I think that using the math book makes it easier to teach math because there are examples to look at” (PST interview week ten).

Kelly continued the lesson by asking the students to work in partners and complete several problems together using the area model. As the students worked in pairs, Kelly walked around the room and assisted them with any problems they had. After about 15 minutes, Kelly returned to the front of the room and asked the students for the answers to the problems they had worked. When there was a question about one of the problems, Kelly stopped and worked the problem on the board for the students. Kelly closed the lesson by assigning four problems from the textbook for the students to work on individually.

**Week ten interpretation.** In my opinion, the difference between the previous week’s lesson and this week’s lesson was like night and day. Kelly was much more confident, partly because she was again in control of the classroom, and partly because she seemed to know how to solve the problems enough to teach the students and answer their questions. Kelly said that she used the teacher’s edition of the mathematics textbook to help her prepare for the lesson. This was something that she had not been allowed to do during her internship. Mrs. Mills had told Kelly that she was not to use the teacher’s edition of the textbook during the internship because it didn’t cover the standards well. It was obvious to me that Kelly needed the support and that it helped her prepare for this lesson. Kelly’s confidence with both classroom management and the mathematics content was apparent. In my view, her presence in the classroom was much stronger, and the students responded positively to her.
Summary

For most of the ten-week observation period, Kelly’s classroom management was her strength. However, it masked her difficulties with the mathematics content and pedagogical practices. Because the students were well behaved and responded to the classroom management strategies she used, anyone walking into the classroom would immediately think that Kelly was a good teacher. In reality, she was a great classroom manager, but lacked the mathematical understanding, reflection, and responsibility of complete planning required for effective teaching. However, neither her cooperating teacher nor the college supervisor required her to consistently create detailed lesson plans demonstrating her own understanding of the mathematics topic or pedagogical practices being used. In addition, Kelly was not taught how to be a reflective teacher. With minor exceptions during the interviews, Kelly did not reflect on her lessons and how she could improve as a teacher. She knew the students did not completely understand the mathematics lessons she taught; however, she did not take full responsibility for student learning because she didn’t fully understand her role as the teacher. However, on her own, somewhere between weeks nine and ten, Kelly reflected upon her classroom management and made changes that resulted in positive differences in student behavior. Kelly seemed to be able to see the changes that needed to take place with classroom management, but not with mathematics instruction. Without Mrs. Mills or Mrs. Perez requiring Kelly to reflect upon lack of content knowledge and mathematics instruction, Kelly remained unaware that her own lack of knowledge and ineffective mathematics instruction impacted learning of the students in her classroom. Many of Kelly’s actions, or behaviors, during the internship impacted her delivery of mathematics instruction and more than likely her students’ learning.
Table 5 illustrates some of the behaviors that got in the way of Kelly's instruction and possibly her students' learning. The behaviors were connected to planning issues, mathematics content deficiencies, lack of transfer from methods course, lack of reflection, and pedagogy issues.

Table 5.

**Summary of Behaviors that Impacted Kelly’s Implementation of Mathematics Instruction.**

<table>
<thead>
<tr>
<th>Week</th>
<th>Planning Issues</th>
<th>Math Content Deficiencies</th>
<th>Lack of transfer from methods course</th>
<th>Lacking Reflection</th>
<th>Pedagogy Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Only grade level planning on brief template, no answer key for small groups</td>
<td>Simplifying fractions, using mathematics vocabulary</td>
<td>Student engagement of a “fun” activity but no real student learning (hallway line plot)</td>
<td>No reflection, Kelly did not understand that her difficulty in teaching the lesson was a direct result of lack of planning</td>
<td>No planned questions to use with whole group learning activity</td>
</tr>
<tr>
<td>2</td>
<td>Brief template only including vocabulary words, link to a video, &amp; link to a website</td>
<td>Confusion between a coordinate plane &amp; a line graph; How to find the distance between two points on a coordinate plane; Kelly asked students to explain how they solved the problems so that she would learn how to solve them as well</td>
<td>Only asking low level questions (give coordinate points)</td>
<td>No reflection, Kelly did not seem to see that her own lack of understanding impacted her mathematics instruction</td>
<td>Video was used to teach coordinate graphing that exceeding the scope of the objective</td>
</tr>
<tr>
<td>3</td>
<td>Brief template including only a whole group activity of a link to a video; No answer key for small group problems</td>
<td>Kelly did not understand the relative size of linear metric units &amp; mixed metric &amp; customary units together; She also did not know where to place the decimal in an addition problem.</td>
<td>Accepting all answers &amp; not addressing misconceptions; Creating an engaging activity with no real learning objectives; using student created questions as higher order thinking</td>
<td>Brief reflection during the interview when Kelly stated that the students made no connections between the motion &amp; the relative size because she did not tell them that the motion indicated the size of the unit</td>
<td>Failed to connect symbols for measurements to the relative of the measurement units</td>
</tr>
<tr>
<td>Week</td>
<td>Planning Issues</td>
<td>Math Content Deficiencies</td>
<td>Lack of transfer from methods course</td>
<td>Lacking Reflection</td>
<td>Pedagogy Issues</td>
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<tr>
<td>4</td>
<td>More detailed plan in response to the principal’s request of more “rigor”;</td>
<td>Did not understand zeros in the quotient when doing an example of a division problem for the students; Read 0.264 as two &amp; 64 thousandths</td>
<td>Student engagement of a “fun” activity but no real student learning (weighing ice cream before &amp; after adding toppings &amp; converting from ounces to pounds); No use of manipulatives to understand metric or customary measurement</td>
<td>Brief reflection during the interview as to how Kelly could have helped the students make the connection between converting within metric units &amp; powers of ten</td>
<td>Poor transition between metric conversions within units and powers of ten resulted in no connection between the two; no assistance given to students as they struggled with converting ounces to pounds</td>
</tr>
<tr>
<td>5</td>
<td>No lesson plan – Kelly said that she didn’t plan this lesson because she wasn’t supposed to teach it. No answer key for problems</td>
<td>Kelly thought that a trapezoid was a rectangle; She did not know the definitions of reflexive angle or rotational symmetry;</td>
<td>Accepting all answers as correct without addressing misconceptions; Focus on algorithms &amp; procedures with few connections to mathematical concepts</td>
<td>Lack of reflection as to why the students did so poorly on the mathematics test contributed to Kelly not taking responsibility for student learning</td>
<td>No assistance given to students as they struggled with the mathematics textbook pages</td>
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<td>6</td>
<td>Kelly used the college lesson plan template which provided more detail, but the plan still lacked proof of understanding of the content (What is the volume of a square?)</td>
<td>Kelly explained how to find the volume of a square to the students.</td>
<td>Using manipulatives for fun but failing to provide direction for the students to understand how to use them in such a way that would lead to understanding;</td>
<td>In the post conference, Mrs. Perez led Kelly to reflect upon the use of the connecting cubes; Kelly did no reflection on her own</td>
<td>Kelly provided little constructive feedback to students as they constructed three dimensional shapes for finding volume. This resulted in various shapes which did not lead to student understanding</td>
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<td>7</td>
<td>Mrs. Perez &amp; Kelly worked together to plan this week’s lesson. The plan was much more detailed &amp; led to effective pedagogical practices.</td>
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<td>8</td>
<td>No observation or interview due to testing week</td>
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Table 5 (continued)

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<td>9</td>
<td>Brief template much like weeks 1-3 of the study. Only an activator &amp; whole group activity was listed with no details or questions to be asked.</td>
<td>Confusion on how to measure angles using a protractor; Didn’t seem to understand how to round numbers</td>
<td>Lesson lacked student engagement as students sat in their seats watching Kelly measure angles using a protractor on the board; Kelly tried to teach how to measure using protractors without the students actually using protractors – Smart board was used.</td>
<td>No reflection; although Kelly stated that she knew that the lack of protractors was a problem, she didn’t seem to realize that it impacted student learning of the concept of measuring angles.</td>
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| 10 | Brief plan; however Kelly referred to the teacher’s edition throughout the lesson for support in teaching area models for multiplication | Some reflection about management - Kelly stated she thought about the previous weeks’ management & knew she needed to improve so she implemented some elements of whole brain teaching that helped the overall discipline of the classroom. |   |   |   |

Throughout the internship, Kelly had difficulty developing as a teacher for several reasons: lack of observation of effective lesson implementation, lack of lesson planning, lack of mentoring from the cooperating teacher, lack of consistent supervision from the supervisor, lack of reflection, lack of responsibility, and lack of transfer of what she learned in the mathematics methods course to the classroom. Because Mrs. Mills turned the classroom over to Kelly in the second week of the internship, Kelly did not have many opportunities to observe Mrs. Mills teaching mathematics lessons. If Kelly would have been able to spend time observing Mrs. Mills and discussing effective teaching practices with her, it may have helped Kelly deliver more effective instruction. In addition, the grade level teachers completed basic mathematics plans together for a month in advance. This impacted Kelly in several ways. First, the plan was very basic, with lists of ‘what to do’ for whole group and small group activities. The basic plan gave
Kelly the false impression that that was all she needed to effectively teach the mathematics lessons. Second, Mrs. Mills did not take the time to sit down and plan with Kelly in detail because Kelly and she planned with the grade level. It appeared that Mrs. Mills did not see the need for detailed lesson planning with Kelly. Also, Mrs. Mills did not take daily opportunities to debrief with Kelly, discussing her strengths and weaknesses of the day. It appeared as if Mrs. Mills thought her main role was to encourage Kelly, but the lack of instructional direction Mrs. Mills gave Kelly impacted Kelly’s development as a teacher.

In addition, inconsistent supervision from the college supervisor added to Kelly’s problems with delivering effective mathematics instruction. Mrs. Perez completed four formal evaluations of Kelly’s teaching during short eleven week internship. Although Mrs. Perez visited Kelly a few other times, Kelly needed an instructional coach to help her learn the content and pedagogical practices in order to effectively teach the mathematics lessons. Neither Mrs. Mills nor Mrs. Perez filled the role of instructional coach for Kelly. Also, neither teacher encouraged Kelly to reflect upon her teaching on a daily basis. The lack of reflection inhibited Kelly from making the connection that her lack of content knowledge, deficiency in planning, and ineffective strategies teaching resulted in student misconceptions and misunderstandings.

Although Kelly knew the students had difficulty understanding mathematics concepts and skills, she didn’t take responsibility that their lack of learning was due to her lack of content knowledge, poor planning, and use of effective teaching strategies. When Kelly took the mathematics methods course a year before, she was taught to know the content in-depth, write detailed lesson plans, use manipulatives for conceptual understanding, and anticipate possible misconceptions so that, as the teacher, she could address and confusion students might have. However, Kelly failed to transfer what she learned in the mathematics methods course to the
classroom. Her content knowledge, most times, was only surface level, so her understanding was not deep enough to effectively teach the students the mathematics concept connected to the objective. The lesson plans Kelly used were brief and did not contain enough support to ensure effective teaching. The use of manipulatives was sparse and mainly used for student engagement, not learning purposes. Kelly didn’t understand the mathematics she taught enough to either anticipate misconceptions or sometimes to even address them. Instead, she chose to not answer student questions and moved on to the next part of the lesson because she didn’t know how to explain the mathematics to the student. However, even with the planning and instructional issues Kelly had during her internship, she was viewed by many, including the principal, as a good teacher. Kelly’s classroom management was definitely her strength, and anyone who walked into the room was impressed with her classroom organization and management of the students. It seemed as if classroom management was highly valued by everyone at the school and that if someone was a good classroom manager, he/she must also be a good teacher.

However, at the end of the semester when Kelly moved to her own classroom, classroom management proved to be a challenge for her. The first two weeks were a struggle until she reflected on the students’ poor behavior, thought of a way to make changes, and implemented a classroom management plan. Kelly continued to struggle with teaching mathematics although in week ten, she used the teacher’s edition of the textbook to help her learn both the content and pedagogical practices, which helped Kelly, teach a more effective mathematics lesson. The teacher’s edition provided support that Kelly needed in helping her to understand the content and use effective instructional strategies. Although Kelly used the teacher’s edition, she continued to use the brief lesson plan template to write out daily plans. The lesson plans provided so real
support to her; however, she referred to the textbook numerous times during the lesson in week ten for support. Teaching mathematics proved to be a challenge for Kelly both in her internship and as a full-time substitute as she did not fully understand the content of what she tried to teach. Kelly’s lack of detailed planning was also problematic as it continued throughout her internship and into the full-time substitute position.

The preceding "chapters" of Kelly's story set the stage for understanding the findings from this case study by providing a glimpse into the preservice teacher’s weekly mathematics lessons. The following chapter reveals the themes that emerged during data analysis.
CHAPTER FIVE: THEMATIC FINDINGS

This study examined the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she planned and implemented instruction in her final internship. The following chapter represents the thematic findings and descriptions of my own discoveries of the experiences of the preservice teacher in both planning and implemented instruction. Four themes emerged from my data analysis: lack of planning, lack of support, lack of content knowledge, and lack of transfer of knowledge from the mathematics methods course. In this chapter, each theme is situated within the research question that it helped to inform. First, I provide descriptions of the themes using specific events and quotes from the data. Then, I tie specific events and quotes to relevant literature in the field of education, and discuss my discoveries and questions that were raised as a result of data analysis. I conclude the chapter by connecting the thematic findings with mathematics anxiety.

Themes

Research Question One

What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she plans for mathematics instruction during her final internship? As the first two themes emerged, it became apparent lack of planning by the preservice teacher and lack of instructional support by both the cooperating teacher and the college supervisor played significant roles in Kelly’s planning process. The lack of planning and instructional support contributed to the development of lesson plans that were brief, void of essential details, and basically of no real help to the preservice teacher other than a list of things to do.
Lack of planning by the preservice teacher. Kelly stated she did not begin planning until week four of her internship (week two of this study). She explained that the fifth grade teachers met as a grade level and planned for the month. Kelly actually began planning with the grade level in week four of her internship (week two of the study). During the first four weeks, she used the plans created by the grade level team. The lesson plans consisted of the objective standard to be taught and a brief list of things to do; an activator (opening activity), whole group activity, and small group activities (week one, two, three, five lesson plans). All lesson plans included what to do, but no support such as worked examples and questions for the students.

The plans also did not include any mention of differentiated instruction or remediation for students who did not understand what was taught. Some of the plans also included a link to Cpalms (a state website used for resources) or a video link (week two, three, four, five lesson plans). Unfortunately, Kelly seemed to think that the brief lesson plans were all she needed to support her teaching. Even when Kelly started writing the lesson plans on her own, she continued to use the brief lesson plan template used by the grade level team (week four and five lesson plans). The brief lesson plan Kelly used did not have the detailed components of the lesson plan for formal observations; however, Kelly used the brief lesson plan because Mrs. Mills and the fifth grade teachers used the plan. Though the brief plan was used by the experienced teachers, it did not assist Kelly in thinking about content and pedagogical practices. Week four’s plan was more detailed because the principal of the school requested that the plans show more “rigor” (PST interview week four). Several vocabulary words were listed and questions were included in week four’s lesson plan, but Kelly did not refer to the plan or use the questions during the lesson (observation notes week four). Kelly did not refer to the lesson plans
during any of the observed lessons (week one, two, three, four, five, six, seven observation notes) but instead seemed to have the list of “what to do” in her head.

Weeks six and seven were lessons that the college supervisor, Mrs. Perez, evaluated so Kelly was required to use the lesson plan template developed by the school of education at the college where she attended. The college lesson plan contained more details such as instruction, guided practice, differentiated instruction, and formative assessments. Although all parts of the lesson plan were completed, Kelly seemed confused and didn’t address the template components as required. For example, in week six’s plan on volume, Kelly explained the differentiated instruction for the lesson:

Students will be working in teams to create models using connecting cubes. They will then be asked to find the volume once I have demonstrated how to do so. This will give students different ways of looking at volume and how to solve it. It will also benefit different types of learners. (lesson plan week six)

With more explanation, this could have been the guided practice for the lesson. Kelly did not address how she planned to support struggling learners or the disabled student who had trouble using his hands for this activity. Mrs. Perez attempted to provide support in lesson planning with Kelly on the days that she was scheduled for formal observations. However, Mrs. Perez was unable to provide much support as she did not receive Kelly’s lesson plans far enough in advance to offer feedback to her. Mrs. Perez discussed the timeliness of receiving the lesson plans with Kelly, but it was only in week seven that Kelly actually delivered the plan several days in advance so Mrs. Perez could provide feedback.

Kelly provided week seven’s lesson plan to Mrs. Perez two days in advance and the lesson plan appeared more complete which supported Kelly’s instructional delivery. Mrs. Perez
provided feedback to Kelly regarding the lesson plan helping Kelly develop her instruction and guided practice. For example, Kelly described the guided practice:

Students will each be given granola bars and boxes in teams. They will all have the opportunity to find the volume of the box. They will then be able to determine how many granola bars can fit into each box. (lesson plan week seven)

Even though Kelly needed to add more detail to the plan, such as directions for the students, the activity she described was what was used for guided practice during implementation. Kelly also included a few questions to ask the students in week seven’s lesson plan. The questions included: (1) How did you find the volume?; (2) What are the correct units to use and how do you know?; and (3) Is there another way to find volume that you can think of? (lesson plan week seven).

Though the questions may have been worded differently, Kelly planned for questions that helped the students understand the concept of volume.

With the assistance of Mrs. Perez, Kelly’s lesson plan in week seven provided sufficient support to implement an effective lesson on volume. However, the plans for small group instruction did not seem to change during the study. Each week’s lesson plan only contained a list of page numbers or worksheets Kelly did with the students in small groups (week one, two, three, four, five lesson plans). Weeks six and seven did not contain any small group plans, as those were the weeks of Kelly’s formal evaluations with Mrs. Perez and the post conferences were during the time of small groups. Mrs. Mills did small-group instruction while Kelly conferenced with Mrs. Perez. Lesson plans for small-group instruction were always a set of problems (algorithms) that students completed and explained to each other. Kelly did not plan in advance for the problems and did not have answer keys most weeks. She relied on the students to
explain the problems correctly to each other. When they were unable to do so, she either worked on the problem with the students or Mrs. Mills stepped in to explain how to do the problem.

**Relevant literature connections.** Lesson plans are an important part of teaching as they reflect teachers’ thinking about how a lesson should be taught (Clark & Yinger, 1987; Remillard, 1999; Stein, Remillard, & Smith, 2007). In addition, the quality of lesson plans closely relates to classroom instruction (Burns & Lash, 1988; Stein, Remillard & Smith, 2007). As a part of teacher education programs, preservice teachers learn to write lesson plans. However, when in K-12 classroom settings, preservice teachers sometimes find that their cooperating teachers do not write quality, detailed lesson plans. Many times this is due to experienced teachers having already developed the expert practices needed for effective teaching. Therefore, experienced teachers may not write detailed lesson plans, but enact the details within their lessons, nonetheless. Borko, Eisenhart, Brown, et al. (1992) posit:

Expert teachers plan more in their heads than do novices, using self-created mental scripts to guide the direction of their lessons. They also plan more quickly and efficiently than novices because they are able to combine information from existing schemata to fit the particulars of a given lesson. Novices, in contrast, often have to develop, or at least modify and elaborate, their available schemata. Novices’ schemata for pedagogical content knowledge seem particularly limited. Whereas experts’ schemata include stores of powerful explanations, demonstrations, and examples for representing the subject matter to students, novices must develop these representations as part of the planning process for each lesson. Further, because their pedagogical reasoning skills are less developed than experts’, this planning, itself, is often inefficiently carried out (p. 213).
Kelly’s use of the brief template used by the more experienced teachers did not allow her to completely think through the lessons and resulted in poorly designed instruction.

When Kelly began her internship, she starting using the brief lesson plans created by the grade level teachers. This lesson plan template did not require Kelly to write specifics for the lessons, nor did it spark any thoughts about content, instructional strategies, or common misconceptions. Kelly’s supervising teacher believed that Kelly was not “comfortable enough with the content to use those simplified plans” (Week three ST interview) that were used by the grade-level team. This is supported by Charalambous’s (2010) postulate that brief outlines cannot adequately prepare teachers to “unfold tasks” during classroom instruction (p. 270).

In addition, Kelly did not plan for questioning or worked examples that would have supported her instruction. Deep questions target underlying principles which contribute to schema acquisition and automation (Roarke & Sweller, 2009) and results in effective learning for students (Chi, Leeuw Chiu, & LaVancher, 1994). According to Ding and Carlson (2013) worked examples are problems with solutions given which serve to facilitate students’ learning. Even though Kelly worked in small groups each day, primarily on algorithmic skills, she did not consistently give example problems, ask questions directed at learning, or work the problems out in advance to prepare herself for student questions, student errors, or even to know the right answer ahead of time. Instead, she relied on individual students to work the problems and explain how to solve them to each other.

In sum, Kelly’s struggled to write lesson plans that provided enough information to support effective instruction. This supported Charalambous’s (2010) finding that preservice teachers sometimes struggle to write effective lesson plans. Kelly did not seem to realize that the brief lesson plan template did not facilitate enough thinking on her part to fully understand what
she was to teach and how she was going to teach it. The college lesson plan that Kelly used in weeks six and seven required more detail but only with the support of the college supervisor in week seven did Kelly actually plan a lesson that contained enough quality information to implement an effective mathematics lesson. Kelly stated that although she knew the lesson plan provided much better support and cause her to “think things through” (PST interview week seven), she commented that it took her a lot of time to complete and she felt like she didn’t have that amount of time to spend on each day’s lesson. The lack of planning time supported Ding and Carlson’s finding that some elementary teachers do not write detailed lessons because of the amount of planning they must do for all lessons. In addition, in Kelly’s mind, she had two lesson plan choices: the brief lesson plan template used by the grade level teachers, and the lengthy college template used for her formal evaluations.

This raises the question of lesson planning in the internship experience. How do preservice teachers effectively plan for lessons with enough detail to support their understanding of both the content and implementation of the lesson using a concise format? Existing research tells us that lesson planning can be difficult for preservice teachers because of their lack of understanding of what should be included in the plan to better support effective teaching (Charalambous, 2010; Ding and Carlson, 2013). However, as preservice teachers take over lesson planning during their final internship, many choose to use brief templates that may not support their lesson planning needs. Preservice teachers need to learn to effectively plan for lessons with enough detail to support their understanding of both the content and implementation of the lesson using a concise format that would fit into their busy schedules.

**Lack of instructional support.** The instructional support Kelly received during her internship experience was not consistent. Although Kelly received some support from both her
cooperating teacher and college supervisor, much of the time Kelly was left on her own and received little instructional support from either Mrs. Mills or Mrs. Perez.

**Cooperating teacher.** Mrs. Mills did not provide consistent instructional lesson plan support to Kelly. Kelly completed the lesson plans on her own using the grade level template provided to her. Since Mrs. Mills was frequently called out of the classroom to attend to other school duties, Kelly said that Mrs. Mills did not always seem to know what she was doing in the classroom “except from what the plans say” (PST week four interview). Mrs. Mills failed to provide instructional support in lesson planning for Kelly and Kelly was not sure if Mrs. Mills even looked at the lesson plans. Kelly stated that Mrs. Mills used the template to enter each day’s standard that was to be covered and Kelly did “everything else” (PST week four interview). Kelly explained that she “ran things by” Mrs. Mills just to make sure Mrs. Mills was aware of what Kelly was doing but Mrs. Mills did not provide instructional support by asking Kelly if she needed help with lesson planning or made any changes to Kelly’s lesson plans (PST interview week four). When Mrs. Mills was asked what type of support she provided Kelly, she explained that she “intervenes” when Kelly needs help and that they “always plan together as a grade level” (CT interview week five). It was obvious that Mrs. Mills’ view of instructional support for lesson planning was very different from what Kelly actually needed. Kelly’s lack of understanding how to plan for effective lessons demonstrated that she required substantive instructional support.

The lack of instructional support from the cooperating teacher contributed to the lack of effective lesson planning that Kelly was able to accomplish during her internship. Many of the content and pedagogical problems that Kelly experienced during mathematics lessons could have been worked out in advance if Mrs. Mills had provided the instructional support for lesson planning that Kelly needed.
**College supervisor.** Another potential arm of instructional support for Kelly was the college supervisor, Mrs. Perez. However, Mrs. Perez did not observe Kelly’s teaching on a consistent basis, and therefore did not provide the amount of instructional support Kelly needed to become an effective mathematics lesson planner and teacher. Although the college only required four formal evaluations, according to Mrs. Perez, she completed several walk-through observations in which she did not formally evaluate Kelly but was able to look at Kelly’s lesson plans and observe her teaching for a short time. Mrs. Perez stated that she was aware of Kelly’s weaknesses in planning, but felt that the relationship between Kelly, Mrs. Mills and herself was not a strong one. Mrs. Perez felt that Mrs. Mills and Kelly did not accept her role of college supervisor as one of assistance and wanting to help Kelly grow as a teacher, but instead as someone who wanted to criticize and look for the negative in whatever Kelly did. Mrs. Mills and Kelly developed a close relationship from a previous field experience and Kelly believed that Mrs. Mills felt the need to “protect me” (Kelly, PST final interview). This impacted the interactions that Kelly and Mrs. Perez had because Kelly seemed to hear one thing from Mrs. Mills and another from Mrs. Perez. Mrs. Mills praised Kelly in her planning, taking pride in the fact that Kelly had been planning the lessons “since about the third week” (CT interview week four); yet Mrs. Perez often pointed out areas in planning where Kelly needed to improve. In addition, during the time of the study, the college had no formal expectation of the preservice teacher, the cooperating teacher, and the college supervisor working together. Mrs. Perez’s role as the college supervisor was primarily the evaluator.

As the evaluator, Mrs. Perez’s job was to observe and evaluate Kelly four times during the internship. Mrs. Perez’s instructional support in lesson planning was limited even during the four times she evaluated Kelly because Kelly did not provide the lesson plan in enough advanced
time for Mrs. Perez to give feedback. Only in week seven did Kelly provide the lesson plan in advance so that Mrs. Perez could give instructional support. Because of the lack of instructional support given in the planning of the lessons, much of Mrs. Perez’s instructional support was given after-the-fact as she debriefed each lesson evaluation in the post conferences with Kelly. Mrs. Perez always addressed Kelly’s lesson plan and what needed to be included so that Kelly could be better prepared for instruction. During the post-conference observations, Mrs. Perez encouraged Kelly focusing on her strengths, but also challenged her by setting one or two goals that she was to improve upon before the next formal observation. The first post conference I observed was actually the second observation and evaluation completed by Mrs. Perez. One of Kelly’s goals from the first evaluation was to plan and implement more engaging activities for the students. Mrs. Perez commented that Kelly met her goal as the students had used whiteboards at their table groups and “everyone participated” (post conference PST and CS week one). The goal of planning for engagement was also evident in subsequent weeks as Kelly designed the line plot activity, the ice cream activity to convert from ounces to pounds, the collaborative-pairs activity of finding objects in the classroom for linear measurements, and the connecting-cubes activity to find volume. Student engagement became the norm for Kelly’s lessons; however, connecting engagement with student learning continued to be an area in which Kelly needed to improve. Mrs. Perez didn’t see the most of the lessons Kelly implemented so she didn’t see the disconnection between planning for engaging activities and planning for student learning. Kelly’s lesson plans exemplified the lack of connection between engagement and student learning as they only included the activity for each week but no questions or detailed instruction for conceptual mathematical thinking.
Lesson plan six exemplified an engaged activity without thought of conceptual mathematical thinking. Lesson plan feedback from Mrs. Mills or Mrs. Perez may have helped Kelly prepare more thoroughly for the formal observation in week six. The lesson was on volume, stressing the question of “What is volume?” (observation notes week six). Kelly’s lesson never addressed the lesson essential question, but instead focused on the procedure of finding volume using length times width times height. Mrs. Perez explained that the students were able to do “the algorithmic math” but did not seem to understand “the concept of volume” (post conference PST and CS week six). Mrs. Perez asked Kelly if she could come back to do another observation the following week. She stressed that Kelly needed to send the lesson plan several days in advance so that Mrs. Perez could provide feedback. She told Kelly that the feedback could be used to improve the quality of the lesson and focus on student learning.

Kelly gave week seven’s lesson plan to Mrs. Perez several days in advance and Mrs. Perez was able to provide Kelly with feedback for the lesson that Kelly incorporated into her teaching. Mrs. Perez suggested Kelly review volume by creating a PowerPoint that included real-world examples where students might use volume. She also encouraged Kelly to design an instructional activity in which the students could explore the meaning of volume to understand the concept instead of focusing on the procedure. In the post conference, Mrs. Perez said that the lesson was “very good” because it involved “problem-solving that engaged the students” (post conference PST and CS week seven). Kelly explained that she felt more confident with the lesson because she knew there was “a lot more in-depth thinking and it wasn’t just me brushing the surface” (PST interview week seven).

The instructional support Kelly received from the college supervisor, Mrs. Perez, seemed to help Kelly, but was not enough. Mrs. Perez only met with Kelly four times during the
semester and only provided feedback on one lesson plan to prepare Kelly for implementation of
the lesson. It was evident that the instructional support Kelly received in planning week seven’s
lesson resulted in a more cohesive lesson that not only engaged the students but focused on
conceptual mathematical understanding. Because Kelly did not receive input or feedback from
her cooperating teacher during the lesson planning process, feedback from the college supervisor
was imperative.

All told, the support Kelly received from her cooperating teacher and supervising teacher
during the internship was inconsistent and sometimes nonexistent. The cooperating teacher, Mrs.
Mills, provided little to no support in learning to write lesson plans. According to Mrs. Perez, the
daily lesson plan Kelly created using Mrs. Mills’ template was “surface level” and Kelly did not
seem “comfortable enough with the content” to use the simplified plans (CS interview week
three). Mrs. Perez provided support with goal setting in each post conference in order to help
Kelly improve her planning and teaching before the next observation. Mrs. Perez also provided
support in lesson planning when Kelly supplied the lesson plan to her in enough time to give
feedback. The fact that Mrs. Perez only observed and provided feedback to Kelly four times
during her internship was not enough support to make up for the lack of instructional support
Kelly received from her cooperating teacher. The lack of instructional support in lesson planning
Kelly received contributed to her feelings of frustration and exhaustion for most of the
internship.

**Relevant literature connections.** Mrs. Mills did not provide sufficient instructional
support that Kelly needed for lesson planning purposes. Since Mrs. Mills was familiar with
Kelly’s fears about teaching mathematics from a previous field study experience, she seemed to
focus on giving Kelly the emotional support needed to help boost her confidence, but not the
instructional support Kelly needed to help her develop as an effective teacher. Emotional support is intended to help preservice teachers move past fears about learning to teach (Butler & Cuenca, 2012). Accordingly, the emotional support Kelly received from Mrs. Mills helped relieve some of her fears of teaching; however, Mrs. Mills’ lack of instructional support in lesson planning failed to provide Kelly with constructive feedback to improve the methods and techniques she used when implementing the mathematics lessons. Kelly struggled to develop as an effective mathematics teacher even with the emotional support provided by Mrs. Mills because of the minimal amount of instructional support in lesson planning that she received.

The instructional support provided by the college supervisor, Mrs. Perez, seemed to help Kelly in lesson planning and thinking about student learning; however, it was just not enough. Mrs. Perez only met with Kelly four times during the internship creating long gaps in between observations and feedback. The discussions Mrs. Perez and Kelly had during the post conferences presented opportunities for Kelly to learn about effective mathematical planning and to implement those practices in future lessons; but without similar feedback from Mrs. Mills, Kelly lacked the support she needed to effectively plan lessons. Findings supported Frykholm’s (1998) study, in which the college supervisor and the cooperating teacher differed in their feedback—Mrs. Perez provided more feedback related to mathematics while Mrs. Mills’s feedback focused on encouragement and emotional support. The lack of consistent and similar feedback from the cooperating teacher and college supervisor can send mixed messages to a preservice teacher (LaBoskey & Richert, 2002). The mixed messages Kelly received fed her confusion and frustration as she tried to work with and please both Mrs. Mills and Mrs. Perez.

Although Mrs. Mills accepted the role of cooperating teacher for Kelly, she did not seem to realize that part of her responsibilities included providing instructional support for lesson
planning. Butler and Cuenca (2012) suggest that cooperating teachers who provide instructional support “keep pace with the developing abilities of their preservice teachers and exhibit a readiness to assist in instructional growth” (p. 299). Mrs. Mills’s lack of planning with Kelly failed to provide the instructional support to aid in Kelly’s development as a teacher. Kelly’s abilities as a lesson planner lacked, but Mrs. Mills did not recognize Kelly’s weakness and therefore failed to assist her, stunting her developmental growth in lesson planning. Mrs. Mills may not have recognized Kelly’s deficiency in planning because she did not attend a teacher preparation institution and therefore may not have had extensive lesson planning practice herself. Jones and Straker (2006) posit that cooperating teachers’ own “practice and experience” influence the way they mentor preservice teachers (p. 172). Mrs. Mills’s own “practice and experience” helped to explain the lack of instructional support through planning done with Kelly. Mrs. Mills may not have ever created detailed lesson plans to include worked examples and questions. She practiced writing brief lesson plans with her grade level, who may have been her mentors as she began her teaching career.

All told, although Kelly received emotional support from her cooperating teacher, and encouragement and guidance in developing one effective mathematics lesson from her college supervisor, the lack of consistent instructional support impacted Kelly’s ability to plan effective lessons. This was largely due to Kelly’s cooperating teacher not providing detailed planning support. Instead, she expected Kelly to do the detailed lesson planning on her own. Knowing that Kelly lacked in instructional planning support from her cooperating teacher, the college supervisor, Mrs. Perez, tried to provide more detailed instructional planning support for Kelly, but limited observations with Kelly and Kelly’s tardiness in sending lesson plans to Mrs. Perez in time for feedback hindered the instructional support Mrs. Perez was able to give. Kelly’s
inconsistent and often nonexistent instructional support in lesson planning confirms the need for the preservice teacher, the cooperating teacher, and the college supervisor to work together. According to Akhtar, Majeed, and Murtaza (2013) each member of the triad plays an important role and if the expected outcomes are clear and every member of the triad has a “good sense of what is expected of him/her” the internship should be productive and rewarding for each member of the group (p. 111). In addition, each member of the triad must understand the importance of instructional support in lesson planning. Instructional support provides constructive feedback to improve the methods and techniques used in teaching (Butler & Cuenca, 2012).

Nonetheless, findings in this study revealed that the cooperating teacher did not provide the instructional support for lesson planning that Kelly needed. Instead, she viewed lesson plan support as the time when the entire grade level met to plan for the month. The long term planning session did little more than create a list of “to-do” for Kelly for each mathematics lesson. Without unpacking what content knowledge was needed for the lesson, how to teach the lesson, appropriate materials to use for the lesson, and possible misconceptions student may have during the lesson, Kelly was not prepared to implement mathematics instruction. This raises the question of preparation for cooperating teachers. What methods are currently being used to successfully prepare cooperating teachers to provide instructional support in lesson planning for preservice teachers during K-12 classroom experiences? Recent research tells us that cooperating teachers report that they offer a safe learning environment, serve as role models, explain their actions, and create opportunities for preservice teachers to observe them; however to a lesser degree cooperating teachers ask the preservice teachers to formulate and pursue learning goals (Hall, Draper, Smith, et al., 2008; Lafferty, 2015). In addition, Lafferty found that in response to a survey, 73% of cooperating teachers identified providing emotional and professional support,
while only 8% cited critical evaluation and reflection as components they require of preservice teachers. However, as recent studies do not specifically address instructional support in lesson planning, are cooperating teachers providing the support necessary for quality planning in preservice teachers? And if they are, what methods are currently being used to successfully prepare cooperating teachers to provide instructional support in lesson planning for preservice teachers during K-12 classroom experiences?

All told, research question one was informed by two main themes that were discovered during my data analysis. The nature of the preservice teacher’s experiences as she planned lessons included lack of lesson planning and lack of instructional support. Kelly struggled to write lesson plans that provided enough content and pedagogical information for effective mathematics instruction. Kelly did not seem to understand that the brief lesson plan template used by the fifth grade teachers did not provide opportunities for her to fully think through the content of the lesson and address such aspects as differentiated instruction, worked examples, and formative assessments. Lack of instructional support in lesson planning from Kelly’s cooperating teaching and college supervisor did not provide the assistance Kelly needed to learn how to develop effective lesson plans.

**Research Question Two**

What is the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she implements mathematics instruction during her final internship? As the themes emerged that helped to answer research question two, it became apparent that Kelly’s lack of content knowledge and failure to transfer knowledge from the mathematics methods were the main reasons why Kelly struggled to implement effective mathematics lessons. Kelly’s lack of content knowledge contributed to incomplete and sometimes ignored
explanations as well as parts of lessons that were incorrectly taught. Her failure to transfer knowledge from the mathematics methods course contributed to implemented mathematics lessons that were engaging and fun, but did not lead to student understanding.

**Lack of content knowledge.** Kelly’s lack of content knowledge was evident in almost every mathematics lesson. In week two, Kelly used a video to teach coordinate graphing to the students because she felt like she did not know the content well enough to teach it. She explained that as she watched the video with the students it helped her to understand coordinate graphing at the same time as the students were learning. In week four, Kelly taught converting within metric units also using a video, but this time as an illustration. The video showed a female athlete throwing a shot put at an athletic competition. Kelly asked to the students to estimate how far the shot put was thrown. Several estimates were given; however Kelly did not validate any of the answers because she wasn’t sure of the answer. Kelly said that when she doesn’t know the answer to something, she “just doesn’t respond” (PST interview week four). Kelly quickly transitioned from estimating the shot put throw to powers of ten. The students seemed confused at first but soon caught on to the topic. I asked Kelly why she did not make the connection between powers of ten and converting units within the linear metric system. She stated that she did not know the connection “until just now when you asked” (PST interview week four). Kelly’s lack of content knowledge lead to poor instructional practices of using a video because she thought the video did a better job of explaining the lesson than she did and failing to make important mathematical connections for students.

Also in week four, Kelly’s main activity was for each student to weigh a bowl of ice cream before and after adding toppings and then convert the ounces to pounds. The students struggled with the conversion and seemed confused about customary units. Kelly later explained
that she did not “know anything about the customary system” (PST interview week four). As Kelly tried to help the students with the conversion of ounces to pounds by doing a division problem, she did the problem incorrectly because she left out a zero in the quotient. When presented with a picture of the division problem done incorrectly with the zero left out of the quotient, Kelly said that she did not realize zeros were to be put in the quotient. She said she had “done it wrong my whole life” (PST interview week four).

Again in week five, Kelly did not know the mathematics content for the lesson. She drew examples of a rectangle and a trapezoid on the board and told the students that both of the shapes were rectangles. When asked about the shapes she drew, she said that she did not know that the shape she drew was a trapezoid. She thought that “maybe it was a rhombus or maybe a parallelogram” (PST interview week 5). Another example of Kelly’s weakness in mathematics content happened in week six when she told the students to find the volume of a square. Kelly believed that her mathematics content knowledge deficit was related to lack of conceptual understanding. Kelly said that she could do mathematics if it was a “rule or procedure” but she did not understand the concepts behind the rules or procedures (PST interview week four). Kelly’s lack of content knowledge contributed to incomplete and sometimes ignored explanations given to the students as well as parts of lessons that were incorrectly taught.

**Relevant literature connections.** As Shulman (1986) argued, the three types of content knowledge: subject matter content knowledge, pedagogical content knowledge, and curricular content knowledge are part of learning to teach mathematics. Kelly did not have sufficient content knowledge in mathematics to effectively implement mathematics lessons. Her lack of knowledge about zeros in the quotient in week three caused her to incorrectly teach division as she was trying to convert ounces to pounds. In addition, the lack of Kelly’s content knowledge in
linear measurement led to confusion as she tried to deliver instruction about relative size of the units the to the students in week four. In week five, Kelly’s lack of knowledge of quadrilaterals caused her to incorrectly call a trapezoid a rectangle and in week six Kelly explained how to find the volume of a square to the class. It was apparent that Kelly also lacked in pedagogical knowledge needed to effectively teach mathematics.

Hill et al. (2004) further expanded upon Shulman’s (1986) original definition of pedagogical content knowledge to include the mathematical knowledge needed for teaching (MKT) and referred to this as “specialized content knowledge needed for teaching” (p. 13). This kind of knowledge is required to answer student questions and address misconceptions. In 2010, Thames and Ball discussed specialized content knowledge for teaching in terms of mathematics. They stated that good mathematics teaching requires an “abundance of mathematical skill and of usable mathematical knowledge” (p. 233). This supports the work of Hill, Sleep, Lewis, et al. (2007) who argue that teaching mathematics requires “making the content accessible, interpreting students’ questions and productions, and being able to explain or represent ideas and procedures in multiple ways” (p. 123). In most weeks, Kelly could not answer students’ questions so she ignored them and moved on to the next part of the lesson (Weeks two, three, four, 5). In addition, Kelly was unable to address student misconceptions or even anticipate them (weeks one, two, three, four, five, six). For example in week one, the students worked on a problem involving order of operations. One of the students was confused as to the correct order for addition and multiplication. Kelly did not know how to answer the question, so she moved on to the next problem. Another example was in week two during a video that Kelly used for instruction. The voice on the video posed a question about the distance between two points on a coordinate graph. A student gave an incorrect answer, but Kelly did not address the
misconception; instead, she turned the video on and went on with the lesson. Kelly later said that she did not know how to explain absolute value to calculate the distance, so she just turned the video back on. Kelly’s lack of mathematical knowledge for teaching impacted her ability to be an effective mathematics teacher.

The findings in this study support Thames and Ball’s (2010) assertion that teaching mathematics requires mathematics knowledge. However, Thames and Ball also posit that mathematical knowledge in and of itself does not provide an “edge in teachers’ capacity” at the K-8 level (p. 221). In order to teach mathematics effectively, a teacher must also possess mathematical knowledge for teaching, which according to Thames and Ball is a kind of “complex mathematical understanding, skill, and fluency sued in the work of helping others learn mathematics” (p. 228). But what if a teacher, like Kelly, doesn’t possess common mathematical knowledge? Kelly’s lack of common content knowledge influenced her pedagogical decisions. The findings in this study revealed that the lack of common content knowledge impacted every mathematics lesson Kelly tried to teach. Even though she tried to create engaging, real-world activities for the students to make apply mathematical ideas, Kelly’s lack of content knowledge led to incorrect information given to students and student questions going unanswered. This raises questions of teachers’ competency in teaching mathematics. If teachers don’t possess mathematical knowledge to solve problems, can they learn the content in a short amount of time and effectively teach it to the students? Can preservice teachers effectively learn mathematics content and begin to develop mathematical knowledge for teaching at the same time?

Lack of transfer from methods course. Kelly referred to what she learned in her mathematics methods course several times over the course of the internship. But what she took
away from the course did not seem to help her with implementing effective mathematics lessons. For example, in week one Kelly said that one of the reasons chose the instructional activity of going into the hallway and making a life-sized line plot was because she remembered that in the mathematics methods course she learned how to use manipulatives, so she wanted to “get them (students) up and moving and use themselves as visuals” (PST interview week one). The students moved around but Kelly failed to design questions or activities focused on student learning to accompany making a human line plot; therefore, the instructional strategy seemed to be centered on getting out of the classroom instead of learning about line plots.

In week four, Kelly created a similar activity where the students came to the back table, made ice cream sundaes, weighed them, and then were to convert the weight of the ice cream from ounces to pounds. She stated that she chose this activity because she remembered that the mathematics methods course stressed “strategies for getting students engaged” (PST interview week four). Kelly said that she wanted to get the students engaged in the lesson, so she created the ice cream activity. The students seemed to really enjoy making ice cream sundaes; however, the mathematics lesson seemed to take a backseat to the activity and the students had difficulty with the division involved in converting ounces to pounds. Similarly in week six, Kelly implemented a mathematics lesson using connecting cubes because she remembered using the cubes in the mathematics methods course. Her connection was not with the mathematics concept of creating a large cube from the smaller cubes to show volume. Instead she wanted to do “something they might enjoy” (PST interview week six). It was interesting that in week nine (first week observing Kelly as a full-time substitute) Kelly did not implement an engaging activity for the students even though they were learning how to measure angles using protractors.
She couldn’t find the protractors she planned to use; however, she made no attempt to print any from the internet or find alternate ways of measuring angles.

Kelly stated that she remembered the engaging and fun mathematics activates that were demonstrated in the mathematics methods course and thought the activities she created and implemented were good mathematics activities; however, no connections were made between the activities and what the students were to learn through the activities. Throughout the implementation of the mathematics lessons, Kelly seemed more concerned about keeping students interested in mathematics than what they were to learn in mathematics.

*Relevant literature connections.* Mathematics methods courses are common to preservice teachers’ learning experiences for elementary education. Methods courses may differ in their design; however, Ball et al. (2008) assert that knowing the content well enough to explain it, working with students in practicing the content, and addressing misconceptions that may develop from the content is crucial for teachers to know if learning is to take place in the K-12 classroom. The mathematics methods course Kelly had completed was centered on mathematics content, pedagogy, and identifying and correcting misconceptions. Even though Kelly earned a B in the course a year prior to her internship, she did not know fifth grade level content well enough to explain it, struggled in working with students in practicing the content, and could not address misconceptions as she was not familiar enough with the content to understand what misunderstandings the students had. Although the fundamentals of knowing mathematics content, teaching mathematics content, and addressing students’ misconceptions of mathematics content was presented in the mathematics methods course, it appeared that Kelly focused on making students’ activities fun and engaging, not on learning the mathematics content and addressing students’ misconceptions. This finding supported Kennedy’s (1999) posit
of problems of enactment, or connections made between what preservice teachers learn to do and what they actually do in classroom settings. Kelly had a disjointed understanding of student engagement in the classroom and therefore what was taught in the methods course and what was enacted in the classroom looked very different. The implementation of engaging mathematics activities during the lessons made for a fun class time; however, Kelly’s failure to connect the importance of mathematics content knowledge to the activities meant that the implemented lessons may have been fun, but little mathematics learning took place.

Kelly’s lack of transfer of theory to practice is not uncommon and still exists (Boyd, Grossman, Hammerness, et al., 2008). Even though Kelly was enrolled in a field experience at the same time as the mathematics methods course, it appeared that little to no theory-to-practice connections were made between what she learned in the course and what she practiced in the classroom. Lampert (2010) articulates that the issue of transference of knowledge between theory and practice is important in that they are different from each other, but both are essential. She asserts that in the organization of learning teaching, there is still a “gap” to be “bridged” between theory and practice (p. 11). While in her internship, Kelly attempted to implement effective mathematics instruction; however, because of the lack of transfer of what was taught in the mathematics methods course (theory-to-practice), she did little more than create fun activities for students.

In sum, Kelly’s implemented mathematics lessons were influenced by her lack of transfer from what was taught in the mathematics methods course. The course was designed around three main principles: mathematics content, mathematics pedagogy, and identifying and correcting mathematics misconceptions. However, Kelly’s main take-away from the course seemed to be that mathematics lessons should be engaging and fun. Kelly did not use manipulatives as
mathematics learning tools, but only as a way to make the lesson more exciting. Her failure to see the connecting cubes as mathematics learning tools was evident in week six when she told the students that if they did not work quietly, she would take the cubes away from them. Throughout her internship, Kelly consistently admitted that she lacked mathematics content knowledge. Her lack of understanding of the mathematics content and focus on “fun” supports Wilkins and Brand’s (2004) finding that some preservice teachers, even after taking a mathematics methods course, lack knowledge in some areas of elementary mathematics but still believe they are good mathematics teachers. Kelly wanted to be a good mathematics teacher and seemed to think engaging lessons would help to accomplish that. However, her emphasis on implementing “fun” and engaging lessons actually became the focus for most mathematics lessons. Her lack of content knowledge and failure to connect the engaging activities to students learning led to the activities being nothing more than something fun to do for mathematics class. This raises the question of theory to practice between the mathematics methods course and the K-12 classroom. What types of practice or rehearsals are needed in methods courses to help preservice teachers better connect course contents to K-12 classroom settings?

**Mathematics anxiety.** Kelly, by her own admission, had feelings of mathematics anxiety which she believed stemmed from her own poor experiences in learning mathematics as a child. Kelly often referred to her mathematics anxiety and feelings of poor self-efficacy in regards to mathematics during the internship. However, each time Kelly seemed anxious about mathematics or stated that she was not confident about something in her lessons, it appeared that the anxious feelings were related to not knowing the mathematics content or her own lack of planning for the lesson. Table 6 shows the connections between Kelly’s feelings of mathematics anxiety and the lack of content knowledge and planning throughout her internship.
Table 6.

*Summary of Behaviors that Impacted Kelly’s Implementation of Mathematics Instruction.*

<table>
<thead>
<tr>
<th>Week</th>
<th>Feelings of Mathematics Anxiety and Low Self-Efficacy in Teaching Mathematics</th>
<th>Connection to Mathematics Content</th>
<th>Connection to Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kelly felt anxious because she didn’t know what to ask the students during the line plot activity.</td>
<td>Kelly did not know how to problem solve using a coordinate graph.</td>
<td>Kelly failed to plan questions to ask students.</td>
</tr>
<tr>
<td>2</td>
<td>Kelly intentionally called on a student who could answer a mathematics question while the principle was in the room. Also, she used a video to teach the lesson because she felt the video did a better job than she did.</td>
<td>Kelly did not know the linear units of the metric system.</td>
<td>Kelly had not worked the problems in advance so she wasn’t familiar with how to solve the problem.</td>
</tr>
<tr>
<td>3</td>
<td>Kelly said that she “gave the students a warning about how bad” she was with the metric system when she asked Mrs. Mills for help during a lesson.</td>
<td>Kelly did not know the linear units of the metric system.</td>
<td>Kelly did not plan how to use the motions to show students relative size of linear metric units.</td>
</tr>
<tr>
<td>4</td>
<td>Kelly said that she was “not a division person” and didn’t like division. Also, Kelly said that she confused the students when she asked them to convert the weight of the ice cream from ounces to pounds and she felt stressed about that.</td>
<td>Kelly did not know how to divide using zeros in the quotient. Kelly said that she knew nothing about customary units of measurement.</td>
<td>Kelly did not plan the ice cream activity well because the numbers were too small for the students to successfully convert ounces to pounds.</td>
</tr>
<tr>
<td>5</td>
<td>No admitted feelings of anxiety with this lesson.</td>
<td>Kelly drew a trapezoid and called it a rectangle. She did not know the terms reflexive angle and rotational symmetry.</td>
<td>Kelly did not plan the lesson at all because she was not supposed to teach it due to an absence.</td>
</tr>
<tr>
<td>6</td>
<td>Kelly was not confident with the answers to several example problems.</td>
<td>Kelly told the class how to find the volume of a square</td>
<td>Kelly did not work example problems out in advance to properly prepare for teaching or possible misconceptions</td>
</tr>
<tr>
<td>7</td>
<td>Kelly felt unsure as she taught a conceptual-based lesson on volume because she “doesn’t like mathematics concepts and tries to avoid them.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Findings regarding Kelly’s mathematics anxiety support Gresham’s (2007) findings that preservice teachers’ attitudes toward mathematics play crucial roles in their efficacy beliefs about their ability to teach mathematics. In weeks five and six, Kelly stated that she actually felt more confident in teaching the lessons because she liked geometry. However the confidence Kelly felt did not help to improve the mathematics instruction she implemented because she did not know the content well enough to teach it and lacked in planning effective mathematics lessons. Kelly’s lack of content knowledge and lesson planning was apparent in every lesson except week seven because of the instructional support she received from the college supervisor in planning the lesson. Kelly’s confidence during the implementation of week seven’s lesson varied because of her own lack of conceptual understanding of volume; however, in the post conference with Mrs. Perez, Kelly expressed confidence because she felt the lesson was effective and successful as a result of planning the lesson in detail and being more familiar with the content. This raises the question of mathematics anxiety and lesson planning. Would focused lesson planning instruction help to reduce mathematics anxiety in preservice teachers?

Finally, Kelly’s feelings of mathematics anxiety were observed in many lessons over the course of the study as she seemed unsure of how to answer student questions, used videos to teach lessons because she thought the video explained the lessons better than she did, and using students to explain how to do problems because she did not feel confident explaining the solutions. The feelings of anxiety Kelly experienced seemed connected to her own lack of content knowledge and lack of planning. Confidence in a particular area of mathematics did not result in a better taught lesson for Kelly because she still lacked in planning and content knowledge needed to effectively explain the material to the students.
All told, a thematic data analysis revealed that lack of planning and instructional support from the cooperating teacher and college supervisor impacted the nature of Kelly’s experiences as she planned for mathematics instruction because without content knowledge and instructional support, the lesson plans were just merely a “to do” list. Data analysis also revealed that lack of content knowledge and transfer from the methods course (theory to practice) impeded Kelly’s implementation of effective mathematics lessons because she often incorrectly taught mathematics problems and focused on engaging and fun lessons rather than lessons designed for student learning. Lack of content knowledge and planning also influenced Kelly’s feelings of mathematics anxiety because she did not know the material well enough to teach it and failed to plan thoroughly enough to support herself with content and pedagogical practices that would have produced more effective mathematics lessons. Kelly’s feelings of anxiety and negative self-efficacy as she attempted to implemented mathematics instruction were connected to her lack of content knowledge and poor planning.
CHAPTER 6: DISCUSSION

Throughout this research endeavor, the experiences of a preservice teacher, self-identified as having mathematics anxiety, as she planned and implemented instruction during her final internship have been studied. This work builds upon research that indicates preservice teachers must develop a special kind of content knowledge to effectively implement instruction in a content area (Ball, et al., 2008; Hill, et al., 2004; 2005; Schoenfeld & Kilpatrick, 2008; Shulman, 1986) and adds to knowledge in the field of mathematics anxiety and low self-efficacy in preservice teachers’ instruction of mathematics (Gresham, 2007; Hembree, 1990; Hoffman, 2010; Swars, et al., 2006) by offering explanations as to why the preservice teacher struggled to plan and implement effective mathematics lessons some of the time. Through such findings, this study responds to the call for observations of preservice teachers in their clinical experiences to shed more light on the actual enactment of teaching strategies in mathematics (Swars, Daane, & Giesen, 2006). This research extends the previous work that employed quantitative and qualitative methods (Hill, et al., 2004; Gresham, 2007; Hoffman, 2010; Swars, et al., 2006) by following one preservice teaching, self-identified as having mathematics anxiety, in her final internship through observations, interviews, audio journals, and artifacts as she planned and implemented mathematics instruction.

Through a case study design, this study allowed for rich description of each week’s data in the form of stories, helping to provide the context for the content and thematic findings to further understand preservice teachers as they develop as teachers during the internship experience. It is hoped that this work will give insight into preservice teachers’ internship
experiences, thus contributing to the field of teacher education. This chapter offers a summary of the study, discussion and implications of the findings, lessons learned, and ideas for future research.

**Summary**

This study examined the nature of the experiences of a preservice teacher, self-identified as having mathematics anxiety as she planned and implemented instruction in her final internship. The research questions that guided my inquiry were:

1. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she plans for mathematics instruction during her final internship?

2. What is the nature of the experiences of a preservice teacher self-identified as having mathematics anxiety as she implements mathematics instruction during her final internship?

Using an interpretivist approach to a case study inquiry, I used semi-structured interviews, observations, audio journals, and artifacts to collect data on a preservice teacher, cooperating teacher, and college supervisor. I collected data during the preservice teachers’ internship once each week for seven weeks and once each week for three weeks as she accepted a position as a full-time substitute teacher. I analyzed the data using content and thematic analysis and findings indicated that lack of planning, lack of instructional support, lack of content knowledge, and lack of transfer of what the preservice teacher learned in the mathematics methods course impacted her planning and implementation of mathematics instruction. In this way, the study identified the importance of instructional support for preservice teachers during K-12 classroom experiences, theory-to-practice connections between coursework and field experiences, and preservice teacher reflection to recognize weaknesses and seek out solutions to solve problems of practice.
Discussion

The complexity of learning to teach was exemplified in this inquiry. According to Shulman (1987), learning to teach is complex because teachers need to know not only the subject area in depth, but how to teach the content and explain it in alternate ways so that diverse students can understand and demonstrate mastery. Because Kelly had not mastered the content needed to explain it to students, she did not seem to follow Feiman-Nemser’s (2001) stages of growth. It appeared that Kelly remained in stage two (developing subject matter knowledge for teaching) and did not progress into the others stages as she should have due to her own lack of content knowledge. Kelly’s need to focus on her own level of content knowledge contributed her lack of seeing what the students were actually learning in each lesson. However, Kelly’s classroom management skills seemed to mask her ineffective teaching and lack of content knowledge as she was seen by administration and other teachers as a good teacher.

Learning to teach mathematics was very difficult for Kelly due to her own lack of content knowledge in mathematics. Kelly had difficulty engaging students in “meaningful learning through individual and collaborative experiences” (NCTM, 2014, p. 5) because she did not know the mathematics material well enough to teach it effectively. Many of the instructional strategies that Kelly used were merely fun activities that engaged students in the process of mathematics, but not the learning of mathematics. Applying Schoenfeld and Kilpatrick’s framework to this study shows that Kelly was deficient in several areas: (1) knowing school mathematics in depth and breadth; (2) knowing students as mathematical thinkers and learners; and (3) reflecting upon one’s own practice. Kelly’s lack of reflection hindered her from seeing as deficiencies her lack of content knowledge and knowledge of the students as mathematical thinkers and learners. These three elements would have helped her improve her practice as a mathematics teacher. In addition,
Gresham (2007) found that students who had the highest levels of anxiety explained that they struggled with developing their own lesson plans, how to teach the lessons, and understanding the mathematical content. Kelly’s description of herself aligned with Gresham’s (2007) findings.

The present study suggests at least two new findings: (1) The transfer of what was learned in the methods course is related to preservice teachers’ understanding of content knowledge and past experiences in learning content, and (2) The increase in self-efficacy with certain mathematics topics does not translate into more effective implementation of mathematics instruction. Kelly’s description of her own learning of mathematics as being difficult and bad experiences with teachers as she tried to learn mathematics impacted what she transferred from the methods course to the classroom. Kelly wanted to make learning fun and engaging, in contrast to what she experienced as a child in school. The methods course included pedagogical strategies to create engaging mathematics activities; however Kelly’s lack of content knowledge impacted the implementation of engaging activities, as Kelly could not successfully demonstrate or explain the mathematics content needed for student learning. Therefore, the focus of the mathematics instruction was more about fun, moving activities than about the learning of mathematics. The finding in this study of the lack of transfer of theory to practice corroborates Boyd, Grossman, Hammerness, et al.’s (2008) finding that lack of transfer from theory to practice is not uncommon and still exists, but raises new questions on what contributes to the lack of transfer from theory to practice. The evidence represented by observations notes and interviews points to lack of content knowledge and past experiences of preservice teachers as contributing factors to the lack of transfer from theory to practice.

In addition, Kelly’s affirmation of having mathematics anxiety substantiated earlier studies on preservice teachers with mathematics anxiety and self-efficacy (Gresham, 2008, 2009;
Hoffman, 2010, Swars, et al., 2006). However, findings from this study suggest Kelly’s confidence with the topic of geometry (PST interview week five) did not help to improve the instruction of the lessons (weeks five and six) as Kelly did not know the content well enough to effectively teach the geometry lessons and her lesson plans did not support the content understanding that was needed. Kelly did not know several geometric vocabulary terms she was supposed to teach the students in week five and also incorrectly named a trapezoid by calling it a rectangle. In week six, Kelly incorrectly taught the students that they could find the volume of a square. This raises the question of mathematics anxiety and self-efficacy in relation to content knowledge and planning. Kelly’s lack of content knowledge and planning contributed to her not being prepared to teach the geometry lessons even though she was confident in the topic of geometry. It appears that diminished mathematics anxiety and higher self-efficacy does not necessarily lead to effective mathematics teaching.

The findings of this study seem unfavorable as Kelly did not develop as an effective mathematics teacher and it showed in her lesson planning and implementation of mathematics instruction. However, the findings in the study are important and could be applicable to other preservice teachers. There are many “Kellys” in teacher education programs around the nation—preservice teachers that lack content knowledge and lesson planning skills, and those that do not get the instructional support they need during their internships or struggle with transferring theory to practice. All of the findings may not apply to all preservice teachers; however, one or more of the findings may be applicable to some preservice teachers at any given time. The implications explain how important it is for the education community to understand how preservice teachers develop during their internships. Therefore, even though this study focused
on one preservice teacher, findings from this research can be used to better understand preservice teachers as they complete their final internship experiences.

This research was small and focused on one bounded case (Stake, 2010); it was not intended for generalization of the thematic findings. As the findings were discussed, the importance of understanding the uniqueness of the case was expressed by references to this one preservice teacher. Given the potential for Kelly to be a preservice teacher in any teacher education program, inferences were suggested regarding what might be seen in other preservice teachers like Kelly. Implications drawn from the findings include lesson planning, instructional support for preservice teachers, importance of content knowledge, and theory to practice connections. Implications for next steps regarding teacher education programs are discussed in relation to practice and research. Table 7 organizes the thematic findings from this study in relation to inferred findings and future implications.

**Implications for Teacher Education Preparation**

The thematic findings from this study imply consideration for changes in methods courses and field experiences. Table 7 describes how such themes inform suggestions for teacher education preparation. Perhaps the themes of this study could become topics of conversation at department faculty meetings in teacher education programs to further discuss the realities of preservice teacher internship experiences.

**Content knowledge.** Conversations about content knowledge in subject areas at the elementary education level could bring about change in the prerequisites needed for methods courses. Other conversations might include ways to help preservice teachers learn content knowledge before taking methods courses. Specifically, faculty could share ways to ensure that preservice teachers had sufficient content needed for understanding and implementing
pedagogical practices in content area subjects. Ideas such as administering diagnostic content area pretests in order to discover gaps in content knowledge and address as part of methods courses might be a topic of conversation as well. Another suggestion might be to assist preservice teachers in seeking assistance through college content courses or tutoring. Discussions of requiring a passing score on a content knowledge assessment before taking a methods course might find its way to department faculty meetings. No matter the conversation, the hope is that finding ways to help preservice teachers learn content knowledge might enhance the internship experience by allowing for better lesson planning and effective instruction.

**Theory to practice connections.** Additionally, it is anticipated that the findings from this study will help teacher educators realize that preservice teachers transfer knowledge of what they learned in methods courses based upon their level of understanding of content and pedagogical practices. Kelly did not have a deep understanding of the mathematics content or pedagogy required to enact effective lessons so the only piece of learning that she appeared to transfer was that mathematics lessons should be engaging for the students. From this finding, it appears teacher educators need to think about making clear connections between what is taught in the methods course to classroom practice by providing opportunities for preservice teachers to consistently practice what is taught in the methods course in classroom settings. Helping preservice teachers develop routines of practice that support student learning appears to be an important piece in the transfer of theory to practice. Predictable routines in which preservice teachers pose and represent mathematics problems and lead instructional conversations must be taught and practiced in teacher education programs (Ball & Forzani, 2009). Kazemi, Lampert, and Ghousseni (2007) emphasize that routines that preservice teachers practice in teacher
education programs must advance both student learning and the teacher’s insight into student learning.

Efforts could be placed on linking methods courses to field experiences where preservice teachers could practice the routines they are taught in the methods courses in actual K-12 settings, debrief about their enacted lessons in methods courses in order to reflect on their strengths and weaknesses, and strive to make changes in the next implemented lesson. If connecting the methods course to a K-12 setting is not possible, perhaps more peer classroom teaching could be implemented to simulate the K-12 setting and peers, as well as the instructor, could provide feedback to preservice teachers in the methods course. No matter how it is designed, more theory-to-practice connections need to be made for preservice teachers by providing opportunities to practice what they have learned in the methods course during the same semester they are taking the methods course. This consistent application from the methods course to the classroom will allow preservice teachers to see the implications of transferring what they have learned to the K-12 settings.

**Lack of lesson planning.** Through this study, Kelly’s lack of lesson planning did not provide the support she needed to effectively teach the students in her classroom. Teacher educators and preservice teachers might have discussions as to why brief lesson plans do not support novice teachers in their endeavors to construct effective lessons. Ample practice writing lesson plans using a designed template to facilitate thinking that preservice teachers need to do to produce quality plans that lead to effective instruction could be used to show the type of thinking that experienced teachers do when planning for lessons. Different lesson plans containing varied
Table 7.

**Themes and Implications of Findings.**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Inferred Findings</th>
<th>Implications for Teacher Education</th>
<th>Implications for Future Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of planning by the preservice teacher</td>
<td>Brief lesson plans do not provide sufficient content and pedagogical support for preservice teachers to enact effective instruction.</td>
<td>Since the college lesson plan template may be too lengthy for preservice teachers to use for every lesson while in the K-12 setting, require preservice teachers to develop a personal, usable plan that would provide sufficient content and pedagogical support but be concise enough to feasibly use in the classroom.</td>
<td>Observe a greater number of preservice teachers and examine their lesson plans for types of information included in the plan and how it impacts implemented instruction.</td>
</tr>
<tr>
<td>Lack of instructional support from the cooperating teacher and the college supervisor</td>
<td>Preservice teachers must have instructional support during the planning process of lessons to help think through the lesson and plan for effective instruction.</td>
<td>Specific instructional support training should be provided to both cooperating teachers and college supervisors. In addition, instructional coaches from the college need to work with preservice teachers on a consistent basis during the final internship. The instructional coaches need to be involved in the planning of lessons, observations of implemented instruction, and the facilitating of preservice teacher reflection to address weaknesses and strive to improve upon them.</td>
<td>Qualitative studies of preservice teachers and instructional coaches to collect data through observations and interviews in order to better understand the impact of instructional coaching on planning and implementing effective lessons using content knowledge and effective pedagogical practices during the final internship.</td>
</tr>
<tr>
<td>Preservice teachers lack of content knowledge</td>
<td>No matter the level of self-efficacy a preservice teacher has in a subject area, without content knowledge in the subject area, he/she is unable to effectively implement instruction</td>
<td>Administer diagnostic content knowledge pretests to preservice teachers to discover gaps in content knowledge and address as part of the methods course. Advise preservice teachers who lack substantial amounts of content knowledge to seek help in the form of subject area classes or private tutoring. Require a passing score on a content knowledge assessment before entry in a methods course.</td>
<td></td>
</tr>
<tr>
<td>Preservice teachers lack of transfer of knowledge from the methods course to the classroom</td>
<td>Preservice teachers transfer knowledge from the methods course to the classroom based upon their level of understanding of the content and pedagogical practices.</td>
<td>More classroom practice needs to be implemented in methods courses through K-12 settings or peer classroom teaching to make stronger connections between what is learned in the methods course to application in real instruction.</td>
<td>Examine a greater number of preservice teachers, through observations and interviews as they implement instruction in order to document instances of transfer of theory to practice and possible explanations of this transfer (or lack of transfer).</td>
</tr>
</tbody>
</table>
examples of planning might be given to the preservice teachers to facilitate small group
discussions about the support that each plan provides and what they might add to the lesson plans
to better inform effective instruction. Further practice could be given to preservice teachers to
develop their own personal, usable lesson plan that would provide sufficient content and
pedagogical support but be concise enough to feasibly use in the classroom on a daily basis.

**Lack of instructional support from the cooperating teacher and the college supervisor.** Findings from this study point to the need for cooperating teachers, preservice
teachers, and college supervisors to work together during the final internship. The dynamic of the
“student teaching triad” (college supervisor, cooperating teacher, and preservice teacher) (Byrd & Fogleman, 2012) was, at best, dysfunctional. Although Mrs. Mills met the minimum
requirements for mentoring a preservice teacher, it seemed as if she did not fully understand her
role as the cooperating teacher. In addition, Mrs. Perez’s lack of communication with Mrs. Mills
led to misunderstandings as to the support that each of them was to provide for Kelly. Mrs.
Mills’s praise of how well Kelly was doing seemed to be in direct contrast to Mrs. Perez’s
suggestions for improvement in Kelly’s mathematics instruction. The conflict in what Kelly was
hearing from her college supervisor and her cooperating teacher caused tension, especially in
week six, during the post conference. Byrd and Fogleman (2012) posit that one of the major
causes of tension in the triad is the lack of “clear role definition and boundaries” (p. 195). In
their data collection on student teaching triads, Johnson and Napper-Owen (2011) found that role
perceptions of each member impacted group interactions in both positive and negative ways.
Negative contacts were attributed to confused role definitions and lack of communication
between members of the triad. Mrs. Mills did not seem to understand that her role was to provide
both emotional support and instructional support, as the majority of her interactions with Kelly
were connected to emotional support. When Mrs. Perez attempted to provide instructional support for Kelly by asking questions of Mrs. Mills regarding what areas Kelly needed to improve upon, Mrs. Mills always defended Kelly and seemed to want to protect her from earning a poor evaluation. Mrs. Mills did not see Mrs. Perez as a member of the triad, but only as an evaluator looking to find fault with the preservice teacher. Lack of communication and lack of role definition were contributing factors to the dysfunctional triad. O’Shea, Hoover, and Carroll (1988) state that the triad needs to exhibit a respect for others, communicate in clear, non-judgmental terms, and encourage all members to share in decision and goal setting. Mrs. Mills, Mrs. Perez, and Kelly did not meet as a triad, and therefore, did not establish the necessary relationships needed to create a functional, successful partnership. Because the triad was dysfunctional, neither Mrs. Mills nor Mrs. Perez fully provided the support Kelly needed during her internship. Also, neither teacher encouraged Kelly to reflect upon her teaching on a daily basis. The lack of reflection and inconsistent feedback from Mrs. Mills and Mrs. Perez inhibited Kelly from making the connection that her lack of content knowledge, deficiency in planning, and ineffective teaching strategies resulted in student misconceptions and misunderstandings.

Findings from this study also point to the need for administrators, cooperating teachers, and teacher educators to have conversations about their roles in mentoring preservice teachers. These conversations could lead to professional development for cooperating teachers and college supervisors on how to provide instructional support, especially in the lesson planning process. These conversations could lead to better relationships between cooperating teachers, college supervisors, and preservice teachers as they see themselves all striving to reach one goal: successful lesson planning and implementation of instruction that leads to student learning. The implications in the area of the student teaching triad are linked to standard two of the Council for
the Accreditation of Educator Preparation (CAEP). In order to develop and prepare teachers for
careers in education, CAEP (2010) explains that teacher preparation programs must create
nurturing opportunities for preservice teachers to “develop, practice, and demonstrate the content
and pedagogical knowledge and skills that promote learning for all students” (“CAEP”, Standard
Two Rationale, 2010). In order to create nurturing opportunities for preservice teachers, teacher
education programs must seek to establish partnerships with administrators, cooperating
teachers, college supervisors, and preservice teachers. According to CAEP (2010),
characteristics of effective partnerships include: “mutual trust and respect; sufficient time to
develop and strengthen relationships at all levels; shared responsibility and accountability among
partners, and periodic formative evaluation of activities among partners” (Standard Two
Rationale, para. 3). Ensuring that effective partnerships are developed will help make the
learning experience for the preservice teacher positive and foster relationships between colleges
and schools to share standards of good teaching that are consistent across courses and clinical
work.

In addition, teacher educators could discuss the possibility of providing instructional
coaches for preservice teachers in their final internship. The instructional coaches could help
preservice teachers on a consistent basis by providing instructional support in lesson planning
and implementing effective instruction aimed at student learning through the use of content
knowledge and pedagogical practices. Since college supervisors typically serve as evaluators for
preservice teachers, instructional coaches could provide support and build relationships with the
preservice teacher and cooperating teacher that possibly the college supervisor is unable to do.
Or perhaps, instructional coaches could possibly serve as “the person in the gap” for preservice
teachers whose cooperating teachers or college supervisors are not providing the instructional support they need.

**Implications for Future Research**

The following implications are based upon the thematic findings of this research study. These ideas may provide further knowledge and understanding into preservice teacher development during the final internship.

**Lack of content knowledge and lack of instructional support.** As the findings in this study concurred that preservice teachers without sufficient content knowledge do not effectively implement instruction, and lack of instructional support impacts their lesson plan development and implementation of effective lessons, further research on the impact of the use of instructional coaches during the final internship is needed. Qualitative studies of preservice teachers and instructional coaches could provide a better understanding of the type of instructional coaching needed during the final internship. Possible data collection could include observations of enacted instruction, observations of preconference sessions (before implementation), and post conference sessions (after implementation). Interviews from preservice teachers and instructional coaches could provide better understanding on the impact of instructional coaching during the final internship.

**Lack of transfer of knowledge from the methods course to the classroom.** Future research in the area of theory to practice transfer could include examining a greater number of preservice teachers through observations and interviews as they implement instruction. Documentation could include instances of transfer of theory to practice during observations and possible explanations of the transfer (of lack of transfer) from interviews with the preservice
teachers. This could allow for better understandings of the types of theory-to-practice connections that are made and perhaps why some connections are made and some are not made.

In addition to the ideas for future research associated with the thematic findings in this study, other situations and happenings in the study provoked further wonderings that may serve as future research ideas. The first wondering includes investigating the relationship between lesson planning and mathematics anxiety in preservice teachers. How would the mathematics anxiety and self-efficacy of preservice teachers be impacted if preservice teachers created lesson plans that supported content knowledge and pedagogical practices and implemented instruction using the lesson plans? The second wondering I have includes how professional development for cooperating teachers impacts (if at all) the mentoring of preservice teachers. Finally, I wonder how preservice teachers’ completion of internships in departmentalized versus self-contained settings impacts their teacher development and learning.

In addition to ideas for future research, I have learned a great deal as a result of this research study. As a teacher educator, this research has helped me understand several things that will enhance my teaching and supervision of preservice teachers. Studying Kelly’s experiences as a preservice teacher in her final internship taught me three lessons.

**Lessons Learned**

**Lesson One**

During the final internship, implementing effective mathematics instruction without explicit lesson planning and knowledge building results in the implementation of instruction with less than adequate pedagogical content knowledge.

**Support for lesson one.** Kelly’s implementation of mathematics lessons was impacted by her lack of content knowledge and poor lesson planning. Kelly attempted to address her lack
of content knowledge using internet videos, but that in itself was not enough to for Kelly to
internalize the knowledge so she could effectively teach the students. Kelly needed more
knowledge-building practices like using the teacher’s edition of the textbook to scaffold her
learning and assistance from someone who could teach Kelly the mathematical skills she needed
to know before she attempted to teach the students. According to Hill et al., (2007) teachers of
mathematics need to know the content well enough to explain, represent ideas, and interpret and
answer student questions. Meeting regularly with the cooperating teacher, the college supervisor,
or an instructional coach would have helped Kelly build knowledge and write effective lesson
plans resulting in effective mathematics instruction by helping her learn the content and
anticipate student questions in preparation for teaching. On her own, Kelly did not understand
that she was not yet experienced enough, did not have the content knowledge, and had not yet
developed the mathematical knowledge for teaching needed for concise lesson plans. As a
developing teacher, Kelly needed to build her own knowledge of the content and write more
detailed lesson plans to support the pedagogical content knowledge needed to implement
mathematics lessons.

Lesson Two

During the final internship, few theory-to-practice connections were made beyond
seeking to create fun, engaging activities.

Support for lesson two. Kelly attempted to design fun, engaging activities for the
students. However, the activities focused more on engagement than on learning. Even though the
mathematics methods course contained instruction in mathematics content, pedagogical practices
(which included designing engaging activities), and identifying and correcting misconceptions,
Kelly did not seem to transfer anything from the course to the classroom except that mathematics
instruction should be engaging. Lampert (2010) asserts that transference between theory and practice is important, but some preservice teachers still struggle with how to take what they learned in their coursework and put it into practice in the K-12 setting. Kelly’s use of manipulatives as “something fun to do” (PST interview week six) instead of as mathematics learning tools demonstrates that she did not make the connection between manipulatives and student learning, even though student learning through manipulatives was a part of pedagogical practices in the mathematics methods course. Kelly attempted to use engaging activities as a way to keep students interested in the mathematics lesson; however, the lack of focus on student learning demonstrated her weakness in attempting to make theory-to-practice connections.

**Lesson Three**

Without reflection into one’s own teaching and learning, preservice teachers are unable to recognize weaknesses and seek out solutions to solve problems of practice.

**Support for lesson three.** Kelly did not practice reflection during her internship. Without the guidance of Mrs. Mills posing questions about how effective Kelly thought she was at the end of each day, Kelly never saw nor took responsibility for the lack of student learning in the classroom. Thus, for the most part, each day’s mathematics lesson resembled the day before. When asked what influenced her implementation of lessons the most, Kelly stated that the students did (PST final interview). She said that she learned how to teach based upon how they learned. However, this was not apparent in the observations as Kelly continued to implement less-than-effective lessons due to her own lack of content knowledge and lesson planning.

Some reflection took place in the post conferences between Mrs. Perez and Kelly. Mrs. Perez always began the post conference by asking Kelly how she thought the lesson went. Kelly responded each time but failed to support her answer with anything but her own feelings. Mrs.
Perez attempted to direct Kelly’s thoughts to student learning during each conference, but without more consistent reflection, Kelly did not always see the connection between her teaching and lack of student understanding. Since reflection was not a structured part of Kelly’s internship, she did not do it. This supports Dysthe and Engelsen’s (2004) claim that student teachers are not likely to be involved in reflection and self-assessment unless they are built into the assignment or specifically required.

Without compulsory reflection, Kelly missed opportunities to see her own weaknesses and how to improve upon them. Fendler (2003) suggests that reflection is like a mirror that helps see one’s own practice. Had she looked into the mirror on a daily basis, Kelly may have been able to see problems of practice and seek out ways for improvement. However, without reflection, Kelly failed to see weaknesses in her planning and implementation and, therefore, did not make adjustments which could have positively impacted her internship experience.

Each of the lessons described above resulted from studying the planning and implementation of mathematics lessons of a preservice teacher, self-identified as having mathematics anxiety, in her final internship. The lessons I learned point to the importance of preservice teachers making theory-to-practice connections, practicing self-reflection, and knowledge building and explicit lesson planning for the implementation of instruction.

**Limitations**

As a novice qualitative researcher, I must address the limitations of my inquiry. I was the main instrument in the inquiry; therefore, the threat of researcher bias existed (Patton, 2002). In reality, my presence as a non-participant observer (Merriam, 2009) might have affected my assumptions and discoveries because the preservice teacher might have varied her planning and/or enacted instruction because of my presence in the classroom. In order to eliminate
potential risk of bias, as well as to increase the study's credibility, I utilized member checking and a peer reviewer (Onwuegbuzie & Johnson, 2006) to triangulate the data and establish an audit trail (Merriam, 2009; Miles & Huberman, 1994). After each interview was transcribed, I asked the participants to read over the transcripts to ensure that my perceptions were accurate. I used a person not affiliated with this research study and who had no direct interaction with the participants to read over the research in order to provide balance to the possible bias posed by the researcher (Onwuegbuzie & Johnson, 2006). Michelle (a pseudonym) was a doctoral student in elementary education who had studied Qualitative Research I, Qualitative Research II, and case studies. Michelle read over my codes and we frequently met to talk about my inquiry throughout the semester. This is described in detail in the peer reviewer section.

The discoveries of my inquiry are also limited in their generalizability, though partial generalizations to a similar population may be possible (Myers, 2000). As Erickson (1986) noted, “Since the general lies in the particular, what we learn in a particular case can be transferred to similar situations” (as cited in Merriam, 2009, p. 51). For example, similar perceptions and understandings about mathematics anxiety in the connection to lesson plans and implemented instruction may be discovered in similar populations of preservice teachers with mathematics anxiety. However, the discoveries found in my study cannot be generalized to the greater teaching population.

Time is also another limitation of my inquiry since this research was conducted during seven weeks of a ten-week final-internship experience. After seven weeks, the preservice teacher was offered a full-time substitute position in another grade level at the same school at which she completed her internship. Week eight of the study was testing week, so only the audio journal data were collected. I observed and interviewed the preservice teacher in weeks nine and ten in
the classroom in which she was a full-time substitute. I only observed the preservice teacher one
lesson each week of the nine weeks and, thereby, only saw a small portion of her mathematics
instruction.

Another limitation is the relationship that existed between the preservice teacher and
myself (the researcher). We had known each other for two years and I had instructed her in three
courses including the mathematics methods course. There were benefits to us having known each
other for that long in that I believed that we had built trust. Kelly had come to me on many
occasions to help her in designing lessons and implementing instruction in her field experiences.
Those were not courses in which I was the instructor, but she had felt comfortable enough to
come to me to ask for assistance. I had attended outside activities at which Kelly was in
attendance such as school of education events and sorority events. However, our relationship
could have presented a problem with the power structure involved. I was no longer the evaluator,
nor would I be the mentor for the lessons, as I played the role of a non-participant researcher
observer. It may have made Kelly uncomfortable for me to observe her lessons and not give her
feedback or suggestions as to how to improve upon her instruction. There may also have been
some sort of negative power play as she was given the transcripts each week to read over and
verify that I had indeed captured the experience correctly. To address these limitations, before
the research study began, I sat down with Kelly and had a discussion about the role that I had to
play during the research study. I tried to make her feel comfortable with her new role at member
checking and assured her that I was not trying to present her in any sort of way (positive or
negative), but instead just wanted to report her experiences.

Additional limitations include how the preservice teacher perceived her own mathematics
anxiety as it may or may not have influenced the choice of tasks in her lesson plans or classroom
instruction. Her view of her own mathematics anxiety and how it influenced the experiences within her internship were based solely on her perceptions. Also, the degree of mathematics knowledge of the cooperating teacher and the college supervisor may be a limitation of this study. For example, to what degree did their lack or depth of knowledge limit or facilitate Kelly’s growth as a teacher? How different would the findings have been if Kelly had been assigned a different cooperating teacher or college supervisor?

The potential for the Hawthorne effect or the Halo effect to occur was also present. The Hawthorne effect (Adair, 1984) asserts that the presence of the researcher may alter the event being studied. Even though I knew the preservice teacher well and had instructed her in several courses at the college, my presence in the classroom may have caused her to alter the instruction. The Halo effect (Nisbett & Wilson, 1977) may have influenced my interpretation of what I read, heard, or saw as it is defined as the potential for self-fulfilling prophecy. Because of my experience in teaching mathematics at the elementary level and at the college level, I had certain expectations in mathematics instruction. Potentially, I might have seen practices that otherwise might not have occurred because I expected them to occur.

Finally, I taught the elementary mathematics methods course at the college in which the preservice teacher participant was enrolled. She took the course in spring 2013. While in the course, all preservice teachers, including the participant, focused on three areas: (1) content knowledge, (2) pedagogical content knowledge, and (3) common misconceptions that students may have about mathematics content. The content knowledge instruction included the Common Core State Standards and the Elementary Mathematics Competencies and Skills for state accreditation. Pedagogical content knowledge instruction included learning to design academic tasks, including whole group, small group, center activities, and facilitating mathematical
discourse. The NCTM Standards for Mathematical Practice (NCTM, 2000) were also introduced and stressed as a vital component to good mathematics instruction. Common misconceptions that students may have were also discussed in the course with preservice teachers identifying the misconceptions and practicing how to guide students into correct thinking processes.

The preservice teacher and I were familiar with each other because of the elementary mathematics course, as well as three other courses in which I had been her instructor. In the past she had asked me to help her with creating lessons for her field study experiences in both reading and mathematics. The fact that I was her mathematics methods instructor and we had worked together in the past on mathematics instructional strategies may have contributed to the Hawthorne and Halo effects in this study. Despite the limitations, the findings from this study inform teacher education and propel researchers to do future studies on preservice teachers as they develop into effective teachers.

My Insights

Conducting this research has been an eye-opening experience for me. I have served as a college supervisor for many interns but have not spent as much time with any preservice teacher during a final internship as I did with Kelly. As I sat through classroom observations and interviews with Kelly, there were times when I felt sorry for her because she was bearing the responsibility of the classroom teacher without being given opportunities to learn from her cooperating teacher. I often wondered what Kelly’s internship experience would have been like had she been in another teacher’s classroom who would have given her the instructional support she so desperately needed. Would her experience have been different in a self-contained classroom? Through this study I learned that context is important in preservice teacher development. I think that Kelly’s internship placement actually stunted her growth as a
preservice teacher. Instead of giving her opportunities to learn how to teach mathematics effectively, having to teach most of the day in a content area where she was not comfortable and having no instructional support in planning made learning to become a teacher very difficult for Kelly. Placing preservice teachers in final internships with cooperating teachers requires careful thought and knowing the cooperating teachers and preservice teachers well.

Additionally, through the classroom observations and interviews, I learned that Kelly’s understanding of lesson planning and what lesson planning really is were two different ideas. Kelly basically used a list of what to do each day as her lesson plans. Consequently, when creating the plan she did not thoroughly think through the lessons she taught and therefore was not prepared to teach, creating ineffective mathematics instruction. This made me wonder how preservice teachers view lesson plans. Do they see them as support or just a list of what they are to do? Through Kelly’s lack of planning, I learned that teacher educators need to find ways to help preservice teachers view detailed lesson plans as a support and not a chore to complete.

Finally, as I talked with Kelly each week, listening to her explain the lack of support she received for the week’s lesson, I realized that Mrs. Mills did not view instructional support as important as the emotional support she gave Kelly. However, even with emotional support, Kelly struggled in developing effective mathematics lessons because of the lack of instructional support provided to her. Kelly was Mrs. Mills’s first full-time intern. I wondered what type of training she had received. I know the requirements of mentoring a preservice teacher involve teachers completing an online course through the school district, but obviously, something was missing. Through Mrs. Mills’s lack of instructional support, I learned that teacher education institutions must take a more active role in providing professional development for cooperating teachers. By providing the professional development, teacher educators can share their
expectations and show cooperating teachers the importance of providing both emotional and instructional support to preservice teachers.

Personally, this study has inspired me to make changes to my mathematics methods course in the future to better ensure preservice teachers content knowledge and theory to practice connections. As a college supervisor, I will make concerted efforts to create positive relationships with both preservice teachers and cooperating teachers, ensuring sufficient instructional support is provided to preservice teachers.

**Conclusion**

The research questions for this study encompassed the preservice teacher’s experiences as she planned and implemented mathematics instruction. The research was informed by a literature review which provided information in what we know about learning to teach, preservice teacher development, learning to teach mathematics and mathematics anxiety. Through a case study design, data was collected including observations, interviews, audio journals, and artifacts. Content and thematic analysis revealed that the experiences of the preservice teacher pointed to lack of planning, lack of instructional support, lack of content knowledge, and lack of transfer of knowledge from the methods course to the classroom. These findings helped to inform the field of teacher education by showing that the lack of transfer of knowledge from the methods course to the classroom is related to preservice teachers’ content knowledge and past experiences. Another finding informed the field of mathematics anxiety by revealing that low mathematics anxiety and higher self-efficacy in a mathematics topic did not result in more effective teaching because of the preservice teacher’s lack of content knowledge of the mathematics topic.
Kelly represents preservice teachers who want to teach, but struggle with content knowledge, lack theory-to-practice connections, lack understanding in developing quality lesson plans, and fail to receive sufficient instructional support to facilitate growth during the final internship. Learning to teach is a complex process (Darling-Hammond, 2006, emphasis added). Learning to teach requires knowing the content and being able to explain the content in various ways that all students can learn (Shulman, 1987). Learning to teach also requires support in the form of quality lesson plans and experienced teachers’ instructional support sharing their knowledge and expertise with those learning to become teachers. By studying the final internship experiences through preservice teachers, cooperating teachers, and college supervisors, researchers can continue to inform the educational community and impact teacher education instruction in methods courses and designing quality internship experiences.
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APPENDIX A: SYLLABUS

Course Syllabus

Course Description:

4 credit hours. In this course, the student will use 21st century technology tools to promote the engaged teaching and learning of concepts explored in elementary mathematics. The emphasis will be on the real number system and its subsystems, relating these systems to basic concepts of algebra and geometry. There are no prerequisites.

Student Learning Outcomes:

Students will be able to…

1. Solve a real world problem by employing math concepts and strategies
2. Locate relevant internet resources that address the real-world problem and solutions
3. Create academic tasks that meet state standards
4. Develop a mathematics lesson plan that instructs K-6 students to use math concepts and strategies to solve real-world problems
5. Identify and correct common misconceptions
6. Present a math lesson utilizing technology tools to model math strategies
7. Create small group activities and centers using manipulatives that meet state standards
8. Collaborate with fellow students on a mathematics unit for specified grade level

Course objectives are aligned with Florida’s Next Generation Sunshine State Standards (http://www.floridastandards.org/Standards/FLStandardSearch.aspx) and the following National Council of Teachers of Mathematics, NCTM, Principles and Standards (http://www.nctm.org/).

Required Materials:


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Major Course Topics:

The course focuses on three main categories:

1. content knowledge
2. pedagogical content knowledge
3. common misconceptions

Content Knowledge:

1. Pre-number concepts
2. Base ten numeration system/ place value
3. Operations with whole numbers
4. Factors, multiples, primes, composites
5. Operations with rational numbers
6. Problem solving
7. Geometric ideas
8. Measurement
9. Organization, representation, and interpretation of data

Pedagogical Content Knowledge
10. Whole group instruction
11. Small group instruction
12. Mathematical discourse
13. Mathematics Manipulatives
14. NCTM’s Standards for Mathematical Practice

Misconceptions
15. Diagnosis
16. Strategies for correcting misconceptions

Strategies and Themes:
Mathematical Connections—integrating mathematics within the subject and across other curricular areas with considerations for the learning environment and including the use of relevant children’s literature

Mathematics as Problem Solving—Innovative curricular approaches and materials emphasizing problem solving

Learning Environment—Fostering mathematical reasoning, understanding and communication through a variety of teaching strategies, lesson planning and learning centers

Worthwhile Academic Tasks—Selection, use and design of instructional materials

Assessing Children’s Mathematical Understanding—Alternative assessment procedures

Implementation of Technology for Mathematical Learning—Calculators, computers, videotapes, etc.

Course Requirements and Evaluation

*All assignments with Florida standards are required to be posted on Chalk and Wire in order to be assessed and earn a passing grade in the course.*

Overview of Assignments (Specific details will be provided in class)

Chapter Quizzes:
Students will complete chapter quizzes from the readings. Quizzes will be completed outside of class prior to when the chapters are discussed and are open-book. Students are required to read every chapter as assigned on the course schedule and should be prepared for quizzes for each chapter.
Post Class Thoughts & Professional Participation:
Students in the School of Education are expected to participate in classes as professional teachers would participate in their training in-service sessions. A participation grade will be assigned each day and includes arriving on time, bringing required materials, engaging in activities and discussions, and acting professionally when participating in class. Additionally, students will be asked to respond to prompts at the end of each class. Because of the nature of these activities and discussions, Professional Participation & Post-Class Thoughts grades cannot be made up if the student is absent, regardless of the reason for the absence.

Miscellaneous In-Class Assignments:
Students will complete various activities and assignments during class. Some of these assignments will be collected and graded. Because of the nature of these activities, in-class assignments cannot be made up if the student is absent, regardless of the reason for the absence.

Daily Problem Activity (Elem Ed C&S: 28.1; 28.2; 28.3; 28.4; 28.5; 28.6; 28.7; 28.8; 28.9) *(This assignment must be uploaded to Chalk and Wire.)*:
Teacher candidates will complete daily mathematics problems. Problems will be completed prior to class in order to check and evaluate during class time. A notebook of the daily problems will be collected and must include the solution to the problem and a detailed explanation of the problem as it should be explained to the appropriate grade level. The daily problem will include the following:

- Associate multiple representations of numbers using word names, standards numeral, and pictorial models for real numbers
- Compare the relative size of integers, fractions, decimals, numbers expressed as percents, and numbers with exponents
- Rations, proportions and percents in real-world situations
- Represent numbers in a variety of equivalent forms
- Perform operations on rational numbers using multiple representations and algorithms
- Select the appropriate operation to solve problems
- Use estimation and problem-solving situations
- Apply number theory concepts
- Apply the order of operations

Mathematics Integrated Unit (Elem Ed C&S: 32.1; 32.2; 32.3; UCC a) *(This assignment must be uploaded to Chalk and Wire.)*:
The teacher candidate must develop and implement part of a Mathematics Unit consisting of class lesson plans. All activities and lesson plans within the unit, will include clearly stated learning goals that are aligned to the Common Core State Standards. Teacher candidates presenting the activity must meet the following standards:

- Identify a variety of appropriate instructional strategies (e.g., cooperative learning, peer tutoring, think alouds) for teaching specific concepts
- Identify ways that manipulatives, mathematical and physical models, and technology can be used in instruction
- Identify a variety of methods for assessing mathematical knowledge, including analyzing student thinking processes to determine strengths and weaknesses
Use high level questioning to facilitate higher level mathematics concept

Teacher candidates that participate in the classroom activities will complete an evaluation and reflection of the activity presented.

Topics will include:
- Developing Early Number Sense
- Developing Meanings for the Operations
- Helping Students Master the Basic Facts
- Developing Whole Number Place Value Concepts
- Developing Strategies for Addition and Subtraction Computation
- Developing Strategies for Multiplication and Division Computation
- Developing Fraction Concepts
- Developing Strategies for Fraction Computation
- Developing Concepts of Decimals and Percents
- Proportional Reasoning
- Developing Concepts of Exponents, Integers, and Real Numbers

**Geometry & Measurement Academic Tasks (Elem Ed C&S: 29.1; 29.2; 29.3; 29.4; 29.5; 29.6; 29.7; 29.8; 29.9; 29.10; 29.11.)**

*This assignment must be uploaded to Chalk and Wire; HOWEVER, please do not upload until Activities 4 and 5 are complete. Activities 1,2,3,4, and 5 must be uploaded at the same time.*

Activity 1: Ordered Pairs
- Identify and locate ordered pairs in a rectangular coordinate system

Activity 2: Geometric Properties and Concepts
- Apply geometric properties and relationships to solve problems
- Apply the geometric concepts of symmetry, congruency, similarity, and transformations

Activity 3: Two and Three Dimensional Shapes
- Analyze properties of two-dimensional shapes
- Analyze properties of three-dimensional shapes
- Compose and decompose two-dimensional and three-dimensional geometric shapes
- Identify three-dimensional objects from two-dimensional representations of objects and vice-versa

**Geometry & Measurement (Elem Ed C&S: 29.1; 29.2; 29.3; 29.4; 29.5; 29.6; 29.7; 29.8; 29.9; 29.10; 29.11. UCC a)**

Activity 4: Measurement
- Determine how a change in length, width, height, or radius affects perimeter, circumference, area, surface area, or volume
- Solve real-world problems involving estimates and exact measurements

Activity 5: Measurement Units and Conversions
- Solve real-world problems involving measurement with both direct and indirect measures and make conversions to a larger or smaller unit
- Select appropriate measurement units to solve problems and math computational skills/concepts
Algebra & Data Analysis Academic Tasks  (Elem C&S: 30.1; 30.2; 30.3; 30.4; 30.5; 31.1; 31.2; 31.3) This assignment must be uploaded to Chalk and Wire; HOWEVER, please do not upload until Activity 8 is complete. Activities 6, 7, and 8 must be uploaded at the same time.

Activity 6: Patterns and Relationships
- Extend and generalize patterns or functional relationships
- Interpret, compare, and translate multiple representations of patterns and relationships by using tables, graphs, equations, expressions, and verbal descriptions

Activity 7: Properties and Equations
- Demonstrate knowledge of one- and two-step linear equations and inequalities
- Apply the commutative, associative, and distributive properties to show that two expressions are equivalent

Algebra & Data Analysis Academic Task  (Elem C&S: 30.1; 30.2; 30.3; 30.4; 30.5; 31.1; 31.2; 31.3)

Activity 8: Data Construction and Analysis
- Demonstrate knowledge of the concepts of variability (i.e., range) and central tendency (i.e., mean, median, mode)

Use data to constructs and analyze frequency tables and graphs (e.g., bar graphs, pictographs, line graphs) Make accurate predictions and draw conclusions from data

Manipulative Lesson Plan, Video, & Reflection  (ESOL C&S: 1.5; 9.1; ESOL Standards: 3.2i; 3.2k; 5.3c)  (This assignment must be uploaded to Chalk and Wire.)

The teacher candidate will develop a FSC lesson plan that includes a clearly stated learning goal that is aligned to Common Core State Standards. The teacher candidate will complete the video reflection. The teacher candidate will videotape the lesson and bring the video recording to the class to be viewed by peers. Teacher candidate peers will give feedback to the teacher candidate and the teacher candidate will write a response to the feedback addressing each issue. The lesson plan, reflection, and feedback must be submitted to Chalk and Wire. The lesson plan must include:
- Strategies to promote multicultural sensitivity and diversity in the classroom
- Methods and strategies used to incorporate appropriate listening, speaking, reading and writing activities for teaching ELLs from diverse backgrounds and at varying English proficiency levels
- 2-3 tools/materials that assess mathematics content area learning for ELLs at various levels of English language and literacy development
- 2-3 instructional techniques that will assess mathematics/content area learning for ELLs at varying levels of English language and literacy developments
APPENDIX B: DATA

Cooperating Teacher Initial Interview

R: Tell me about your teaching experience. How long have you been teaching, what grades….

M: This is my 5th year teaching. I started as a long term sub in kindergarten. I got hired as a 4th grade teacher and taught 4th for one year and then I’ve been in 5th grade ever since.

R: Same school?

M: Yes

R: I know teaching wasn’t your first career though, so what brought you into teaching?

M: I used to be a crime scene investigator and on my days off, my mom runs the YMCA reads program out of Winston, so I would go down there and I fell in love with seeing the kids succeed and suddenly I made a choice to change.

R: What are your thoughts and beliefs about math instruction and how students learn that?

M: It needs to be rigorous, it needs to be very concrete. They need as much reinforcement as you can give them.

R: Do you use the textbook or do you get your own materials?

M: This year with everything being so different we do a lot of our own….. CPalms lessons and engaged lessons too. So it’s all new. They have an interactive part where you can write steps in for each standard that we’re teaching.

R: Describe your experience in working with pre-service teachers, like Kelly.

M: Kelly was actually my very first ever intern last year and she was wonderful. She’s still wonderful. I had 2 interns one day a week the first semester of this year. Then Kelly is back full time.

R: So you’ve had positive experiences all the way around?

M: Yes.

R: How you feel like you can best mentor those teachers?
M: I love it. Kelly and I have formed a really good relationship. I enjoy seeing them grow.

R: How do you give her feedback? Say she teaches something in the lesson that didn’t go well. How do you go about giving her feedback for that?

M: She very good about and being open to let’s try something different next time or this how maybe I would have done it. And then she implements the suggestions I have. So I think that’s good that she keeps that open mind.

**PST and CS First Conference Interview Week One**

P: I do want to ask you for in the future you do have to put in what the whole standards are. Just a logistical thing there. I thought when you started the game you did a really nice job. You showed the rules and I thought that was really important. You set the expectation that this is what I expect you to do and because it’s new that’s really important for them. You did a great job with that. It was new to them but you set it up well. You said “this is new and these are the expectations or rule I want you to follow.” You called on one student from each group to share. It looked like we missed that in the very beginning.

K: We started with the EQ and read it out loud. Then we did the piece of paper that we’ve done all week just as an activator so they don’t forget what we’ve been doing all week.

P: So you started with your EQ which is really important. Then you activated their background knowledge and each group had a different problem. It was really good you had them solving that problem in their groups but when they shared out their answers the rest of the group didn’t know what their problem was. It might have been helpful for tables 2, 3, 4 for table 1 to hold up their problem so they could see what they were talking about. I don’t know if there is a Doc camera, but that group could have put their problem under the document camera to solve it. It was good that you had them working in groups and solving the problems but if they’re going to explain it then everybody needs to be able to see it. Not everybody is an oral learner. Especially in math. You set it up well where each team had a facilitator. That was a great idea because one person was going to give out the answers for that group and you established that upfront but then you asked each team to decide on a name which was a great idea; it’s fun and engaging. But think about the time spent (you used your timer for deciding on a name) but then getting the name on the board seemed to take a long time. Give them a time frame for that. That’s lost instructional time.

You have a really good routine for starting to get their attention “class, class, yes, yes.” That’s good. Those routines will save you a lot of time and stress.

K: With 5th grade, I have done things like that before and I’ve learned that in class, but they think the little rhymes are babying them. Students have told me “we don’t like it when you do that because we think that you’re babying us”. I try not to but sometimes I can’t get their attention.

P: They know that and it gets their attention and they do get quiet. If they think that you’re babying them then ask them for suggestions on getting their attention. Put it back in their lap,
what do you want me to do? Maybe it is something like counting down. Even if you think its babying them it’s effective and that’s the important part.

Your goal from last time was higher student engagement and I think you met that goal this time. I think most students were engaged at their table groups. You had a white board at each table and every person was supposed to solve the problem on their papers too.

K: Something that we talked about last time that I’ve been trying really hard to work on is asking the question before calling on the student. So I thought that with this they all can see the questions so they all have to think about it even though it’s just one person holding up the board they are all supposed to be doing it.

P: The only thing I would add to that is some of the groups were talking and some of them weren’t. “A” was sitting here and she was talking to everyone in the group. Have everyone solve the problem first then share in your group and come to a consensus. That way everyone is responsible for solving the problem then they have that discussion about how they solved the problem.

K: That happens a lot, there are kids who are high and low in all the groups. So when there is a problem the kids who are high will solve all the problems. The low kids will wait for them to solve the answer.

P: So if you say I want you to take 90 seconds and everyone solve the problem, no talking for this time, and then let everyone work and say turn and talk to your neighbor, see what the answer is and if you don’t agree, have that discussion about why you don’t agree. But then everyone is accountable to do that problem. Like this girl over here at the table with that boy and this girl here had her head down. She was not as engaged and you want to make sure she’s solving those problems and having that discussion between the teams. Then say, rather than calling on the facilitator…have you seen the Kagan spinner? It’s a spinner divided into 4ths and you spin it and whatever number it lands on, you call on that person in the group to answer that question. That way it’s not just the facilitator in the group answering the question. That will up the engagement. The white boards were a way to up the engagement. Everyone was able to solve the problem and then adding that middle step there “now talk about it at your table and make sure everybody agrees”, that will up the level of engagement and understanding.

When we talked about your goals last time, it was more student engagement and you used white boards and then calling on the students after you asked the question. You definitely did that in the Jeopardy game but when you were in the small group, that wasn’t happening. Think about how you can make sure that happens in a small group. Asking that question first then having everybody think about it.

K: With the small group today, the list she gave me for groups to call, they were different levels, so half of them would get it in 5 seconds and then A and M were a lot slower. So the other kids would already have the answer so I would ask A to work through it with me so the other kids were just sitting there waiting.

P: Did you have those math problems worked out in advance?
K: No, probably should’ve.

P: Alright, let’s make that one of your goals for next time. To have all the math problems solved in advance because you want to make sure they’re getting that correct answer. Always solve your math problems in advance so you have answers. You can check yourself and you have a group of kids with different answers it is easy to miss a step but if you know the correct answer, you can say whoops guys we missed a step. Who can find out what we missed? That’s really important. You did a really good job during the vocabulary review addressing vocabulary. You used numerator, denominator, and math vocabulary and the language of math is math, so you need to think about that. Don’t be so hard on yourself. You did a really great job with using the language of math. If students don’t understand the language they are not going to be able to pass the test or problem solve but that’s one of the things you did really well. Don’t be so hard on yourself. You’re going to learn and grow in this and you’re going to make mistakes and you need to say that’s okay because if it was all easy you wouldn’t need the internship and that the whole point is to learn and to grow.

You did a thumbs up if you had the answer and everyone was supposed to have the answer on their paper so that’s another way of meeting your student engagement goal. You did ask some good questions such as “why did you move the decimal place to the left?” you made them explain and you asked why several times which pushes this to a higher level. All of the questions in the game were to find the answer and there were no real world problems expect for in your small group. The game was low level but when you ask why you’re upping the level. And when on student solved it one way and another student solved it another way, you acknowledged that there were multiple ways to solve a problem, that was really good too. That’s what common core standards are addressing, that there are multiple ways to solve a problem. Asking why is great, you’re good at that, you used the vocabulary, you made progress towards engaging every student in problem solving.

My biggest suggestion for next time is solving all of those problems in advance. Especially with the small group work because that’s where it seemed like you felt uncomfortable.

K: Yes. Especially with the jeopardy, I wasn’t teaching them how to do anything. I was overseeing them do it and then in small group when I was teaching them how to do it that’s where I get uncomfortable with it.

P: In the jeopardy game there was one problem where they had to solve something in parenthesis. They had to know the order of operations. I think several students missed that problem.

K: They don’t teach PEMDAS anymore, they’re just supposed to know it and I haven’t gone over with her how they do that so I have no idea. That was the first problem so most of them got it wrong.

P: If you don’t teach them the acronym PEMDAS then you still say we have an order of operations that we have to follow in mathematics. First we do parenthesis, then we do exponents, etc.)
K: I kind of skipped over explaining it because I wasn’t confident in explaining it. I worked the problems out but I am not good at teaching others to do it because I am not confident so I don’t come across as confident in what I'm talking about so then they get confused. I didn’t want to confuse them more.

P: That’s your job now is to teach them how to do it. You know how to do it because you solved for the correct answer. You have to find a way to explain that order of operations. If you wrote it out on a chart, I would have said “it looks like some of you guys forgot what to do next but here’s a chart to help us remember what we do first and last.” Set yourself up for success. If you’re not comfortable with it, make yourself a chart and then put it on the board and say “I had a feeling some of you would be tripped up with this.” You’re creating yourself a cheat sheet to make yourself more comfortable because you knew it but because of your anxiety you didn’t explain it so they didn’t learn it. You have the responsibility to make sure they learn it. You can do that because you solved the problem. That leads us to the second group, the small groups that you did.

K: Just as an overview, when we do small groups we do the whole group lesson then they do problems then small groups and we do test-backs to prepare for their FSA. Once they do, it’s a 2 hour block for math, when they come back from lunch we do iii and we go over the problems we did in whole group so it’s split in a way and small group is different.

P: I want you to think about too, since you brought up the FSA…the essential question was how will doing this help us on the FSA? I understand testing is important and that’s what they’re evaluated on and that’s what teachers are evaluated on but that’s not why they’re learning this. They’re learning it so they will know how it will help them in the real world. I want you to add to that and say “okay, so it’s going to help us on the FSA” and they respond to that then you say “how will this help us in the real world?” Make it applicable to their lives, make it relevant. This group that you have right now is the high group so they’re motivated by that score on the FSA. The next group isn’t the high group; they’re just the average kids. They want to know how this applies to my life, why do I need to know how to do this. Add that question in there because that’s important. Relevance creates motivation.

The other thing was in your small group somebody said you were doing mixed numbers like 1 ½ + 2 3/4. What you were having them do was to turn everything into an improper fraction and then add and reduce. Correct?

K: Yes, that’s how they learned it so when I went over it with Ms. E that’s how she taught me to do it.

P: That’s correct; you can do it that way. You had a student in the small group that was struggling. So can’t you add “this” and then add “this”?

K: So add the whole numbers and then the fractions?

P: Yes. So 1 ½ + 2 3/4, well 1 + 2 is 3 so then you have 3 + ½ + ¾, so then we know we need to find the common denominator and that’s going to be ¾ because it stayed the same. 2 x 1 = 2. So you got 3 + 2/4 + ¾….
K: I don’t how to do that way so I know you can do it both ways but I’m not confident in working that through with them because I don’t know how to do it so I redirected it to the way I do it.

P: Could you have said “A, show me the way that you’re doing it” so you could see how he was thinking? Because there are multiple ways to solve math problems and get the same answer. This actually reduces the amount of reducing that they have to do and is based on the commutative property that says you can add in any order so your answer would have been 4 ¼. Do you see what I did here? 1 ½ + 2 3/4… I'm going to take these whole numbers and add them together. 2+1=3, 3 ½ + ¾ … so this 3 is going to stay the same and then I take these 2 numbers and I have to find the common denominator. Then I get 3 + 5/4 and that turns into 4 ¼ because there’s one left over.

K: I’m just confused with the whole number and the fraction, like combining them. Before you showed me I didn’t know how to get it to be 4 but I knew it wasn’t 3, so I didn’t want to do it because I knew I didn’t know how to do it.

P: That’s okay, asking is how you learn. Do you have a math book? Like the teacher manual?

K: No, they don’t use their math books anymore since they changed the standards.

P: What I would suggest since she isn’t using it is you use it because you’re struggling with this and you can use the manual as a resource. You can at least look in the index to see what it says about adding fractions.

K: I’ve been watching math antics videos this whole week. They teach you how to do math problems and they are for 5th graders so I’ve been doing those.

P: Another resource is Khan Academy and it talks about how to solve mixed number fraction problems so you can Google that. I think it’s really good you’re looking at other resources. A resource that is sitting in the room and apparently not being used is that teacher’s manual, so I would definitely ask to borrow that. Because A is struggling to make improper fractions because I think he was struggling with number concepts for one thing. He couldn’t do 6+11. So what does that tell you that A needs?

K: I'm pretty sure he knows how to do it, he’s just slower. But if you push him and say “try again, try again”, he’ll get it.

P: He was struggling with the multiplication too … so this takes away some of that extra multiplication so it would probably be easier for him. I am really excited that you went to the math antics videos.

K: It’s helpful because it breaks it down into simple terms and that what I need.
P: That’s what you need and that also what your students need. Which shows you’re growing professionally and that’s what this whole this about. Because if you can’t understand it, you can’t teach it to the students. You did a really nice job of meeting your goal of student engagement and I want you to continue to work on that because that’s something we all have to work on, all the time. So continue to add to that goal and your goal for next time is to make sure to solve all of the problems in advance and have those cheat sheets for yourself if you know you need that to support your explanation of that answer, like the order of operations. Even for your small groups that important too because you solved the problems for your whole group but not the small group. In the whole group there were a couple of kids that you say could you come up and explain that and they probably could, but in the small group you might not have that so you need to make sure you can explain those questions.

Good use of vocabulary. Keep using that. The more you use it, the more you learn it. We know that with vocabulary instruction, kids need multiple interactions with that language and so that’s true in mathematics language as well so keep using it. If they don’t understand the language, they won’t pass that assessment. So that’s really, really important too. Did you have questions for me?

K: I don’t think so.

P: Overall, your lesson went well. So don’t be so hard on yourself. You’re expecting perfection but none of us are perfect. None of us. I make mistakes about literacy and Mrs. R is going to make mathematics mistakes. I think part of that is understanding and telling your students “oh my goodness, look at this”.

K: I just get worried because I know that students have to pass a test, a math test, and I am the one teaching them. I don’t know if I can help them pass it because I don’t know if I could pass it. I am not confident in myself in that at all so every time I mess up, it just makes it worse.

P: You have to teach them that it’s okay to make a mistake but that we have to check our work. We go back and we correct it. Life is all about making mistakes and then readjusting so you have to teach them that. If they think they have to be perfect then they might shut down, just like you did probably in school. You don’t want them to shut down, you want them to feel safe in your classroom and you have such a good rapport with the kids. It’s real obvious. When “A” held her board up and you said “girlfriend put that board down.” Very comfortable and you’re really good at giving specific feedback. You said “I love the way you use the word numerator” or “I like the way you did that.” You give very specific feedback, you have good rapport with the kids, and you’re giving them feedback. It’s okay to teach them, teachers make mistakes too. We’re all going to make mistakes but it’s when we ignore that mistake and don’t correct it is when it becomes a problem. That’s a very valuable lesson that you can teach them about mathematics and about life too.
Preservice Teacher Initial Interview Week One

R: Tell me a little bit about yourself

K: I am from ___________. I came here as a transfer from _______. I just wanted to get away from the party school scene. My best-friend from high school went here so that’s how I found it or else I would have never heard of it.

R: In general, how do you feel about math?

K: I hate it. I would rather do anything than math.

R: Why do you feel like that?

K: Because I’m not good at it. I'm not comfortable with it. It confuses me and makes me feel like I’m not smart. I’ve never admitted that before.

R: What are your memories of math in your educational experience?

K: Elementary school, I had a 5th grade teacher who would give us Slurpees from 7/11 if we got questions right on tests, so I would always try and get questions right. Then in middle school I had a 6th grade math teacher who was the meanest teacher I had in my whole life. If you got questions wrong she would put you down and make you feel like you weren’t good enough. She was never encouraging. It was more like “oh you got that wrong? Well I’m not going to help you.” So ever since then, that was my mindset, that I wasn’t capable of doing math. So I hated it. I failed College Algebra twice just because I had that mindset that if I didn’t get it right the first time I wouldn’t get it right. And it has been like that ever since then.

R: Do you believe that your math educational experiences influenced your feelings of math anxiety today?

K: Yes, 100%.

R: Tell me about the methods course you completed last year? Is there anything that will help you with teaching math or increased your uneasiness about teaching math?

K: I think the biggest thing that I took from it was using manipulatives because I had never done that before and I had never been in a classroom that used them. Being able to visually see things, touch things, move them around was helpful when we were doing certain things. I had never done that so I was never good at using manipulatives with my lessons because I didn’t know how to before we did stuff like that. I think that with kids, being able to have different ways to learn it can be helpful rather than just a board.
R: Do you have manipulatives in your classroom?
K: There’s a closet at my school that has some but my teacher doesn’t use them very much.

R: Do you think you’re going to use them?
M: I want to. Once I’m comfortable with figuring out how to exactly use them correctly.

R: That might actually be an interesting situation; because she doesn’t use them it could be
because she doesn’t know how to use them either.

K: She uses dice here and there but that is kind of the extent of it.

R: During your three field study experiences you’ve had so far, how confident did you feel while
you were teaching your math lessons?

K: My first field study was 2nd grade. It was fine. I didn’t feel uneasy about it. I still didn’t
understand some of the stuff which is funny because its 2nd grade. I felt like I was doing okay
with it but I was worried that I was teaching them incorrectly. My second one was 5th grade and
that is when it got really bad because I don’t remember any of that [math]. The stuff you have to
do, like equations, fractions, decimals, you actually have to know what you’re doing. I didn’t feel
like I knew what I was doing so the kids would actually call me out on being wrong and that was
a confidence lowerer. I know it’s a learning experience but having a 5th grader tell me I’m wrong
was like “wow, maybe you should teach and not me.” That was hard. My last one was 1st grade
and we didn’t do a ton of math because I was in a reading class and they rotated.

R: What do you believe are your strengths in teaching elementary math?
K: I'm really good with feedback. I give positive and specific feedback. Teaching math? Um…I
know mean, median and mode well. Basic addition and subtraction.

R: What are your weaknesses in teaching elementary math?
K: Comprehending things I'm shown and then teaching it is hard. I don’t understand things
enough to do that. Division, equations, decimals, fractions. I don’t like any of that. Everything,
pretty much.

Observation Narrative Week One

At the sound of the bell, Kelly called to the students to get off the computers and go to their
seats. She took attendance and did the lunch count. Kelly then asked the students to get their
“interactives” and copy the essential question on the board. Kelly read the LEQ, “How do I
create a line plot to display data using fractions of a unit and solve problems using the
information from the graph?” Kelly reminded the students that they have done this skill for some
time. She asked, “What real life situation could we sue a line plot for?” The students discussed
this question in their groups while Kelly walked around giving suggestions for them to think
about. When she returned to the front of the room, she pulled popsicle sticks with student names
on them to ask for examples of real life situations. Students gave situations such as “choice of
meal, different kinds of lunch, gas to fill cars, and shoe types. With every one, Kelly replied with “That’s a good one,” “OK, that works”, or “I like that”. Kelly used the situation of the gasoline to create a line graph, not a line plot. She asked what each axis would represent – one student answered, “Type of gas.” Kelly asked the student what the key should be. The student replied, “One black circle should equal two”. Kelly identified the types of gasoline as diesel, premium, and midgrade. Kelly asked the class what type of vehicles would get diesel. At this point the students became very talkative and she had a hard time getting them quiet again. Kelly made up numbers for types of vehicles to purchase the gasoline. After each number of vehicles were represented by the black circles, Kelly asked the students what the denominator would be. Kelly miscounted and wrote the denominator as 28 instead of 26. One of the students called out that the denominator was 26. Kelly tried to find her error, but could not. Another student pointed out that when counting, she skipped the number 20. Kelly asked, “What fraction of people buy midgrade gasoline?” and “What fraction of people chose diesel and premium?” A student answered correctly and explained that she added the two types of gasoline and placed that number over the denominator.

Kelly instructed the students to go into the hallway and place themselves on the tape strip according to the survey that that had done the day before on their favorite sports. The students divide up into 4 groups – basketball, baseball, football, and soccer. Kelly asked the students how the denominator would be determined. One of the students replied, “Count all of us”, Kelly then asked what fraction would be represented by each sport. Kelly paused and then asked the students to go back into the classroom.

When the students return to the classroom, they are placed into small group: one group went to the computers to take a practice test, one group worked with the cooperating teacher, and one group worked with Kelly at the back table. Mrs. Mills brought Kelly a set of worksheets for the small group. Kelly explained to the students that they would be working on adding fractions. The first problem was \( \frac{1}{4} + \frac{3}{8} \). Kelly told the students that they would need a common denominator. She explained that they would need to find the least common multiple and set up their fractions. At no point did Kelly use the term “equivalent fractions”. Several students seemed frustrated and Kelly reassured them. She told the students that she made mistakes too and identified with the problems they were having.

**Preservice Teacher Interview Week One**

R: This is Kelly and this interview is based upon the first observation.

R: I looked at the lesson plans. Tell me about the decision making that went into planning the lesson. Like, how did you decide on the content, the instructional strategies, and the tasks that you did with the students?

K: This is something they had planned. They plan all of their stuff. This was planned last semester.

R: Who’s they?
K: The 5th grade team. They give me…Mrs. Mills and I are going to sit down for an afternoon and plan my way…kind of the rest of the way that I want to do it. This is plans they have already set so she gave them to me and told me I could change them, adjust them, things like that. But that is the just of what needs to be taught.

R: So basically it had the whole group stuff in there, doesn’t have the small group stuff, it’s the whole group.

K: Small group is they don’t build off of anything new. It’s all looking back, doing reviewing, doing test-backs, doing things that specific lower or higher kids need to work on. So it’s identified by group and that’s something that she usually has out but we’re doing that Friday for me to start changing myself.

R: So you’ll be planning those small groups Friday? So for the whole group, tell me if I’m right, you were given the content which was the line graphs, the instructional strategy which was … there were two of them basically … the first one was asking them to create a real life situation for a line graph and you used the one about the gasoline. Then the task where you took them out in the hallway…

K: I came up with that stuff.

R: You came up with that stuff? Okay tell me about that.

K: I use Pinterest for everything pretty much. She gives me that standard and the content area and I can usually do what I need to do with it to make it my own and those kids are very … if they’re sitting for too long, you lose them. So taking them out in the hallway, it’s a task trying to keep them quiet so they don’t disturb others but they’re up and they’re moving so it kind of brings their focus back so that’s why I did that. And with the real world situation, I always get questions like “why do I need to know this?” always. And I was like that too, I was like “I’m not going to need to know this in real life.” It gives them more of a reason to want to do it if they know that they might need to use these things in the future.

R: So you came up with the one in the hallway from Pinterest? And the one with the gasoline, you were just matching that with why we need to know this.

K: I was pulling sticks, so I gave them time to have discussion along the lines of “why do you think we would need to use a line plot in the real world scenario?” And then they had time for discussion in their groups and then I pulled sticks and that was one of the examples I was given so I just used one of the students’ examples.

R: Okay, good. Tell me about your strengths and weaknesses with this content.

K: Uhm…

R: Or if you have one or the other because one might be stronger than the other. Let’s talk about the line plots.
K: I feel like I can do line plots and I understand them and I feel pretty good myself with line plots, it’s just when it comes to explaining it to them and making sure that they’re okay with it and if someone has a question with solving fractions when it comes to line plots, I’m not good at explaining it or coming across like I know. I can think about it in my own head but I can’t talk about it. It’s weird.

R: Fair enough. What about your strengths and weaknesses with the instructional strategies? I’m going to concentrate on the two. Creating the real world situation and taking them out and making a life size line plot. Strengths and weakness on those two instructional strategies.

K: I think with taking them out into the hallway, I couldn’t really do that before hand with a bunch of kids. It was kind of hard to ask them probing questions while we were out there because I didn’t know what to ask them. So I had them set themselves up and then I was like now what should I do?

R: Right, okay. I see what you’re saying. So you already had your 4 categories chosen and then they got in a line plot. So you’re telling me that once they got in a line plot you didn’t know what to do from that point?

K: Yeah, pretty much. I just made it up.

R: But you did ask them I remember, “What’s our denominator?” and “How do we get the denominator?” Then I think you even asked them to combine two sports…

K: To make a fraction with it.

R: Yes. What connections if any, did you make between your mathematics course work and this lesson?

K: I think manipulatives was always what I got from the course. Don’t just sit there and talk and do work. Use something, use your bodies. So that was where I had them use their selves as the manipulatives pretty much to move around and to have that visualization. So that’s what I took from that, is that to be able to hit different areas of learning. So it’s not just the kids who are good at seeing things, or hearing things or watching things. It’s kinesthetic and they’re moving and it might hit different areas of their strengths and weaknesses.

R: Is there anything else you would like to tell me about the planning or implementation of this lesson?

K: It’s been really hard because Ms. E, she hasn’t a very, very structured routine. Extremely structured.

R: She has a structure…
K: Yes. She’s very structured, it’s routine, the order that they go in is routine and the way things are done is routine. So I don’t like to break that because it’s what they’re used to so it’s hard for me to make it my own. And it’s hard for me to teach because it’s not my own. So I come in and I am teaching everything and I have the lessons and I help create them but I stick her outline, her structure and it’s hard for me to feel comfortable doing that so it makes it more of a challenge because I sometimes don’t really know what I’m doing. Or I guess the best way that works for me but I don’t want to break that because that’s what the kids are used to and that’s what they like.

R: So now I’m going to ask you some questions specifically about the lesson. Just things that maybe I need to clear up or I want to know from your viewpoint. You called, the spiral notebooks “interactives.” What are those?

K: Honestly, I don’t know. That’s what they call them, so I call them interactives. They are spiral notebooks and they have different interactives for each subject. I’m only doing math and science.

R: What do they do in their interactives?

K: It’s just different for each subject. In science and math they will copy down their EQ. Everything that I tell them needs to be in there, will be in there. At the end of every month I will look through it to make sure they’re doing things correctly, staying on task, actually writing down what they need to be writing down.

R: So it’s kind of like a subject journal?

K: Yeah, pretty much. And they can use it as a reference a lot of times if there is a quiz or assessment and you know they’ve been taking notes or they haven’t been...you can be like “you can use your interactive for that” and if they haven’t been doing the notes then they’ve been missing out on. And if they have been, they’re benefiting.

R: So here’s a situation that happened and I want to tell me about what’s going through your mind. When you were doing the gasoline line plot and you were counting up the total you counted to 28 and the students goes “no its 26!” tell me about that.

K: I thought, this is great ... this is just great. Because I had been doing so good with it and then they were like you’re wrong and I was like you’re right. But I couldn’t find my mistake and I kept redoing it and redoing it and I was like why am I not getting this right? Then they told me that I was skipping the number 20 and that’s why. I don’t know why I was skipping the number 20. I just did and I didn’t think about the fact that I was doing it until they told me.

R: I thought you reacted well to it.

K: I kind of tried to make it like a joke like “oh you’re teaching me too” and not like I was embarrassed by it because they pick up on that real quick. But I was obviously. I didn’t realize I was doing it though. I had no idea.
R: It was interesting. Tell me how...we’re going to go into the groups now, okay...how are those groups formed?

K: By their testing.

R: So all together there are 4 groups. So you saw a lower group first, an average group second and then you saw the highest two boys?

K: Yes.

R: Tell me a little bit about “student A”.

K: She has had a very rough time. She lives at the Salvation Army. Her mom tried to kill herself last week and there’s something that goes on at home that rubs me the wrong way. I think it was when you were there, she had a cut on her face that was direct lines and a line across. It was very, very clear that it wasn’t just a scratch. So I was like “A’ what happened to your face?” and she was like “oh my pet duck did it”. They don’t have pet ducks at the Salvation Army. She has a very hard home life and when she comes to school she tries so hard. She gets off task but she really does try. She is in the lowest math group.

R: I noticed that she was really struggling and you were trying to work with her.

K: I try to give her probing questions to make her think step by step and not the whole question because if you break it down into steps she gets it easier that way. Like I will write out steps for her and she’ll follow it that way. Something like that rather than looking at the whole question and getting overwhelmed. Because that’s what I do. I look at it and I'm like nope and that’s exactly what she does. I try to break it down with her but sometimes there just is no comprehension involved.

R: One time, or you told them more than one time, that they needed to go slow when doing it. Why did you tell them that?

K: Because they are lazy. And they want to be done and they think if they do their problems quickly, they can go on FCAT Math. So they’ll rush through it and they’ll be like 4+7 is 8 and then they’ll stop there and it’s because they’re rushing through it. They know how to do it. If they just take their time, if I give them a time limit and I tell them they have to take that whole time, I’ll see a difference. Because if they’re rushing through it it’ll be like oh, you’re subtracting with an addition sign. So it’s a matter of their focus and if they put their all into it they will get it. But if they’re just trying to rush through it they’ll make mistakes.

R: You said FCAT Math ... is that what they were doing on the Smart Board?

K: Yes. It’s more of the fun center and it’s sad because the kids who aren’t higher in math never get to do it and they don’t get to do calendar because they’re doing triple I or they’re with me at small group. So they don’t get to do that and they think if they get done early, they’ll be able to which makes them rush through the problems and get them wrong.
R: One thing I wanted to ask you, there was a problem, $2/8 + ¾$, and you said what’s the common denominator and a couple of kids gave you 8. One little boy, he was on fire. He was saying 8! One thing that I noticed that you didn’t do and I just wondered if there was a reason if they’ve done it before or whatever, you never asked the students to show you how to find the least common denominator.

K: That’s something that she has them not write out unless they need to. If they need to write their multiples, they can do that but most of them they can just look at it and know.

R: I couldn’t see everybody in that small group so is everybody pretty much getting the common denominator thing?

K: Yeah, and if they want they write the multiples out and circle them.

R: Okay because I couldn’t see that. I also noticed that when you are making the new fraction with the new denominator, you didn’t use the term “equivalent fraction” is that something that they haven’t done?

K: Hmm, I don’t think I’ve ever said that.

R: I just wondered if they didn’t learn it that way.

K: No they know what that means. I just…

R: You just didn’t say it

K: I never … now that I think about it I don’t think I’ve ever mentioned the word “equivalent.” Which is the proper way to say it.

R: Math vocabulary.

K: Yeah.

R: That leads me to another one, because I thought this was interesting and it had to do with math vocabulary. You asked a student, they were reducing fractions, putting them in simplest form and you asked the student “why (I forget what the number is, 17 or 19 or something like that)…an you said “why can’t that reduce?” and the student was struggling a little bit to get it out and your cooperating teacher was standing right there and she said “what kind of a number is that?” and she led the student to “prime number”. Is that what you were trying to get the student to do?

K: No

R: Because you know what I noticed then is in the next group (that was with the first group) in the next group you did do it.
K: I can remember it specifically because I didn’t think about what a prime number was and honestly…

R: let’s think about prime number and equivalent fraction are both math vocabulary. Do you think that’s an area you might struggle in then?

K: Yes. Clearly. Especially now that you’re talking about it because both of those things are words that if I talked about they would know what I was talking about. If I try to just explain it the way that I think about it, it doesn’t work like that.

R: So maybe in your mind there’s not a connection.

K: I don’t think there is. But when she said it, I was able to do it.

R: You did. Because you did it perfectly right with that second group.

K: But before she said it I wasn’t even looking for that answer, at all.

R: That’s interesting. Alright…which group are you most comfortable with?

K: The high ones.

R: The two boys?

K: Yeah

R: Why?

K: Because I don’t have to explain things to them. I don’t have to explain anything and that’s what I get anxiety about because I think that I’m going to do it wrong. So with those two, they explain it to me. I’ll be like show me how and then “yep, didn’t know how to do that one” and they show me and I’m like awesome, good job!

R: So which group are you least comfortable with?

K: The lowest ones

R: For the same reasons?

K: Yeah, because they’re asking all the questions that I'm in the same boat as them half the time. I don’t know how to answer it. It’s not because I don’t know how to do it, I just don’t know how to relay the information and I always think that I'm going to be wrong so I don’t want to talk about.
R: This next one relates to that, so “E”, he used cross-multiplication to compare his fractions. Did you know how to do that before?

K: No earthly idea that you could do that so that’s why I made him show me like 4 times and finally I'm like well he’s not getting the wrong answer I'm like well it must be right. I don’t know if it’s the right way to do it or not but if he’s getting it then good for him.

R: So when you’re going over that is there some kind of assessment or something that they had?

K: It was just a formative to see what they know or what they’ve learned, it wasn’t graded.

R: Did you have an answer key for that?

K: No, I don’t get a key to anything. Nothing I grade…

R: So you didn’t see that ahead of time?

K: Nope.

R: So really you are relying on them?

K: Yep, pretty much. I’ve never had a key, never once. So I’ll have test to grade and I think I’m going to grade them wrong because I don’t know what to look for or even if I’m doing it right and then I freak out that I'm doing it wrong and it just makes it worse.

R: I’m going to give you some quotes that you said and I want you to tell me, I'm not sure why you’re saying them so I want you to try and give me some idea on why you’re saying them, I have an idea … one of two things but I’m not going to tell you what my idea is. You said “I make mistakes too.”

K: I want them to know that it’s okay to make mistakes and that they don’t have to be perfect and I want them to know I am going to make mistakes and I’m going to not always be right and I think that by saying that…I don’t know, I think it was because I was scared I would keep making mistakes in front of them and that way they might be more understanding. Like I get nervous with them, and they’re students. I shouldn’t be nervous around them. So I think I was saying that as like a warning type thing.

R: When one of the students made a mistake, you said “I would have done the same thing”… I don’t remember, I think it was changing a fraction incorrectly. And you said, “I would have done the same thing.” Was that a true statement or was that to make them feel better?

K: No it probably was true. I think that when I get down to that level with them and they don’t feel like they’re being judged for doing it wrong or like I think they’re not good enough or smart enough, because that’s how I felt when I was being taught. And if I got it wrong them I wasn’t smart enough or I wasn’t good enough, so I think that if I could bring myself to that level and I'm honest and I say I would have done that the same way so don’t be hard on yourself then that will
make them feel more comfortable to try and bring that up and be confident because I wasn’t like
that and it brought me down.

R: Understandable. You said “You’re better at this than I am!”

K: Gosh, these are just terrible … uhm

R: Again, is that a true statement?

K: Yeah, it was true. And I think that they’re more open.

R: I remember this statement and it wasn’t with the two boys. It was with the average group and you were doing the fractions with them and they were catching on pretty fast and I think you actually said it to “A”.

K: Yeah, “A” he is very low.

R: Do you think you could’ve said it as a confidence booster to him?

K: Yes, I think a lot of it would’ve been for him to get that confidence and I think a lot of it all stems back to me not having that from my teachers and me not feeling like I was good enough or me not feeling like I was going to make it in math. Which is the whole reason I have this problem so I think that that’s me trying to make them believe in themselves because I don’t believe in myself. Wow I just had like a realization.

R: You had one last time we talked too. I have two more statements. These two statements you said with J and E. “You’re way ahead of me with that one.”

K: They’re probably like who is she and why isn’t she good at math?

R: Do you think that’s a true statement?

K: That’s probably true, especially with him.

R: What I am trying to figure out is, are those statements coming from that the way I feel or am I doing this to boost the kid’s confidence.

K: I think it’s more of that the way I feel and I want them to understand that and to know that I am being honest with them and then in turn it will help them with their confidence level but if I didn’t feel that way I wouldn’t have said it.

R: Okay last one. “I’m not very good at patterns”… no you said, they did a problem where they had to do patterns and they just automatically got the pattern and you said “if I’m not very good at patterns how would I know that?” So my question to you is did you not follow the pattern that they told you or did you just want them to verbalize how they got the answer?
K: I think that one way more of a I wanted to know how and I wanted to know why.

R: For your knowing or you wanted to know what they knew?

K: I wanted to know what they knew. So they could explain it. Because I’m pretty sure with the patterns I got that for the most part. I don’t think they were difficult patterns. It was like multiplying by two I’m pretty sure.

R: So that’s why I ask you about the quote because I really felt that some of them went one way to build confidence in others I felt like you were more coming from your heart on that. So I was trying to distinguish between the two.

K: In the small group it was more so because that’s how I felt about it and not so much because I want them to think that they’re great at it.

R: So do you feel like you make connections with those kids in the small group?

K: Oh yeah I can see myself in their shoes especially the low kids because they just struggle and they struggle and the get frustrated and then they want to stop and that’s how I was. And I never had someone telling me I could do it telling me that I was good at math or telling me that I was getting at, so I never believed that. Even now I still don’t believe that I’m good at math or that I can get it, or that I can make someone else get it. And so I see myself in their position and I want them to know that I sympathize with them and I know how they feel and I know what it feels like to know that you’re never going to get it and so it definitely is something that I feel and not just something that I say to make them feel better. I don’t think I’m bad at all aspects of math. I like geometry and I got a B which is good for me in math and I don’t think about it everything, but there are things where I just look at it and I tell myself that I will never get it. I will never be able to do it, and I just bring myself down so far that I can’t even teach them if that’s how I feel about it myself. And so, it’s hard for me to bring home papers in figure them out because I shut down when I see problems that I don’t know how to do. Because I think that I’ll never get it and I’ll never be good, what’s the point?
College Supervisor Initial Interview

R: Describe your supervisor experience.

P: I started supervising 3-4 years ago at the college level with pre-service teachers at a different university and that was part of my role as a hybrid educator, partner resource teacher. I supervised the first semester just a few students and then it built each semester and then I had quite a few the last semester. Then here, I’ve supervised field study students that are only there 2 days a week and then this semester final interns who are in the classroom 5 days a week.

R: What other types of experience do you have that allow to inform an intern’s progress?

P: I was a classroom teacher and then after that I became a reading coach and as a reading coach I had a lot of…I attended a lot of training that talked about working with teachers to try to improve instruction so I feel like a lot of that training really prepared me for the supervisor role as far as not evaluating teachers but providing feedback to help them think about what they were doing and why they were doing it.

R: So in your experience what types of experiences or attributes do you see that allow a pre-service teacher to be the most successful in the classroom?

P: What are their attributes that allow them to be the most successful? I think the first thing is they just have to be open to feedback because not everybody is and that’s one of the very first things. I think that to help them be successful I try to help them plan and that’s an important part of their success because it’s important to plan through your steps and to think carefully about what you’re going to say and to anticipate student responses, whether they’re correct or incorrect and how you might deal with that. In the planning I think you prepare yourself better and then in the delivery, do you use an attention grabber, do you something to get students’ attention, do you engage students’, or do you stand in one place? That makes a difference. I think, do they know the content? Obviously that makes big difference. But that’s evident in the planning. But then you can have a beautifully planned lesson and still not be able to deliver that lesson well if you’re uncomfortable with it, if you don’t know the content, if you don’t have a good rapport with your students. I think that’s important for pre-service teacher success.

R: What do you think…any negatives that maybe in your experience with pre-service teachers that you have found that impact them in the classroom where they’re not successful? Have you seen a trend or anything?

P: What might make them unsuccessful? I think a lack of planning leads to that unsuccessful lesson leads to that unsuccessful lesson. I also think that trying to do what you’ve seen the teacher do even though it’s not what you believe in sometimes can make a pre-service teacher unsuccessful. I experienced that the other day. The pre-service teacher was trying to make her lesson exactly like the classroom teacher’s lesson and it didn’t work. I said can you explain why you made that decision, why did you do this? And she said because that’s the way the teacher did it. She hadn’t thought through the way that would be best for her or for the students at that time. So lack of planning, trying to make it fit somebody else instead of you. I think that’s a real
detriment to pre-service teachers. I think sometimes they want to attempt something new but they haven’t thought through all of the pieces of it so sometimes that leads to, for lack of a better word, failure of that lesson. Occasionally that lack of maybe being a risk taker, it almost feeds this idea that “I can’t try anything if I don’t know if it’s going to turn out just right.” And really we do experiment sometimes and we have to try new things and venture out and take risks.

R: So put yourself into a post conference that you’re having with a pre-service teacher. What type of feedback would you give that pre-service teacher?

P: I read an article about 3 years ago that said most supervisors tend to give feedback about management and behavior issues rather than focusing on content so since then I’ve tried to be very aware that I balance that. I’ll give some feedback on management issues but I also try to focus on content. If it’s a math lesson maybe I’ll point out that the pre-service teacher used math vocabulary well in the lesson or perhaps she didn’t use math vocabulary well in the lesson. Or try to talk about “okay you did this in the lesson but did you connect it to the real world for the students ..., did you make it relevant?” I try to connect it back to the content as well as behaviors.

R: Do you have anything else to add about supervising pre-service teachers?

P: I think it starts with building relationships. If you have a relationship with the student then the pre-service teacher can be more open and honest in discussion and it’s less threatening if they know you and they know that yes you have to evaluate but you’re really there to support them in being the best teacher they can when they step foot in the classroom.
Preservice Teacher Interview Week Two

R: This interview is based on week two observation and the lesson was graphing points on a coordinate plane. So tell me about the decision-making that went into planning the lesson.

K: So we were working on plotting points, it was kind of building from fractions so we were using T charts to make fractions and building from there and then we were moving from there and talking about how we can use these in the real world. So then it was a continuous building an application. I like to talk to them about real-world problems so that they have a purpose because I know when I was doing math when I was younger I felt like there was no point in no purpose to it and I was never going to use it down the road until now. So I like to give them a purpose and I like to make them feel like they might use it down the road so that way they are more apt to want to learn it. So that’s what went into that and using the map, something that we got to do the next day that was really enjoyable, that they loved was once we got through using the map, trying to find coordinates on the map, we printed out a map of the school and I made it into a coordinate plane and I gave them points and they got to go around the school and locate those points and there was a treasure at each point to show me that they went to it. So then they got to actually apply it and go around and it was a fun activity so they get to run around and really some energy. So it was an enjoyable lesson for them. When we did it that day it was in the beginning it was the new EQ, it was just started so the grasping wasn’t as great. They are great at it now. The first day they didn’t quite get it right when I introduced it. It was kind of hard to teach it just because there are some need different ways I feel like with coordinate planes that you can explain it. And the way that we talked about it was you can carry the latter over set it down and then you go up so that way they always remember that they have to carry the latter before you can climb up it. So over and then up, the same way on the other side over and then up. Horizontally and then vertically.

R: I noticed you were using four quadrants, did you keep that up?

K: We only used one quadrant. The day that we used the four quadrants was the first day so that they knew that there were four quadrants, that way they knew that a coordinate plane does include four quadrants. But we just worked in one quadrant.

R: So tell me about the content. The content came from your standards. So how did you come up with the instructional strategy of showing the video? Where did you get that idea?

K: I googled it. I think that videos are great and it does a better job of explaining it than I do. And so that way they have a little bit of an introduction and when I watched the video it helps me too so it teaches them and me. And that way there someone else introducing it that might explain it better than I can.

R: The task that you gave them just for that short session – you had them think of a way they would use it in real life and then one of the boys actually gave an example and then you did that one on the board. So did you come up with that idea or did your cooperating teacher help you come up with that?
K: I came up with that. I kind of just have been trying things and seeing what works best. I’ve been mixing things up and having them create their own problems sometimes gets the more excited than having me create a problem in them work it out so I’ve been trying to have them come up with a problem so then it’s more higher order thinking and not just working out a problem but actually coming up with it.

R: So tell me about your strengths and weaknesses with this particular content of coordinate graphing

K: I feel like it’s the same thing where I feel like I know it in my head but I don’t think that I can relay it correctly. Like with this I felt like I knew what I was trying to say, but I didn’t think I was saying it correctly. Like I was getting confused and there were so many different ways to do it, I was just sticking to one thing that I was comfortable with and not touching anything else so I feel like they were learning to do it one way which was the way that I was safest with teaching it. And so I think that explaining things is always my weakness because I feel like I’m not comfortable explaining that. Strengths? I was going to say feedback but I say that every time so I should probably think of something else.

R: With that particular content or the way you taught it – did you feel like you had any strengths?

K: I mean they all know that you go up and over, I mean over and then up, so the ladder example was good because that’s stuck with all of them. They all have not forgotten that.

R: Were there any connections that you made between your mathematics course work and this lesson?

K: Not that I can think of. It’s kind of hard to remember but not that I can think of.

R: Is there anything you want to tell me about the planning and implementation of the lesson?

K: It is been kind of difficult ‘cause I feel bad changing Mrs. Mills plans. I don’t change them but kind of change the routine because they have a very strict routine, as I told you, and I like them having the routine but I found that it’s easier for me to teach things differently than for her. So I always like to have a video or some type of activator where it activates their brain and we start off by doing something and then we go over it together and then we jump into the lesson. That’s been something that I’ve kind of struggled with – doing that all on my own with the lesson planning. I don’t know what works best for them and they say that they get it. A lot of them seem like they get it but I don’t know exactly if they really are grasping it.

R: Does she know if you’re going to use a video? Does she know that ahead of time?

K: I put it all in the plans which are on a one drive computer system. So if she checks the plans, then yes she does. It’s on here, I’m pretty far ahead. I have it done through March.

R: So now let me go into some questions about the actual observation. Can you explain to me what 251 boxes are?
K: 25 line boxes

R: Oh, 25 line boxes!

K: They do two boxes and five lines down each so two boxes that are five lines down. So they are five lines thick. It is for the EQ – one for a prediction and one for the answer.

R: So they write to the EQ at the top, and then they do two five lines – one for the prediction and one for the answer?

K: So when they are predicting it’s what they think the answer will be to the EQ.

R: Okay now I understand, I was a little lost on that. That particular morning when you started the lesson, it was difficult to get them settled I noticed tell me what the normal routine is without.

K: Something that Mrs. Mills is very good at is when she just stands in front of the class they get very quiet. With me, not so much. And being the intern, I’ve struggled with not being able to just be their friend and actually having to discipline them because Mrs. Mills leaves a lot of the time and she wants me to have the classroom to myself so that I have to experience that. And it’s been hard because I want them to like me. With field study experiences you’re there once a week, you really don’t discipline them, and they love you. But with internship, you can’t just be their friend, you have to make sure they’re on task and stuff like that. So she doesn’t really do anything, they just will look at her and read her facial expression and it will work. That hasn’t worked with me. So I’ve tried doing the Red Robin Yum thing. I tried doing the bring it back, bring it back, bring it back. That worked and they all go huh. It’s kind of hard though to get them back down from that. But then it kind of gets that out, and then they stop. That’s been something they do at the start.

R: Did the students come up with that or did you?

K: They told me about that. I always said bring it back because that’s just what I say. And then one person went huh. And I said what are you doing? And then they told me that that was something that they had done before. And so a kind of went from that. But once I do that, sometimes it’s hard to keep their attention and keep them engaged so it’s a challenge.

R: All right let’s talk about the video. Did you watch the video ahead of time? If so is it for you, is it for them?

K: It’s really both. If I don’t understand it, I like to stop the videos while were going and ask questions just to make sure they are actually watching and if I don’t watch and understand I can do that. And for them I want to make sure it’s following the standard and it’s what they need to be learning. But if I don’t watch it beforehand, I might not know what it’s talking about.

R: That particular video got a little confusing for them because it talked about absolute value. They were lost.
K: Yeah, that was because I didn’t know how to explain it.

R: As the video went on you did tell the students not to worry about absolute value. You went on to the address the coordinates of (four, three) and (four, -4). So the answer was really a seven between the three and -4. Why didn’t you pause the video and use the smart board to actually count the distance on the coordinate plane to show the difference between three and negative four?

K: A lot of times I get scared to try things with them because they’ll say things like........ I don’t know if I told you what C said. I don’t remember what I was teaching but I made a mistake and she said sometimes I think that I’m better at this than you are and I was like while. I know that there just in fifth grade and they don’t really mean that in a hurtful way but that makes me not want to try things with them because if I make a mistake and I hear one of my students say that to me I think maybe she’s right, maybe I shouldn’t be teaching math.

R: What I saw you doing was really relying on the video to teach them, but the things that you were saying were right; however you never demonstrated anything with an actual pen, you let the video demonstrate everything. Let’s go on, the next part of the lesson had the students creating their own scenarios of how you would use a coordinate graph. A student came up with eating less pizza for a number of weeks and losing weight. So he had five weeks, you wrote that on the board and put it at the top. And then the weight loss was 2 pounds, 4 pounds, 8 pounds, 16 pounds, and 32 pounds. By the way I want that diet! How do you feel like this is similar to or different from a line graph?

K: A coordinate plane?

R: He said the number of weeks that he cut back on pizza and weight loss.

K: Well a T chart could be turned into a line graph with that information so you could use a line graph to plot it. We did line graphs the week before so a lot of them were getting confused about the difference between a line graph and a coordinate plane. Like I would ask for a line graph and they would give me coordinates or I would ask for accordance and they would give me a line graph. So I try to keep those separate.

R: The next part of the class was small groups. And you started with the lower group and gave out blank sheets of paper and they chose coordinates and you plotted them on a whiteboard. You ask each student to give you a set of coordinates and you plotted them. What was your goal in doing that?

K: I don’t remember.

R: Okay. I only ask because you plotted the points, the students just gave them to you.

K: Was it with group one?

R: Yes it was
K: It was probably because they aren’t…. I didn’t want to push them. I guess this is bad, but I don’t want to challenge them, even though I need to, but I don’t want to make them feel like they’re not smart enough when they don’t get it right.

R: So you want them to feel successful?

K: Yes, which is bad because they need to be challenged.

R: Why do you think you want them to feel successful?

K: Because I didn’t. I’ve told them that before and I think that if I give them questions they can answer, they’ll be more confident in themselves, even though it might be too easy.

R: Okay from there, you went back to fractions. You’ve been doing that for a while now. One of the students was working on a problem and said “I did it but I think it’s wrong”. You said “don’t think that, believe in yourself, you can do it”

K: I should take my own advice. It was A. I remember that now, she says things like that all the time. She’s just like I am.

R: So do you find yourself encouraging her?

K: Yes definitely

R: How does she react to your encouragement?

K: I think she takes it like a grain of salt. She’ll listen and shall say thank you but she still doesn’t believe in herself. She and I have that in common.

R: In one problem you had them list the common multiples and find the common denominator. One student said “I don’t know”.

K: Yes it was B. He was having an off day.

R: So you didn’t address that. You went on. Why?

K: With B, it depends on the day. If you give him more attention, his negative behavior will continue. It’s an attention thing with him. I’ve tried multiple things with him. I told him not to be lazy and to figure it out, and he just gets mad. I’ve told him nothing and then if I don’t give him the attention, sometimes he’ll just sit there for the rest of the small group or actually try. It just depends upon his day.

R: The first week I observed, they used whiteboards in this week you chose to use white paper instead. Why did you make that switch?
K: Because I want to have it so that I can see their progress.

R: Oh I see, so you collect to them then? And so you’re looking at that for like an informal assessment?

K: In small groups, it’s based on need. So every group do something different for the most part. I’m trying to move on from fractions but I can’t do that until I know that they get it. And so collecting those papers helps me.

R: Okay, why do they copy the word problem?

K: Because Mrs. Mills wants them to be prepared for the FSA and be able to read and write so it’s kind of integrating the writing aspect of it.

R: Yes they had the question of the walnuts and the cake…..

K: I know I picked a long question

R: Yes it took them a long time to copy that. When you changed groups, use the same question, but it was on a worksheet. With this group was solving that problem, one of the students said that there wasn’t an answer that she could choose. You led her into reducing that fraction by saying “are they both even numbers?” So you were instructing her to first divide by two and then divide by three. Is that the way you do it?

K: Yes I divide by the simplest number I can think of.

R: So you don’t divide by the greatest common factor?

K: I usually start at two and I’ll go through and see what both are divisible by starting with the smallest. It has more steps but that way I can see it broken down.

R: For the next few problems you said “I’m going to have each of you teach me how to solve these problems” why did you do that?

K: Multiple reasons. It depends, because I think that when they teach it, it makes them think about it more and not just an half we get through it and stop. I think when they created themselves, it makes them think about it more and challenges them more, but then I can see them teach me and I have found that they do it different ways and so when their teaching, I’m learning new ways to do it. As they are teaching their classmates, all watch in all be like “oh, I didn’t know you could do it that way”. But I won’t tell them that. I’ll just say “good job”.

R: You said a couple of quotes that I want to repeat to you. “You’re so much smarter than what you are doing now” I don’t remember who you said that to, but it was someone in the second group. And then you said “I believe in you, come on”.

K: They probably weren’t trying and I wanted them to keep trying.
R: Another thing that you said was “one mistake I always make was that when I find a reciprocal I still cross multiply.

K: I remember when I said that.

R: Why did you say that?

K: A lot of them make that mistake to. You find the reciprocal or cross multiply and a lot of them will find the reciprocal and then cross multiply. And then they get the wrong answer. And that’s something I always used to do and I sympathize with them all the time when they make mistakes because I don’t want them to feel like you’re not good enough when they make a mistake. I was trying to identify with them.

R: One of the last problems you worked on in that group said something like this: when you multiply 4/8 by a number, it results in a product larger than 4/8.

K: I did not like that question!

R: There were several answers and you suggested that they work each one out, and whichever one came up 4/8 was the answer. My observation is that the students didn’t understand the concept of multiplying a fraction by another fraction and that resulting in a smaller product. The only way to get a larger number than what you start with is to multiply by something larger than one, like a mixed number or improper fraction.

K: I didn’t get that concept either. But later in the day, one of the students explained it to me that way and I learned it.

Preservice Teacher Audio Journal Week Two

This week I had a formal observation. The principal was in the room and, this is so terrible, I pulled a popsicle stick with a student’s name on it and it was a little girl’s name and I knew she wouldn’t get the answer to the problem I was going over, so I made up a name because I didn’t want to have to explain the answer in front of the principal because I didn’t want to get it wrong. So I made up a name and wasn’t honest about whose name I really drew on the stick - because of my own problems. The kid that I said the name got the answer right and I gave him positive praise and I didn’t have to explain it and possibly get it wrong. So for the kids who didn’t know how to do the problem, I didn’t teach them anything. But I don’t know if it was just me being scared to get it wrong in front of her or if that’s because I thought I couldn’t do it, or maybe that’s the same thing. I know that just being nervous and having anxiety about math can be two different things but it all comes back to my confidence level in math. So I lied and I’m sorry, it’s not very professional.
PST Interview Week Three

R: The EQ for this lesson was: how can I convert different size standard measurement units and use them to solve problems? And your guiding question on your lesson plan was, measuring how long something is.

K: We’re talking about length

R: Right, you’re just doing length. You said that this was the very first lesson of this particular unit right?

K: Yes

R: So tell me about your decision-making that went into planning this particular lesson

K: Well, when I did my field studies last year, this was my first lesson that I did that I had a formal evaluation on. The very first lesson I did was on converting units and it was the first day and it was my first formal observation and I just bombed it. It was terrible. I had no idea what I was talking about and the kids didn’t know what I was talking about. It was awful and so coming into it I was like thinking about how terrible I did and what can I do differently. So with this, I’m more so sat down and taught myself how to do it and I was doing that - we got more into it today and I had that light bulb moment this morning when I actually understood what I was teaching which made it so much easier to teach but yesterday with planning it was more just the introduction piece of it. Figuring out like guessing what is about an inch and what is about a centimeter or meter. I wanted them to be able to see it. I’m so visual and I’m so hands-on I wanted them to be able to see it and feel it so it would make more sense so that’s what went into having them find the objects and stuff like that. I wanted them, instead of just thinking about it, we did the activity with our hands in our bodies and stuff like that and I wanted them to find things that way they could connect their thoughts with an object.

R: So the content was the standard in the instructional strategy, you started with a video.

K: And I picked the wrong one.

R: Tell me about that.

K: The one I picked, there are two links. And I picked the one about measuring time. It was about measuring minutes in an hour and I thought oh my gosh this is the wrong one. And so I tried to think of what I could do and I was like. I ask them “is time something you can measure?” And Mrs. Mills gave me a look like “what is this?” And so I asked them if time was something they could measure. And they said yes and then I had them talk to each other and said “in your partners, and in your teams, think of other things you can measure” and so that gave me a chance to change the video to the right one. I was kind of proud of myself for coming up with that.
R: I wondered, because when you paused it and they talked about it - as I had some questions, number one was “did you watch that video?”

K: It was the wrong video

R: Well that answers that. On the video they were doing decimal division and the kids were questioning that. So I wondered if they had actually done decimal division.

K: It was the wrong video, I don’t know what happened with the link, and so I tried to work with it and come up with other ways for them to discuss it and not realize that it was the wrong video.

R: All right so your cooperating teacher walked around the room basically to hear the discussion and a lot of children were talking about measuring and about what you can measure. You would ask about the various things that they could measure and so they answered measuring cups, gallons, using a measuring tape, different things. You were still trying to find the right video and your cooperating teacher asked how many pounds were in a ton. So the students were kind of, she was trying to give them some background knowledge.

K: She knows that I am really uncomfortable with this concept and I told her “you know how much I dislike this and so if you need to step in to make sure they get it, don’t think that you’re stepping on my toes”. I want to make sure, above all, they understand it because they are the ones that are going to be tested on it.

R: So then you finish the video and it actually did conversion from centimeters to meters at that point. So then the question on the video was converting 37 cm to meters. Was this the very first lesson on conversions?

K: Yes

R: So they didn’t have a review on size?

K: No

R: So when watching that video, unless they remembered from other grades…..

K: It was completely new.

R: You paused the video and asked the question that the person on the video asked about the conversion. You ask for a prediction and a student gave you 3.7 m and you said it was a pretty good prediction. Your cooperating teacher came back with “who knows what centi- means?” She was trying to give the student’s knowledge about the prefix which means 100. The student had move the decimal one place instead of two. Some students came back with the examples like there are 100 cents and a dollar. And you said “that’s a really good way to think about that”.

K: Because I had never thought about it like that before - I’m learning new things every day.
R: Then you put the video back on and you stop the video at the next problem when 56 cm was discussed. You asked the question how many meters with this equal and a student answered correctly. Then you asked the question are we moving from smaller units to larger units or from larger units to smaller units. A student gave a response, but you didn’t acknowledge it and just pressed play again on the video. It was obvious that you knew the answer was coming on the video.

K: I know that we’re going from smaller to larger, so I don’t know why I did that.

R: You are then reviewing different units and said “decimeter” or “Decameter”…… “I think it’s decimeter.” “I don’t know.”

K: Yes

R: Did you realize those were two separate units?

K: Yes and as I was saying that I was thinking about how you pronounce it and I confused myself in my own mind and then I thought I’m just going to stop talking. Yeah that was bad.

R: In another instructional strategy you had the class all stand in turn to Mrs. Mills and said, “Mrs. Mills, correct me if I’m wrong, good you know this may not be my favorite”

K: I thought, there I go giving them a warning about how bad I am

R: Why did you do that?

K: I was going to use hand motions for the different units and I didn’t make these up myself. A different teacher showed them to Mrs. Mills and me.

R: Did you know the meanings of them? Why were you doing them?

K: I mean, I was teaching myself in a way. As we were doing it, making the connections with our bodies, I thought it was helpful in having them have to say it as they are making the connection so that way it’s reinforcement with them saying it out loud.

R: My understanding was that the connection was about how large the unit was, so a millimeter was very small (pinching fingers together), a centimeter was the width of your fingernail….. In observing this, I noticed that you never to hold the students that these represented the size of the units. It became more of a symbol, not that these represented sizes.

K: Oh

R: And when you stuck out your foot for yard, a yard is about as long as from the top of your thigh to your ankle, but a meter is a little bit larger than that so were going to point our toe to show that a meter is longer than a yard.
K: Yeah I think you’re right

R: When you did these size motions, it was a mixture of customary and metric. Why did you choose to mix the two?

K: I don’t know the difference.

R: The next strategy you used, you asked the students to get in partners. No - you had already assigned them partners. You ask them to copy a chart whereby they would find objects in the classroom and decide which unit would be best to measure them with - millimeter, centimeter, or meter. You asked them to do a prediction and did an example with them of how many centimeters wide you believe the computer screen is. When asking them to estimate you told them to “just guess - it doesn’t matter if you’re right”. Can you take me through your thinking process on this?

K: That’s a hard question. I think it goes back to me wanting them to actually try and not be afraid to try and not be afraid that they’re going to be wrong.

R: Okay. I know this was an introductory lesson and I’m trying to understand it because the EQ was about converting, but the activity wasn’t about conversions.

K: We’re doing that EQ for a total of about seven days. So they haven’t looked at units of measurement at all so it really was just about them getting an idea of units of measurement.

R: I followed a couple of students around as they were filling out their organizer on this activity. One group walked by you and you directed them to go to measure the rug. You reminded them that it was millimeter, centimeter, or meter. You also showed them the motions when he reminded them of this. You then asked one of the students what do I used to measure the rug? The student replied, “a foot.” And you said, “That’s not one of our choices”.

K: He was right, we could’ve measured it using a foot.

R: Yes, if you were using customary measurements. But right after he made that statement, you turned around and walked away. The boy and his partner had no discussion about the problem. He did finally say that it was either centimeters or meters and marked both on his chart. He didn’t use the motions that you taught them and didn’t seem to make the connection that he was supposed to use the motion. How would you reflect on this?

K: That the idea of the motions didn’t work for him. He didn’t see the connection between the two which I can understand. I know that for measuring the rug, you could’ve done multiple things, so he was right, you could do both. Maybe the connection just wasn’t made or didn’t need to be done.

R: Let’s move on into the lesson - you asked the students to return to their seats and they gave you examples of their estimates. One pair said that they estimated the door to be 72 cm. They also said that that was equal to 6 feet. You replied “does 72 cm equals 6 feet?”
K: Yes I really didn’t know whether it did or not and I wanted them to go on so that we could try to figure it out together.

R: One of the students replied yes, 72 cm equals 6 feet. Your cooperating teacher intervened at that point and said….

K: She probably knew that I didn’t know

R: She understood that the student divided by 12 to get the answer six. So she asked why they picked 12 to divide by. The student replied that there are 12 inches in 1 foot. At that point, I believe you made the connection because then you said, “It would work if it was 72 inches because that equals 6 feet, I like the way you are thinking”

K: Is that even right?

R: yes

K: Good. I think I said that because they were still thinking about it and they were still trying and I didn’t want them to think….. I don’t know, it just goes back to me getting everything wrong and never having that encouragement. So even though it wasn’t the answer that was right, it was still a good answer and I didn’t want them to think less of themselves.

R: Okay you then moved into small groups and worked with the low group first. You told them that they were going to review the four operations using fractions and asked them to make up their own problems. Why did you have them do that?

K: Because were finishing out fractions now, this is the last week were doing it with them, they need to move on to something else. For them to create their own problem, it will show me that they actually can create a problem and solve it instead of…… It’s been a lot of me creating the problems and going step by step by step and really breaking it down and on their test that can’t happen. And so I thought that maybe if they created their own problems, they would maybe think about it deeper and see it more by doing it themselves.

R: How did you figure out if they were right or not?

K: I had them teach their own problems by using the whiteboards in breaking it down step-by-step.

R: One of the students problems was 8/6+8/12. You asked the student why he chose 8/6 and he replied that he started with a mixed number but “I think I did it wrong”. So you went back to the problem 8/6+8/12 and didn’t address that he thought he had done it wrong.

K: I think that it was because after he looked at the problem he realized he did a wrong. He was saying that he did it wrong, even though he hadn’t even started it, just because…. I don’t know why he said that but I know he hadn’t even started the problem that was just what was written
down. He hadn’t changed it from a mixed number at all. I think he said that he did it wrong in hopes that we wouldn’t do it may be….. Or something like that.

R: Did you ever do something like that?

K: Oh yeah all the time. All the time. Oh yeah I did this wrong…… Okay moving on.

R: Do you think that became a crutch for you?

K: Yes I think it became something that I would say if I didn’t know how to do it so that I would just skipped.

R: So no one really ever said all right let’s try to work this out?

K: No. So I think the reason why I did that was because even though he said he did it wrong, I wanted to work out the problem that he had given me to begin with.

R: Based on your experience?

K: Yes.

R: The next problem that someone did was a subtraction problem. It was a simple one – 4/6 - 3/6. You quickly move through this problem stating that you already had a common denominator so all you had to do was subtract 4-3. One student said that he did not get the answer of 1/6. He stated that he got a different answer because he cross subtracted. You corrected him and told him that he could not cross subtract. Go through your thinking process here.

K: I thought to myself “be nice” that’s all I can think of. That kid drives me insane. I can see where he gets confused because with multiplying and dividing it and subtracting fractions, there are a lot of different rules. And they get so confused and we’ve been doing division so I guess he thought we could cross subtract. I just straight up told him we can cross subtract. Sometimes I beat around the bush with him but he just doesn’t get it.

R: You then moved onto group 2. Is A supposed to be in that group?

K: Yes

R: He just came back from the bathroom and went right to his seat. He never came to the group.

K: Oh really? Yes he’s in group 2. I must not have noticed.

R: In this group you created a decimal problem. 5.2×10.3. Have you shown them how to do that?

K: No, and I did it wrong. And that’s when I saw Mrs. Mills. I saw her standing by the table and I said “is this right?” And I had to ask her because I was working it out and getting the wrong answer and I didn’t know why.
R: So you gave a student the whiteboard to do the problem for the rest of the group. Why did you do that?

K: I have been working it out and I couldn’t figure out the answer. And I thought okay maybe I’ll have them teach it and then I’ll get it. Which is bad because I’m having them teach me.

R: You said, “Lead me through; explain it to me.”

K: I want them to be able to break it down and explain why they do things, but the other side of it was I wanted them to teach it to me.

R: The student actually explained it correctly. The next problem was order of operations. You ask them to do this in sections by doing the multiplication part first. So you actually told them what part to do first. You asked them to stop after the multiplication part so “we can make sure we have it right so far”. Why did you have them stop here and not figure out the entire answer to the problem?

K: So we could address if there was a mistake before we did the entire problem. Then we could find out where the mistake was made.

R: The student had the answer for the multiplication section as 1.830. And they read the answer as one and 830 thousandths. You corrected them and said, “no - one and 83 thousandths”. “No, wait your right.”

K: Yes, that’s how it’s been going lately.

R: When they got to the addition part, there were many answers that the students gave, see you were trying to figure out which one was correct. One of the students was not lining up their decimals when they added. Your cooperating teacher stepped in at that point.

K: Yes I had to check with her.

R: Yes when the student lined up the decimals wrong, the digits were not in the right place value column, therefore the answer was wrong.

R: would you like to add anything else?

K: This is like mentally and physically exhausting, I can say that. Especially with math. It’s draining because I actually have to teach myself and learn it and then I have to make sure they learn it. It’s really stressful and it’s exhausting and like right now I’m trying to keep it together.
College Supervisor Interview Week Three

R: This is the college supervisor. Can you tell me …we are now at the end of week 3 of my observations and she is at week 6 or so with internship. Can you tell me your observations of planning and implementation of math instruction?

P: I think the biggest thing that I’ve noticed is that as a grade level they plan together but then those plans are very surface level. It’s a list of do this, this and this and this is the content that we’re covering. My biggest concern is that she’s not taking those plans and digger deeper and writing step by step plans for herself. She’s not comfortable enough with the content to use those simplified plans that her team is using. Somehow I have to move her to take initiative and to start planning more deeply.

R: What about her support level from her cooperating teacher?

P: I think she, I'm not sure if she’s even comfortable asking for help or I don’t know how much time they take together aside from the whole grade level planning to plan more deeply. So maybe that’s something else I need to encourage her to do is say “okay, after you plan as a grade level and you have that sketched minimal plan, what about taking time to ask your cooperating teacher to plan with you?” That’s a conversation that I need to have her.

Observation Narrative Week Three

Today’s lesson was on converting among the different sized standard measurement units and using them to solve problems. The guiding question was “How can I measure how long something is?” This was the first day of the new unit and is so Kelly have the students get out there interactive notebooks and copied the essential question in order to make a prediction. After a few minutes the students shared their predictions giving answers such as “using a ruler or measuring tape”. Kelly accepted every answer that a student gave whether it pertained to measuring length or not. She then started a video that she said was about measurement conversions. The video was actually on elapsed time. The video played for about four minutes and then Kelly paused it and asked, “Is time a unit of measurement?” She told the students to turn to their shoulder partners and list all the ways you can measure. Mrs. Mills walked around the room to listen to the groups’ discussions and interacted with them. Kelly walked over to the computer and began looking for something. After she called the class back to order, she returned to the video which was now on metric length conversions. The question calls for the students to convert 37 cm to meters. Kelly paused the video and asked the students to protect what that answer would be. One student answered, “3.7 m”. Kelly told him that was a “pretty good prediction”. Mrs. Mills then asked the class, “Who knows what centi- means?” Students talked for a moment and seemed a bit puzzled. Mrs. Mills drew their attention to a dollar and asked how many cents were in a dollar. Kelly commented, “That’s a really good way to think about that,” and pressed play on the video. The video continued to do the instruction with Kelly stopping it occasionally to ask a question about what was happening on the screen.
After the video was over, Kelly instructed the students to stand and turned to Mrs. Mills. She said, “Mrs. Mills, because units may not be my favorite.” Kelly used motions for various units of measurement integrating both metric and customary with no differentiation between them. She held up her index finger and said, “Centimeter”, and held up her thumb, bending it at the knuckle, and said “inch”. She continued for foot, yard, meter, and kilometer. The students did not seem to understand that Kelly was making reference to the relative size of the unit. Instead, the motion became a symbol for the word. After the motions, Kelly told the students that they would be walking around the room partners finding five objects in the classroom. They were to choose the best way to measure the object using millimeters, centimeters, or meters. The students created a chart to fill in the name of the object and estimation in one of those units. Kelly demonstrated by drawing attention to the computer screen and asking a student about how many centimeters wide the computer screen was. When the student paused, Kelly said, “Just guess. It doesn’t have to be right”. The student guessed 14 cm and Kelly replied, “Good!” Mrs. Mills assigned the pairs for the activity. As the students walked around the room filling in their charts, their estimations didn’t seem to be based upon any relative size. They made no connections to the motion activity that Kelly had previously completed with them. After about 10 minutes of this activity, Kelly asked the students to return to their seats.

Kelly then had each team share one thing that they estimated. One student said that their group estimated that the door was about 72 cm tall and that would equal 6 feet. Mrs. Mills asked the student to explain their thinking and the student replied, “There are 12 inches in 1 foot.” Mrs. Mills explained that they were working with centimeters not inches. Kelly joined in and said, “It would work if it was 72 inches and 6 feet. I like the way you are thinking.” After the whole group activity was completed, the students moved into their centers and the first group met with Kelly at the back table. She told them that they were going to review addition, subtraction, alteration, and division of fractions. She asked the students to make up their own problems and try to solve it. She told them, “don’t be too easy on yourself.” After giving the students a few minutes, Kelly asked them to share a problem that they had completed. She called on A. A had 8/6 + 8/12 written on his whiteboard. Kelly asked him why he started with a “mixed number”. He replied that he thought he just did it wrong. Kelly continued to plod through the problem asking what the common denominator would be in the student answered 12. She helped the students make equivalent fractions and complete the addition. She asks another student to share the subtraction problem she had created. The problem was 4/6 - 3/6. The student shared that all that needed to be done was subtract the top number. The groups were changed and another group came back to Kelly’s table. She gave everyone a sheet of paper and pencil and wrote 5.2 X 10.3 = _____ on the whiteboard. The students worked on the problem and after a few moments Kelly gave a student her whiteboard to do the problem for the rest of the group. She asked the student to explain it to her as she solved it. Kelly gave the students another problem to solve using decimals and order of operations: 12.25 + 3.05 X 0.06. The students worked on this for quite some time and shared their answers with each other. There was a discrepancy about where to put the decimal and Kelly stumbled over her words. Mrs. Mills walked over and told the students that when they added or subtracted decimals, they always had to line up the decimals.
Audio Journal Week Three

The state sent a team to observe fifth grade. They kind of set me up, I wasn’t supposed to be observed, I was only supposed to fill in for another teacher that was designated to take the team around the school. I was told to go in her class and teach a science lesson. I was relieved at that because I feel like I’m pretty good at science. They told me that I would just be watching her kids while she was on the walk-through team, basically going through their science lesson with them. I was told that the state wouldn’t be in there because they knew I was an intern and there was no reason for them to go in to see me. I wasn’t worried about it. I had been in her classroom about a half an hour before science so I had gotten a chance to kind of get to know the kids and they were very sassy and funny. They would make comments that made me laugh so it was a good atmosphere in the classroom. We started doing science and one of the kids told me to put some goggles on - the science goggles. So I put them on in my eyes – well, I looked like a mad scientist for sure. They were just funny and we were having a good time. I did warn them that the state was here to watch fifth grade today and they wouldn’t be in the classroom. But if for some reason they did, you know how to act. It’s a reflection on Mrs. R so keep that in mind. So I didn’t think anything of it and then I hear someone unlocking the door and it’s this team. I was teaching at the time and it wasn’t a review or anything it was an instructional lesson. I was in the room by myself, there was no other teacher in there. About seven of them came in and the kids did so well. They folded their hands on their desks, and I thought to myself that is so fake. I remember the science coach going over the lesson with us and telling us how to teach it and she gave me tips on the best way to do it, asking higher order thinking questions and having them build off of each other. So when the team walked in I thought just don’t look at them because I knew it would make me more nervous. Out of the corner of my eye I saw the science coach and I remembered what he had told me so... They were in there for like 20 minutes. They were in my room the longest of all the teachers. And I’m so happy I didn’t know they were going to be in there or I would’ve gotten really nervous. But we talked about climate zones and stuff like that and I had them talk about vocab words. And there was one word – it was tundra. We were talking about tundra and where it belonged and I couldn’t remember and I’m thinking the state is in here watching me and I don’t know the answer to this and so what do I do? And that one of the students ask “what’s a tundra?” So I said “Let’s pause and I want everyone to close their eyes”. The state team did it too. I looked back and they had their eyes closed. “When you hear the word tundra what is the first thing that comes to your mind? I saw their hands raised so I called on them and some of them answered things like ice caves. They have the right answer and they were visualizing it and they were saying all these different things like glaciers and ice. Once they started saying those things I remembered that that’s what tundra really is. It was something that I said “thank the Lord they were able to answer that with visualization because I didn’t remember”. So that works for them and they did a really good job. They were really good about if someone gave an answer I would call on a student and then say “could you back them up?” Or “if you have a different opinion, can you share that?” I had them give me thumbs-up if they agreed, marshmallow claps, and stuff like that so they were very engaged. The state was in there for about 20 minutes and then they left. I was nervous about it and I went to a fifth-grade meeting after school and told them they were in my room for about 20 minutes and they all said they were only in their rooms for about five minutes. I wondered why they were in there for 20 minutes. So my teacher suggested that I ask the principal for the feedback if I wanted to hear it.
On the team there were two people from the State Department, three principals, and two teachers that were observing and so it was a scary group to be observed for 20 minutes by myself. I’ve never even met anyone from the state before. I saw Mrs. R who was on the walk-through team and she got to hear the feedback and she saw me in the hallway and told me that I was awesome and didn’t say anything else. Anyway, my teacher told me that she would let the principal know that I wanted to hear some feedback on the lesson. I got a text from my teacher that said the principal was going to be calling me. I’m like “What the heck?” Principals don’t call interns ever. I feel like that just doesn’t happen. So I was out to dinner and I left because it was so nervous about what she was going to say. She called and said “well we didn’t tell you we were going to be in there because we didn’t want to freak you out but it was planned to be in there because I had asked her for feedback when my teacher was going to be out one day I asked the principal if she had a second to walk through and give me feedback. I like having feedback and I like her telling me specific things to work on. She’s very sweet and I like being able to hear that so I know especially what to work on. She told me she figured if I wanted feedback from my teacher, why not get it from the state too? I thought thanks for the pressure! And so she told me that all of the fifth-grade teachers were ranked on a scale of 1 to 6, six being highly effective and one being the lowest unsatisfactory and needs improvement. Out of the four fifth-grade teachers three got a six out of six, one got a five out of six and I got a six out of six. Which blew me away and it made me feel so good that I’m an intern and I guess someone from the state asked who I was and Mrs. R said she’s an intern and they had no idea that I was an intern and so the principal was just telling me all these nice things. They said and it made me feel really good. A couple of principals asked for my name and my principal said she had dibs and stuff like that. And for her to call me and tell me they were so impressed, it really made it so that when I have those stressful days it makes it worth it. She told me that I was a natural and that she could tell the kids like me and that I was making a difference. And so to hear that, as frustrated as I get, to hear that from such an important team, it made a difference in the way I think about it. Like waking up in the morning thinking how exhausted I am and how I don’t want to go but thinking how they saw me teaching, it makes it more worth it.

Audio Journal Week Four

I’m sorry I’m sending this to you on Saturday. I got home yesterday and was so tired that I fell asleep. But the activity we did with the shot put, it went really well. On Thursday I went over the powers of 10 with them and how it correlated with the metrics. It kind of gave them two ways to convert units, they can either use that power of 10 rule or they can jump. So that way they have multiple ways of doing it so whatever works best for them was what they were able to do. And a lot of them liked that. Probably about half the class would rather do powers of 10 and half that would rather jump the decimal. The kids who were a little higher, they liked the powers of 10 because it’s more of a shortcut instead of having to write things out. So after doing that correlation lesson they can see why we did the powers of 10 and it made it really easy for them. And then yesterday with the shot put activity, they loved it. We made it a competition between Mrs. in and the para and I. They were cheering for us and we had teams and our teams had to measure our throws and then convert it. So they really like that and it really helped them to see the things in real life – the measurements in real life so it was not just talking about it now they could actually see it and visualize it. And we did predictions before as well so they were able to predict how far we would throw it and then we talked about our predictions and then we got back
we related our predictions to the actual throws so they could see the difference and it was closest and maybe there were predictions that once a realistic and things like that. That’s all. I hope you have a good weekend

Cooperating Teacher Interview Week Four

R: How do you feel Kelly is doing overall?

M: Great – really great. I’ve been telling her for some time now how wonderful she is.

R: What would you say that she needs to work on at this point?

M: She’s too nice. She worries about the students being mad at her. She needs to set the tone for the classroom and be in charge.

R: How is the teaching set up in the classroom – are you doing any teaching with her?

M: No, she’s been teaching by herself for some time. We do small groups together so the students really get double time with a teacher.

R: How do you support her understanding of the mathematics concepts?

M: I intervene when she needs help.

R: Do you plan together?

M: Yes, we do. We plan as a grade level.

Preservice Teacher Interview Week Four

R: Tell me about your formal today. We’ll open with that.

K: I was alone and my cooperating teacher was not there so it made it a little more nerve-racking. I don’t know if you are supposed to do this but I told the kids that if they were on their best behavior in discussion and engaged and working cooperatively and being respectful, I would bring them donuts on Friday. So it worked. It worked and they were great! I taught this in my second block and that’s the class where there are extreme behavior problems. And it’s hard to get them on task, but I hate to yell at them. So that worked well and we were still doing converting units and we did team discussions, posting are sticky notes on the board with our essential question answer, we did stuff and they got to walk around the room, and she watched me pull small groups, which I was most nervous about. In small groups this children always call me out on what I don’t know and I didn’t want her to see them call me out. And they didn’t call me out! So that was good. There was one problem where I forgot to add a one and I realized it before they did and I said “yes”.

R: So you were still doing conversions today?
K: Yes we’ve been doing conversions for a long time.

R: What did you do today?

K: Still metric length measurements

R: Like kilometers, meters?

K: Yes, we’ll be done with it on Friday. It was a two week unit because it’s very confusing so we wanted to make sure they mastered at so we allow two weeks for it. But it went good. She said that classroom management was highly effective, which was nice because that was my behavior class and so those donuts really worked out.

R: Oh so it was the second class?

K. Yes. She said that the rigor was where it needed to be because we were told that it wasn’t rigorous enough and she told me that today the rigor was exactly where it needed to be which was good. That was something that I was kind of worried about because for me to increase the rigor it means that I have to be on top of it to. So I was a little nervous, especially not having my cooperating teacher.

R: Do you remember what your opening problem was that day?

K: Yes I do. It was the shot put. We were doing the shot put conversion, so when you were there you saw the video. We were going off of that. The opening problem was using Mrs. Mills and I. That was our example. I threw the shot put 2 m but Mrs. Mills through the shot put 325 cm. Who through the furthest and how do you know that? So it was something like that so I had them do team discussion, gave them a minute, and then I had them collaborate with other teams, and then share. So that was the activator. So for the whole group we did task cards where they got sheets with problems on it and they got timed for their teams to solve and then we went over them in class. Then they did centers for small groups. While I was pulling centers they did guiding questions. Instead of having them actually convert I wanted to see if they could explain it to me. I wanted them to explain how they knew that because jumping and moving the decimal, you can easily do that by guessing.

R: So they had to write out their answers?

K: Yes. And then they have tomorrow to finish it because many of them didn’t finish. And then I’m going to take that and look at it and based on that will see if we need to review it in small group next week – based upon the explanations. But she said it went really well. I was really nervous. I called my mom on the way there and said “I don’t know what to do” so it went good.

R: Did the principal conference with you?
K: Yes at 1:30 today, I left and went to her office and my cooperating teacher stayed for the rest of class. It was very good and she was nice and easy to talk to. And she told me that I don’t seem like a first year teacher and I told her “I’m not, I’m an intern “and she said “Oh” and that was nice. I’m not really worried about my management – I think I do really good in that. What I’m not so good at is the content. I also don’t worry about whether or not the students like me or stuff like that or how’s the discussion going or if they listen to me. It’s more about “Am my going to teach this right”. Are they going to get it and stuff like that.

R: Okay so let’s talk about yesterday’s lesson, the one I observed. Yesterday the activating video was the shot put and the students gave some interesting answers to your question of how much they think the shot put weighs. Someone said 8 pounds. On the video, when the girl threw the shot put, you ask them how that could be measured and they did a prediction. After that you did the ice cream activity and then you went into small groups. I’m just trying to remind you before we begin talking about it. I also took some pictures while I was there and you gave me some handouts. This is a picture of the go math page and this is a picture of something you did on the board, so we will talk about those.

K: That makes me so scared because now we can see my mistakes and I can’t erase them! Now it’s in the picture! (Both laugh)

R: So tell me about the decision-making process. I noticed that the lesson plan had a lot more content in it than what it has been. What happened there?

K: That was about the principal wanted us to have more rigor and show it so putting it in the plans was a big part of that.

R: Okay so this is a full week of plans and there are about 10 pages which includes both whole group and small group. It doesn’t really say what the small groups are doing just page numbers such as item spec questions page 11 numbers six and seven.

K: Yes, that’s in that binder and it’s all the test specs for the individual tests they’re going to have. It’s all those example problems. We pull up the standard that’s listed and do the examples for that standard. So that’s the page number and the problems we’re going to do.

R: So since you know these in advance, are you working the problems in advance?

K: I don’t know all of them in advance. I did for this.

R: So do you solve them?

K: I usually do because it doesn’t give the answers.

R: Tell me about the decision-making and planning that went into this lesson. How did you decide on the instructional strategies that are in the lesson plan, for example, using the video and then and the ice cream activity. What prompted you to do all that?
K: Not having textbooks that we are supposed to be using, we do everything from C palms. So that was a Cpalms lesson. The shot put conversion is a three-day C palms lesson which we did yesterday, today, and were going to do tomorrow. So the video is from C palms. With the ice cream, that was from the previous activity where we were doing weight so we wanted to be more like a fun activity where they can see, where they would be using it. Because a lot of times some of them will say “I’m never going to use this”. And “I don’t understand why I need to know it” and so we wanted to do that activity and show them where it might be useful and make it more of a fun thing and more enjoyable for them.

R: So the previous day, had you taught pounds and ounces?

K: Yes and we went over going to a frozen yogurt shop and what goes into determining the price. And they were given a sheet that had different frozen yogurt stores and different prices per pound and ounces and different weight measurements and they had to convert it to see which frozen yogurt store was going to be the most profitable and which one might have the most customers because it’s cheaper and stuff like that. The reason we did the ice cream was because it was supposed to be like frozen yogurt. We were doing that like a little store type thing.

R: So where did you get that idea?

K: I just thought of it. I thought it would be more fun to bring it in and do it with them.

R: Okay, are you planning with your cooperating teacher?

K: I do most of it by myself. She’ll put the standard in the lesson plan and I do everything else. So I have to look at the standard and go from there.

R: So when does she look it over? You put it on the computer, so does she go in some point and look it over?

K: I don’t really know. I like to run by her what I’m doing just so she is okay with it, like the ice cream thing. We’ll talk about that, or with plans I’ll tell her what I have planned, that way she’s okay with it. But otherwise she might just go in and look at it herself, or maybe not. I don’t really know.

R: Does she ever say “Hey, what are you doing here, or maybe we need to change this”? Has she ever done that?

K: Nope

R: All right so tell me about your strengths and weaknesses with the content in this lesson. We will specifically talk about the conversions between the metrics and then between the customary.

K: I feel like with metric, we’ve done it so much and it’s so repetitive that I feel like I’m good at it because we’ve been doing it for two weeks now. So I feel like I’m good at it.
R: Was that your ah ha moment?

K: Yes I mean I hate metric conversion. When we were starting it, I hated it.

R: Why do you think you hate it?

K: It confuses me.

R: Is it not as confusing now?

K: Yes because I’ve been doing it so much. Like with field studies, I didn’t not hate it because I did it once and that was it. And with internship, I have to do it every single day so I don’t have a choice. And so I have to know how to do it. And so after doing it for like 10 days I feel like a pro.

R: Did you use the videos to teach you how to do it? Videos from Khan Academy or Learn Zillion?

K: Yes we did and Khan Academy. And then there was one day where there was a sub in the room and it was the first day of teaching metric conversion and she told me, “this is what I do and it’s really easy for me” and I take what I do now from her. She could tell that I didn’t like it and was confused so what she showed me is now what I do and now the students understand it so much better. I feel more confident in my knowledge of it

R: So I wonder, I’m trying to figure out the role of your cooperating teacher and how she’s working with you. Is there any point where the two of you sit down together and she teaches you how to do some things?

K: No. If I ask her a question, she will show me.

R: But does she check with you to see how you are feeling about a particular lesson that’s coming tomorrow or the next day? Or does she ask you if you want to go over anything?

K: No

R: Do you think that would be helpful?

K: Yes. I love my teacher, she’s great. She’s working as the acting assistant principal a lot right now so she’s not in the room much at all. I know that if I asked her that she will sit down and help me, but she’s not in the room so she doesn’t know what we’re doing except from what the plans say. And you know, things are a little different in the classroom than they are on paper. So I don’t want to have to explain everything to her and waste her time by helping me when I can watch a video or teach myself somehow.

R: Okay, so we were talking about your strengths and weaknesses. Tell me what your strengths and weaknesses were with the conversions.
K: With the conversions, I’m not a division person. I don’t like division. I don’t know the rules for division. Whenever I do a division problem I say “Okay Johnny, what do I do first?” And then the student tells me and I say “I think so”. I’ve never been good at division and I’ve always disliked it my whole life and nothing’s changed. So with conversions, it’s a lot of division, especially with weight. That’s why I think I like the metrics one because all were doing is jumping, moving the decimal. It doesn’t involve anything. All you have to know is which way to move things. That’s why I like it because it’s not like division where I have to know exactly what comes next.

R: So you think metrics is your strength at this point? More so than customary?

K: Yes I think that where it’s anything that’s just knowing the rule is what I’m better at than knowing the concept.

R: Oh, that’s an interesting thought.

K: It is an interesting thought. I can memorize a rule and if I keep doing it, all remember how to do it. But with a concept, we actually have to dive in and figure something out, that’s where I get nervous and I don’t want to do it.

R: That’s very deep, you may have hit on something. I’ll have to think that when through. Is there anything in this lesson that you linked with your mathematics methods course?

K: With methods it was always talking about strategies for getting students engaged and not just sitting at desks, so kind of with the ice cream activity, I was making sure they were engaged. When it came to the actual content, I don’t remember metrics. I probably tuned it out because I don’t like it.

R: Is there anything else you want to tell me about the planning and implementation of this lesson?

K: It’s kind of been hard not having her planning with me and doing it on my own because I don’t know if it’s the right way. And so I’m in the classroom and I’m like “well I hope this works”.

R: Has she ever done any co-teaching with you?

K: She will play off of what I’m saying so I’ll be teaching and she’ll ask a student the question like “why” and stuff like that so adding additional higher order thinking questions.

R: But not really a planned co-teaching? Where you sit down and say, I’ll teach this part of the lesson and you teach that part of the lesson.

K: Even with observations, it’s always been me. And if she has little things to add, then she will. But otherwise, it’s just me. And so that’s where I get nervous that the students’ grades
depend solely upon me. It freaks me out because it’s confusing stuff and I don’t want them to get bad grades because I’m the only one getting to them with math.

R: You said last week, I wrote some notes for this week too. You said last week that you have plans done through March.

K: I think we have them done through March 15.

R: So pretty much until you are finished. So what are you doing to prepare yourself for these daily lessons?

K: I can show you. What I do is I look, I’m a big writer, I write everything out.

R: I did notice this week that you had this notebook and I took a picture of that.

K: I do that. I look at the lesson plans and break everything down so that when I’m writing it out I will understand it better. So that way when I’m teaching, I don’t have to stop and pause.

R: Can I see that?

K: Yes I can show you today’s. So I have the LEQ written out and I have things that I want to say written out. Because if I just look at the lesson plan I won’t get it I won’t know how to teach it. So if I break it down I can add questions and build on things and questions to ask them for higher order thinking and stuff like that.

R: I didn’t know you were doing this. But I happen to see it at the small group table.

K: I can give you these too. Those are my notes pretty much.

R: Yes your notes are helpful because it tells me exactly what you are planning on doing that day and it’s more detailed than the other plan.

K: Yes, the blue is what I have written out for tomorrow because when I write it out it makes more sense to me.

R: Why do you think writing it out helps you prepare?

K: Because it gives me a rundown and I can see it.

R: Do you think through the day as you’re doing it?

K: Yes, when I’m doing it all think “Okay, LEQ, are we going to answer today or are we going to predict today?” And how much time should they take? And in my head I break everything down because I’m really organized and so this helps me stay organized with my lessons. It helps me be sure that everything’s in there and if I write it down that way I can see if I’ve missed anything when I look through the plans.
R: Do you carry this around with you?

K: Yes

R: Because I haven’t seen it, I haven’t seen you use it. It must be lying on the desk.

K: I usually don’t like to use it in front of the students, but I like to be able to go back to look at notes while I’m teaching. Sometimes I’ll take it with me too small group because I have their small group stuff written down in that way I know what I’m doing. That is the most helpful thing for me. If someone took my spiral, I would know what to do.

R: So as your thinking through what you’ve written down, let me see that again.

K: I sound like a weirdo (laughing)

R: No – I’m going to look at what you’re doing tomorrow.

K: Yes, they are all dated. I’m very organized.

R: I see that. So, ……

K: It’s funny if you notice, if you turn the page and look under science, there are like two sentences. And if you look at math, it’s like the whole page.

R: So you say, that you’re going to do whole brain the shot put conversion. The teams will take three minutes to create the best word problem with conversion that they can think of. Is that having to do with the shot put?

K: Yes. My word problem today was with the shot put. So that’s the example they had, that was from me.

R: Two teams will teach the class how to do their problems. So then you have task cards four and five as whole group. What’s that?

K: So we did task cards one through three today.

R: Where do you get them from?

K: Cpalms. They are word problems using metric conversions.

R: Are they written in your plans?

K: The link to C palms is. And the activity is called shot put conversion.
R: I just wonder what you’re going to do with them because it’s not written down. Do you know what to do with them?

K: Yes. Each team gets a copy of the task cards and, I think I wrote down how much time they get.

R: Not in this one

K: Today they got five minutes. So I’ll probably give them about four minutes tomorrow. They, as a team, will read the problem together decide how they want to solve it, and then solve it. And then I’ll pull sticks and that way they all have to be prepared for it and the team will teach the class. They didn’t teach the class today. I want them to teach the class tomorrow. Today they explained it to me but tomorrow I actually want them to come to the front of the class and explain it.

R: So this has to do with shot put?

K: Yes

R: And then you say “Explain activity for Friday” and GO

K: Graphic organizer

R: So what activity are they going to do Friday?

K: I need to find a shot put. My teacher’s husband works at a high school so we might borrow one from him or I might go to the athletic office and see if they will let me borrow one. What we’re going to do is, since there are three adults in the classroom, Mrs. Mills, the para, and me, were going to take the kids outside in the three adults are actually going to throw the shotput. It will be quite embarrassing. And then the kids are going to measure it and they will have a graphic organizer that they will injure the different measurements and then they will have to convert each person’s throat into the different units. They are going to be using all of the metric units.

R: Okay then you have your pages for your centers. Do you know what’s included in those pages?

K: Yes

R: So you’ve already looked that up?

K: In order to do small group, I went through their testing that they did at the beginning of the year, looked at all the data, it took me hours, and looked at what each group was least proficient at. And then I went through and picked worksheets or problems that were going to help them with that. So that’s all based on data. If I didn’t have that data information, I wouldn’t know what I was doing.
R: So now let me ask you some specific questions from the lesson. You did estimates in the beginning when they watched the shot-put video. You had them give a prediction of how far the girl would throw the shot-put. And the students said 1 yard and you said what about in the metric system. Some students then said 2 or 3 m, 3 ½ m. And then you said, “Okay, now let’s go to the powers of 10”. So my question is how did the students know if their estimations were correct? They gave estimates, but they didn’t check them to see how close they were.

K: This was just the activator, so it gets them to just start thinking and warming their brains up. I always will do the same thing: I don’t know what the best answer to say is, so I just don’t respond. I think you’ve seen me do that before. They’ll give examples and I’ll say okay and will just move on - Because I don’t know the best way to respond.

R: Does the video actually measure how far the girl throws the shot put?

K: No. It’s just to give them an idea of how to use that kind of measurement. I plan to tie their estimations from today into an activity for Friday where the adults are going to actually throw the shot put the students will measure.

R: When you moved into the powers of 10, you had them create their own question about the powers of 10. What was the connection between the powers of 10 and the EQ for this lesson?

K: Because for them to understand the powers of 10, it’s the whole basis of why we move the decimal where we do. So…..

R: Do you think the students knew the connection?

K: No. Because I didn’t know it until just now when you asked. I had to think about it. It was on C palms so I just said okay. They probably were like “Okay I guess were moving on from metrics because now that I think about it you do need to know the powers of 10 to understand why you’re moving that decimal a certain way and whatnot. But they don’t know that because I didn’t explain that to them”. Hmmm, oops.

R: So what could you have done to make the connection?

K: Give them an example using the powers of 10 with the metric system. Show them that I’m doing the jumping and connect the power of 10 that were using that way. So you could do something along those lines. But I didn’t think of that total just now and you mentioned it.

R: Okay then you moved from the powers of 10 straight into the ice cream activity. In the ice cream activity was no longer metrics. It was customary measurements. And so you had them start copying the chart. So, the transition between the powers of 10 into the metric - there wasn’t a clear transition. And from the metric to the customary measurement there wasn’t a clear transition. Do you ever use the words customary with them?
K: No. I know the metric system so you would think I would know the customary system but I don’t. I don’t know anything about the customary system. If I had to teach it tomorrow I would not know what to do.

R: The students were not converting based on 10 anymore so you ask them to make a prediction, then weigh the ice cream, it would be weighed in ounces they would have to convert to pounds.

K: So they probably got confused because I never clarified how to do that.

R: Have the students ever worked with ounces and pounds before?

K: Yes

R: I know they’ve converted pounds to ounces because that’s usually the way it’s done. And they might if converted ounces to pounds if the ounces were something like 32 ounces equals 2 pounds.

K: They had never done it with such small numbers before. Which is why they got confused.

R: That leads me to my next question. How could you have helped that situation?

K: I probably could’ve prepared better for it and told them or gone over it and given examples of doing problems with the smaller numbers. Because then when they saw the decimals they were all like “what am I doing?” We had never done it.

R: That was my next question-have the ever divided with decimals before?

K: Yes they been doing that for a long time

R: Both in the dividend and the divisor?

K: Yes they know to ignore the decimal. They know all that they’ve just never done it with conversion. They’ve done that.

R: So you asked them to make an estimate of the ice cream and they were way off. Some students said 3 pounds were 5 pounds.

K: Someone had 24 pounds.

R: So my question is, on previous days when you were teaching customary weight, did you use any type of manipulative that they could feel how much an ounce was or how much a pound was?

K: No. I should’ve done that because with them I’ve noticed that they understand it a lot better when they can see it or feel it or touch it. Like what we did the plotting activity where they were walking and finding the plots themselves, they got it so fast because they were doing it
themselves. And so that’s how I learned, if I can see it or I can make a comparison by holding or something. I learned a lot better and so….

R: You said that there are manipulatives in the closet.

K: I’ve never been into the closet. (K uses air quotes for the word closet) and yet that’s the thing that I took the most from the mathematics methods class. Using manipulatives. We did manipulatives like every day and that was what I took most from that class was using manipulatives to help you learn it because it’s a different way of thinking.

R: Well it’s very conceptual.

K: Which is probably why I guess I didn’t use manipulatives because I don’t like the concepts.

R: You say you don’t like the concepts. Is it because you were taught that way or……

K: I never grew up with anything like that. I didn’t know what a manipulative was until I transferred to the school. I’ve never even heard the word. So when I was in the math methods class, that was my first year here and I had never even known what a manipulative was. So I think that’s why I’m more uncomfortable with them because I’m just now being introduced to them.

R: Okay was there any kind of review like the day before of converting ounces to pounds?

K: Yes, we’ve been doing that. They are very good at converting pounced ounces because it’s multiplication.

R: Okay, so let’s look at the math problem that you put on the board remember that I don’t take pictures of things just because they’re wrong, I’ve taken a lot of pictures.

K: I was supposed to add the zeros after the 3/10, right?

R: Well, you can, but that wasn’t the issue here. You did the division of dividing 16 into 33 which was two times. You subtracted and got one. All that was correct. Then you brought the zero down and you said “Does 16 go into 10?” And the students answered no. But what you failed to do was put the zero in the quotient.

K: Oh, really? You have to do that?

R: Yes, you have to do that. So really, the correct answer, if you are carrying this out three places…

K: I’ve been doing this wrong my whole life.

R: If you divide into a number and the answer is zero, you must put a zero in the quotient.
K: I’ve never done that in my entire life. Ever. Once. Never. Oh my gosh, I’ve been teaching them wrong!

R: If 16 will not divide into 10, before you pull the second zero down, or whatever number it is,

K: Oh, there it is. I see why.

R: So really your answer would’ve been .206 if you would’ve taken it out three places. The rest of your division was correct; you just didn’t put a zero in the quotient.

K: It’s the concept.

R: Yes, of zeros in the quotient.

K: I don’t like it. Not a fan.

R: Well that answers my question, you didn’t know about zeros in the quotient.

K: When I saw that picture, I automatically knew. I remember that problem and I was very unsure about it.

R: All right will let’s move to the ice cream activity. You were dishing out the ice cream and S came up to you and said, he brings this paper and said “how do I convert to pounds?” And you said “You divide. You divide. Go back to your seat and divide”. He went back to his seat. A few minutes later A came up and said “what do you do with the pounds?” And you said “Go back to your seat and convert it, you need to do that because it’s going to be graded”. Then another student came up and said “No one at my table knows what to do” and you said “yes they do, they are working” and then you said “L, will you help A?” And I know that you were busy at the time so I want to ask you, what was going through your head as all those students were coming up to you?

K: I was telling myself to keep my cool, don’t get mad. Because it’s the same students every day who are….. With A especially, it’s not that he doesn’t get it, it’s that he’s finding ways out of it.

R: What about S?

K: S is lazy.

R: Really? How do you determine as a teacher if a child is lazy or really doesn’t get it?

K: Because he’s in one of the top math groups and he can teach them everything. He was getting it up until that moment. He had never asked a question about it before. I think that putting an example on the board would’ve helped them. In the second class, I put an example on the board and I didn’t have those questions.

R: So you learned from the first class?
K: Yes, you see my first group where I make my mistakes, but in my second group, that’s where I change them.

R: So what would you do differently next time?

K: Well, when I did it with the second group, it went so much smoother. Just with the example and keeping it up there. It was like the confusion went from a 10 to a six. So I think that with a lot of them, it comes down to modeling before having them go into it themselves.

R: Let me see, let’s go back to the division problem for a moment. You read the answer as two and 64 thousandths of a pound when the answer was written as .264?

K: Was that right?

R: Look at it.

K: Oh, 264 thousandths of a pound. Oh, oops.

R: From there you went into small groups and students that were seated were working on the go math page. Have you taught these conversions?

K: We’ve reviewed them and there was a key in their book as well.

R: About how many days do you think you spent on this?

K: Probably one. We went over the key.

R: So basically, this was all customary. And it was customary weight…… No, it was customary volume or capacity.

K: I gave them capacity?

R: Yes, because this says quarts, gallons, cups, pints.

K: Mrs. Mills picks their workbook pages for them, but I’ve never taught volume or capacity. They know how to do volume like length times width times height.

R: But this is customary conversions between cups and pints and quarts and gallons. And I noticed that a lot of students were really lost.

K. Well, yeah! I think that ties back to us planning together. Because I haven’t gone over any of that.

R: Lastly, these are the two papers that you worked on in the groups. And these come from……
K: Their testing data

R: Do you know anything about that standardized test?

K: No one knows anything about it. It’s a secret.

R: Are you talking about the end of the year test?

K: Yes, this test builds up to the end of the year test.

R: Well I do know that the end of the year test is based on common core. And common core is a lot of problem-solving and real-world problems. So I’m wondering why you are choosing just strictly computation problems to have them practice?

K: With group four especially, it’s because….

R: This is the high group?

K: Yes. They know everything. Everything. Everything comes so easy for them. With this it was more challenging, they had to know placeholder zero, that they been struggling with. So that’s why chose that for them – based on the standard.

R: So you chose this?

K: Yes.

R: Do these come in a book? Where did you get this from?

K: Math worksheets land.com. I googled the math standard and what came up with it was a lot of C palms stuff, but there were no worksheets on their. With the standard attached to it, there were a lot of websites with worksheets. So I got it based off the standard.

R: Is that were you got this one too?

K: No, that one came from the testing book that Mrs. Mills has.

R: Was there a particular standard that you were working on here?

K: I don’t exactly remember what it was but it was something with multidigit numbers.

R: And what about this one?

K: It was reviewing addition, subtraction, alteration, and division, all the operations with whole numbers, decimals, and fractions. So, there’s decimals and fractions on this.

R: So did you have the answers for these problems?
K: No

R: Do you work them out ahead of time?

K: Yes

R: So you do actually have the answers. Do you have them written down somewhere?

K: I don’t bring them back to the table with me. But I do write them out.

R: So what happens to the Go Math work that they do?

K: At the end of the unit, it’s all looked at as a whole. So for our entire conversion unit all that work that they been doing in their go math book will be pulled out and stapled together and then looks through.

R: Do they get any feedback on it as they are doing it?

K: We use it to plan for small groups. We take how they did on those dates are small groups on the.

R: So they are doing this on their own, then you look at it, kind of grade it…..

K: They don’t get a grade. But we look at like, group 4 is not going to need to go over that. But group one is going to need to go over that.

R: Do you have anything else you want to add?

K: Well, I’m sick of math. I go to bed at night thinking about math and I wake up thinking about math. All I think about is math. Every thought I have is math. I see numbers and I think math. It’s so bad. It’s a problem.

Observation Narrative Week Four

This week brought a couple of interesting things into the internship. First, as I walked in for the lesson observation, Kelly told me that the school principal had called her the previous night and offered her a full-time substitute job. She would take over a fourth grade classroom for a teacher going on maternity leave. Kelly told me that if she accepts the position she only has three more weeks in her internship. Second, Mrs. Mills was not in the classroom today because, according to Kelly, she was going to administer testing to another group of students. The paraprofessional assigned to a student in a wheelchair was in the room.

Kelly gave me the lesson plan for this week and it was quite a bit longer than in previous weeks. It contained the essential question, an opening problem to use as a formative assessment, a
question to ask the students, the links for the materials, vocabulary words with no definitions, and small group activities including the students names in each group, the standard the group would work on, and a page number and problem numbers for the groups. The essential question for today was “How can I convert among different sized standard measurement units and use them to solve problems?” While the students were passing out the interactive notebooks, Kelly asked the class if anyone knew what a shot put was. A few students called out their ideas and one suggested that it was a sport in the Olympics that would test strength and ability. As a class, Kelly brought them to the conclusion that it was a heavy ball and asked how much they thought the ball would weigh. Students answered by giving random numbers and Kelly moved on to the next question, “How would we measure how far someone through a shot put?” A student answered, “kilometers?” Kelly replied that it would not be that far. Another student raised his hand and related a Scottish game that he had seen on the cartoon Scooby-Doo to throwing the shot put. That conversation distracted both the class and Kelly and was never redirected back to how far a shot put’s distance could be measured. Kelly turned on the video and the students watched a clip that lasted approximately 1 minute showing a female athlete throwing a shot put. The video did not show the distance that the shot put was thrown.

At the conclusion of the video, Kelly asked the students, “What number is 100 times larger than the 60?” There was no transition or explanation as to why she moved on to another math topic. One student replied, “60 because there are two zeros in 100”. Kelly replied, “Good, now what is 1/10 of 70? Remember, this is just reverse - take away the zero.” A student said, “Seven”. Kelly called out a few more problems similar to those and then asked the students how they knew which direction to move the decimal when doing powers of 10. A student replied, “you move it to the left when it is getting smaller and you move it to the right when it is getting bigger.” “Yes!” Kelly said, “do we all have a good understanding? Give me a thumbs up.” Most of the students responded with a thumbs-up signal but a few did not do anything. Kelly moved on and asked the students to create their own question about powers of 10 in their interactive notebooks. Kelly walked around the room and discussed the students’ problems with the groups.

After reviewing the powers of 10, Kelly put a chart on the screen and asked the students to copy it. The chart was for the next activity – weighing ice cream before and after adding toppings. The measure of weight was customary – pounds and ounces; however there was no transition or mention of changing from metric to customary. The students were asked to make a prediction as to how much their bowl of ice cream would weigh before toppings. Students called out, “5 pounds” “3 pounds”, one even said, “24 pounds”. Kelly responded with “Well, we’ll see”. Kelly reviewed that 16 ounces were in a pound and asked the students to review how many ounces were in 3 pounds. One student replied, “48 ounces”. Kelly asked, “How about 5 pounds?”. Another student said, “80 ounces.” Kelly instructed the students that they were going to go to a table in the back of the room to get their ice cream and weigh it in a bowl on the scale. Further instructions indicated that after the students added their toppings, they were to weigh the ice cream bowl again and use that weight to convert the measurement into pounds. The first group
went to the back table, Kelly scooped the ice cream into the bowl, and each student weighed the ice cream bowl on the scale. The weights were 3.3 oz, 3.4 oz, 3.7 oz, and 3.5 oz. Before leaving the table, one student asked “How do I convert to pounds?” Kelly told the student to think about it. Then she stated, “Go back to your seat and convert it. It’s going to be graded.”

Several other groups went to the back table to weigh their ice cream bowl. Others, who finished that, were trying to convert the ounce measurement into pounds at their seats. Everyone seemed to be struggling with it. A student walked over to Kelly and said, “No one at my table knows what to do”. Kelly replied, “Are they working on it?” The student answered, “yes”. Kelly then asked another student to help that group. Some students went to the paraprofessional for help in trying to convert the ounces to pounds. After Kelly finished scooping out the ice cream to everyone, she walked around the room to see what the students were doing. She said, “Remember, the answer is going to be a decimal or a fraction”. Seeing a student who said he was finished with the problem, Kelly asked, “J, how did you do it?” The student explained that he divided 3.4 by 16 because there are 16 ounces in one pound. Kelly responded, “Yes, that’s how you do it. Let’s work B’s problem on the board together.” Kelly asked student B how many ounces her ice cream bowl weighed. She indicated that it was 3.3 ounces. Kelly put the example on the board, but did the division incorrectly as she did not put a zero in the quotient. Kelly’s answer to the problem was 0.264, but she read this as “Two and 64 thousandths” of a pound. The students didn’t question the math and Kelly told them that it was time for small groups.

The first small group worked on place value and knowing which number was largest. For example, one problem was .034 compared to 3.4. The second small group worked on a worksheet sample test practicing addition, subtraction, multiplication, and division of larger numbers. There were no word problems, just algorithms. While the students were working in small groups with Kelly, the others were working at their desk on an assignment written on the board. The students were confused and several interrupted the small group activity to ask Kelly to explain something to them.

**Cooperating Teacher Interview Week Five**

**R:** How do you help K plan to meet the needs of all your students?

**M:** We go through, it’s called I BTP, so it’s a test almost like discovery and it will show them what they missed, you know what skills. And we plan our small groups accordingly, based on that data.

**R:** So do you plan that with her?

**M:** I did the first week. But for the last few weeks she’s been doing it on her own.

**R:** About what we did she take that over?
M: I would say the third week.

R: Do you look over that to make sure that she’s doing……..

M: I do check the plans

R: Where does she get her materials from for those groups?

M: I’ve got some different books, and there are some different online, 10 marks is a good website. It’s standard based and you just print off assessments from there.

R: Planning - contrast the beginning of the internship and now, if you will please.

M: Before, it was a lot of showing her how to do it and where we get materials from and how to group the kids. And now that she has the understanding, she’s able to do that on her own.

R: She still struggles a little with content. How do you make sure that she understands the content before she teaches it?

M: She’s comfortable asking me questions and she has said before “I’m not sure how to teach this. I don’t understand this”. We have that relationship where she doesn’t feel afraid to ask questions.

R: About how far in advance do she usually ask you for help?

M: Usually a couple days before she teaches the lesson.

R: So at the end of the day, as you are debriefing with her, what kinds of things to talk about?

M: It kind of depends on what happened that day. If I see that she needs to pick up her rigor a little bit, will talk about that. If I see stuff that she’s done well said yes or no, I’ll talk to her about that. So it just kind of depends on what’s happened in the day. There’s nothing really set.

R: Do you talk everyday?

M: Yeah

Preservice Teacher Interview Week Five

R: So you’re eating a bag of Swedish fish?

K: Yes, it’s my last one out of the whole back.

R: Okay, what happened today?

K: I’m just exhausted. And I did planning with fourth grade today.
R: For the possible position?

K: Yes. So now I’m planning for two separate grades and two separate classes. And it’s overwhelming. And on top of that I’m trying to get everything done that I need to have done for the next two weeks in order to graduate. I thought I was going to have two months and there’s no one here, and it’s lonely. So that’s why I’ve eaten a whole bag of Swedish fish this afternoon.

R: Well you deserve that. So the fourth grade position his language arts?

K: No it’s all. It’s all subjects.

R: So it’s a self-contained classroom?

K: Yes I don’t switch with anyone. So I’m planning my class, my small group, my second class small group, all the plans for the day, and now I have to take over the fourth grade E LA, math, science, and small group.

R: So they want you to start planning now?

K: Yes. That’s what I started doing today.

R: Are you planning with the sub?

K: Yes. And I’m thinking “When do I have time to do that”? Plus I have to have time to finish my school work which I need to have done in two weeks. And I need time to sleep, and time to eat, it’s like I can only pick two.
R: Wow that’s a lot. I can’t believe they’re having you plan with the sub.

K: And that’s what’s making me second-guess this position. If I love the school but I hate being in Lakeland alone I’m not going to be happy. My mom said that I should just take it for the experience and I’m getting paid and she said that I could do anything for a month. I do agree with her, but if you’re miserable for an entire month and it’s a choice, then why would you choose that? So I don’t know, but for me not to do it is kind of silly, but the more I think about it, the more I don’t really want to. I just don’t know.

R: Well keep thinking about it it has to be your decision.

K: Well if I get TFA, that begins June 4. But they said all be a sub so that doesn’t really matter. I can miss the last two days of school.

R: Let’s talk about TFA. Why did you do that?

K: It’s Teach for America and it’s where they put you in inner-city schools around the country and I chose to do that because I want to travel. I just want to go somewhere out of Florida and that’s the perfect opportunity. I want to extend my horizons and go somewhere.

R: Do you have training to do for this?

K: You train over the summer. It last five weeks and since I will already have my teaching certificate I’ll be able to start my master’s degree. Depending upon the city I get placed in, I can get my degree with their partnership school. And so if I get Dallas, which is one of the places that I picked, I can get my degree from SMU. And if I go to Washington DC, I can get a degree from Johns Hopkins. So there partnered with really good schools and they give you around $10,000 for your master’s degree. It’s really a perfect opportunity to have a job and be able to travel without having to do all the other certification testing and stuff like that for different states.

R: So you don’t have to have certification in the other states with TFA?

K: No.

R: I wonder how they get around that.

K: I think when you do the five-week training program and they know where you’re going to be they incorporate things into it. I’m not really sure but a couple of places, if you already have a teaching certificate, you can’t teach there. Because the reciprocity doesn’t rollover and they won’t allow you to teach there if you have a teaching certificate without going through that states process. So there’s a couple of places I can go.

R: That seems backwards.

K: It does seem backwards.
R: So basically if you have a teaching certificate, you can’t go some places, so it hinders you.

K: Yes it does. In the interview, it was weird, because they separated us (those who were studying education) from the other people (other majors). We were actually interviewed by someone else. I kind of felt like I was at a disadvantage. My mom said that a lot of people have told her that they think that if you’ve Artie gone through an education program that you think you know everything and you’re not willing to learn or you have one certain way of doing things or one certain way of teaching. They hire people that aren’t teachers because they train you…..

R: In five weeks?

K: Yes five weeks to be a teacher. I just don’t know how you could do that. I could never just learn for five weeks and then go into a classroom. I told them in my interview that I didn’t want me having a teaching certificate to hinder my chances because I’m open to learning new things and willing to try new things. I don’t think there is a right or wrong way to teach. So I’m open willing to try new things but I really thought I was at a disadvantage, definitely. If I don’t get it, I’m just not the type of person they’re looking for.

R: But that doesn’t mean you can’t move yourself somewhere.

K: Yes I know but it’s just a harder process. Being a first year teacher and not having a Masters it would be a little difficult to do that.

R: Okay let’s talk about the lesson. The lesson was about categorizing two-dimensional figures.

K: What I had planned out isn’t exactly what we did. I went with what was in the plans because I wasn’t there Monday because I had my interview. And I guess one of the teachers wasn’t there and they didn’t get to mass at all on Monday. So that’s why it was mostly going over vocabulary, and we actually did that lesson plan today. I wasn’t aware that they had learned any of it until I got there this morning.

R: So the triangle sort, you did today?

K: Yes

R: So do you have Monday’s plans written down?

K: That was for Monday, they just didn’t get to it.

R: The triangle sort was for Monday?

K: Yes, I go through the plans on “one drive” and that was for Tuesday, but they didn’t get that. And I didn’t know that until I got to school on Tuesday.

R: So you just had to introduce vocabulary instead?
K: Yes

R: Okay will talk about this. You can incorporate a little of what you did today since that was what the lesson plan and was about. Let’s talk about planning for this lesson. Did you plan for the vocabulary lesson at all?

K: No I didn’t. I had no idea I was doing that. I did know what have those words meant. I was up there just trying to wing it. I don’t know if you notice that are not.

R: I actually thought your demeanor was a little different today.

K: Well actually I was a little more comfortable with shapes. To be able to go into that lesson and know nothing about it, I was a little comfortable, because it’s shapes.

R: I could tell. You were more matter of fact with them. When they ask you questions, is seem like that you didn’t stumble over your words.

K: Out of all my years, geometry was the only math class that I ever got an A in. The only one.

R: You certainly were more comfortable yesterday. So tell me, when you didn’t plan for this lesson, the academic task that you had was….. Well you started with a video again. Did you watch the video ahead of time?

K: Yes

R: How did that help you?

K: Mrs. Mills showed that on Monday because we picked those videos together. I saw it when we were planning our lessons about three weeks ago. But she showed it Monday and she wanted me to show it again. I don’t know why, but she told me to show it again.

R: So when you plan, you said you planned three weeks ago, do you plan for a month or so?

K: We have PD day where the students have set of in the teachers get together to plan.

R: How long do the plans last?

K: We planned through next week. That’s all we have. So now I’m the one doing the rest of it. On PD day, we sat down and planned math for like three or four weeks and that was one of the lessons that was planned on PD day.

R: Okay so she chose the video and you watched it ahead of time and then did it with them. You were going to do a triangle sort, what’s that?

K: What it was… It was characteristic cards and it said things along the lines of “my triangle has a 90° angle” and then there were some of the other cards.
R: Is that these?

K: No, those are talking about them but it was like a matching game kind of. And it was like “my triangle has a 90° angle” and there was a picture of a triangle with a 90° angle. And so the students had to walk around and matchup with each other. Things like that.

R: Okay so you do that today?

K: Yes

R: Where did you get that idea?

K: Cpalms

R: You’re getting a lot of your ideas from Cpalms.

K: We take everything from Cpalms. That’s what she told me to do… Was to take everything from Cpalms. I don’t think those lessons are very clear sometimes. Like I had to read over this lesson like 17 times because I didn’t know what it was saying. It doesn’t break it down for you. It just gives you like worksheets and stuff. So you don’t know what you’re doing really. It has some good ones, but it also has some that I wouldn’t pick for myself.

R: But for other lessons you said that you’ve gotten ideas from Pinterest, googling things?

K: Yes. Cpalms is there for a lot of it. So I’ll try to find extending activities from different things but I’m supposed to follow the Cpalms.

R: Let’s talk about the vocabulary lesson that you taught. Tell me about your strengths and weaknesses of this particular content.

K: I like geometry. I don’t really feel nervous about it. I feel comfortable with shapes because their shapes. What can be so scary about a shape? Nothing. And, it’s memorization. Acute is less than 90. Obtuse is greater than 90. I can memorize that and know it. I can memorize things pretty good. When it came to lines of symmetry and stuff like that and talking about that type of thing, I was a little more uneasy about it. But with just the basic shapes and today we talked about different types of quadrilaterals and how they have for equal parallel lines and stuff. I like that kind of stuff and I don’t really have a problem with it. It’s when they get into measuring angles and measuring sides and stuff like that I have trouble.

R: So you used the video as your opening instructional strategy and then you gave the students a worksheet called “shape up characteristics”. What was that?

K: That’s something that were going to be doing tomorrow. They will have like all different types of shapes. So today we just focused on triangles.

R: Are they cut outs?
K: Yes. And then they sort them. There are diagrams and they should sort each shape to where it belongs.

R: So that’s really a form of manipulatives?

K: Yes it is.

R: Is this the first time you’ve used manipulatives?

K: Well we don’t do stuff like this often. The point of giving them that she yesterday was so they could see words they were unfamiliar with and that they would know what I was talking about.

R: Did you make any connections between the lesson you did and the mathematics methods course?

K: I remember using shapes. We had triangles and other types of shapes. I remember doing stuff with different shapes and I remember in math feeling comfortable with shapes. I remember that they were little golden triangles that we played with pretty much. And there was one point were we got to like make other shapes with the smaller shapes. I remember doing that. I remember putting two triangles together to make something. And I remember not hating that.

R: So will your lesson that you’re doing tomorrow in some way can act to the mathematics methods course and the use of the manipulatives?

K: Slightly. It’s not the same activity, but I can see where it would tie back to the class.

R: Is there anything else you would like to tell me about the planning and implementation about this before I get into the questions about the observation?

K: Well, I didn’t really know that this was going on until I got there that morning. So I had like three minutes to think of what questions I was going to ask them and it was all kind of off the top of my head. During that video, I was stopping it and asking them questions randomly, just when I thought it was necessary. So I didn’t really have any prep with that because we didn’t plan to teach the vocab. It was just something that I came in and Mrs. Mills told me to do.

R: So did they have a sub on Monday?

K: No, Mrs. Mills was there.

R: But they didn’t do math?

K: I guess the one of the other fifth-grade teachers was out so her class was in my classroom and they didn’t get around to doing it. I don’t really know what happened, I guess they just did the EQ and did a prediction that was it.
R: Okay now let’s talk about the observation. During the video, I noticed that you paused it a lot and asked the students questions. For example, “what is a congruent figure?”.

K: The reason behind me stopping is so much was because I use videos as a way out so I don’t have to pay attention and even as their teacher also back and relax as they watch the video and I don’t have to teach. But I did want to do that. I wanted to actually try and stop and ask those questions. It was benefiting me because I had to dive into it but it was also beneficial for them because I was making sure they were paying attention.

R: Were you familiar with everything on the video?

K: Yes I was familiar. I’m very comfortable with shapes and so I was able to ask questions because I felt comfortable with it.

R: At one point the video was talking about rectangles and you stopped it. You drew to a different kind of rectangles. So I drew what you drew. Look at this and tell me about that.

K: A rectangle and a trapezoid?

R: Yes

K: I didn’t know it was a trapezoid. I just went for it, I thought maybe it’s a rhombus or maybe it’s a parallelogram.

R: I was wondering, instead of this rectangle, did you mean to say quadrilateral? Two different kinds of quadrilaterals?

K: Oh, did I say two different rectangles?

R: Yes

K: Yep that was wrong.

R: Yes, the students didn’t say anything so the class went on.

R: You drew two triangles. One of them was bigger than the other one and you asked the question “do the angles in both of these triangles add up to 180°?” Why did you ask that?

K: Because we talked about angles and we talked about shape and I think that some of them don’t understand that an angle is an angle no matter how big or small a shape is. So I wanted them to see that just because one triangles bigger than the other, it doesn’t mean the degrees change.

R: Next, you passed out the vocabulary sheet and the student wrote in their interactives. You had them talk in small groups about the different shapes in the students around me were using a lot of great vocabulary. What was your purpose and having them talk about those things?
K: I wanted them to use the vocabulary into actually discuss it and not just listen to me and write it down.

R: You seem to be much more confident in this particular lesson.

K: Yes I was. If I had walked in there in Mrs. Mills had told me to do something different that wasn’t with geometry, I probably wouldn’t have known how to do it. It just so happens that this is the only part of math that I enjoy.

R: While walking around listening to the group discussions, one of the students made a comment that a two-dimensional shape has half as many sides and angles as three-dimensional shapes. And you said “good” and went on.

K: (laughing) I didn’t know how to extend upon that. I know that if it’s three-dimensional it’s more than if it’s two-dimensional. Like a cube, I don’t know exactly how many squares, but I know it’s more than one square. I knew that, but I did know how to extend upon that, so I just said “good”.

R: One of the other students made a really good point that “equal” is the root word for equilateral.

K: She’s good at this stuff too, which is funny, because she’s really low. Really low. Even today, she was raising her hand and answering questions correctly which doesn’t happen very often with her. So I’m wondering if she actually understands this because it’s just shapes? She knows it and she doesn’t really know much other math.

R: Do you feel a connection with her?

K: In a way, yes. She’s not very confident either.

R: There was an interesting discussion on heptagon versus hexagon.

K: I don’t even know the difference. I know that a hexagon has six sides.

R: Well a heptagon has 100 edges. And then another student talked about a Nonagon which has nine sides. You really have a lot of knowledge going on in the brains of your students and in that classroom about geometry. They seem very interested in it.

K: They like it. Even today they ask if we were doing shapes and I said yes and they said yeah and I saw that they were excited about math.

R: So why do you think for you or for R or for any other student that might struggle in everyday math, geometry is somewhat easier?
K: I don’t know, I mean I see shapes everyday so I’m exposed to shapes everywhere in everything.

R: Do you think it could be because there’s not……

K: Much math! It’s not really math, it’s just knowing. It’s the concept of some of the other math that I don’t get. But the concepts in geometry, I do get.

R: You said that when you start measuring angles, you get confused.

K: Yes, we will be going into that

R: One of the other students brought up a non-example of a polygon. And you started a discussion about what is a polygon. The students started calling out different answers and Mrs. Mills jumped in and asked the question, “what does Poly mean?” The students had no clue.

K: I had no clue.

R: The students started Brainstorming and eventually got around to that it meant many – many sides. I thought that was a great addition that Mrs. Mills made. Later on you use that same definition of poly and try to explain it in another way and E reworded it and stated differently. What you think about that?

K: I know, he said “I know the exact definition”. Mine was “a figure with many sides” and he said “a many sided figure”

R: He also used the word plane. It almost sounded like he was looking it up on his phone.

K: That’s what it sounded like. But it was some of the exact words I had used, just in a different order. I kind of thought it was funny.

R: Did it bother you in any way?

K: No, because I have the right words.

R: You also talked about reflexive angles. Did you know about that kind of angle?

K: No

R: You defined it.

K: While the kids were having a discussion, I asked Mrs. Mills.

R: So you mentioned reflexive angle and then said “turn to your partner and talk about what a reflexive angle might be”?
K: Yes and while they were talking, I asked my teacher. But at least they were thinking about it. And they were discussing it and thinking about it while I asked about it.

R: There was another term, “rotational symmetry”. At that point, you looked at Mrs. Mills and said “ummmm”. And then said, “more than one line of symmetry?” And she said yes. Then you used a circle to demonstrate that. You also put a triangle on the board. An isosceles triangle. You then drew one line of symmetry. One of the students asked if he could use a different triangle. It seemed as though he was starting to get the idea that if he used an equilateral triangle, he might be able to get rotational symmetry. So you drew an equilateral triangle and you split the triangle from one of the vertices. The student was trying to instruct you on where to put the next line of symmetry. He was explaining that there were three lines of symmetry one from each vertex. But for some reason, he was having a hard time explaining that you. You asked the question “do triangles have rotational symmetry?” And you said no.

K: It should of been yes.

R: Well only some do. The lesson close to that point and you would into small groups. I’ve noticed that the small groups really run like centers.

K: They do. They are in centers.

R: So let’s talk about the groups.

K: I already know that first problem that I did with group one was totally backwards. Because the way I did it with group 2 was the right way and I said to myself “what was I doing?”

R: I actually wrote that down.

K: All you had to do was find out how many centimeters were in 9 m.

R: Yes.

K: And I did a completely backwards.

R: But the way you did it worked.

K: Yes, and I did it in the second group and I thought “What the heck was I doing?” And why was I thinking about doing a backwards? I don’t know.

R: So the problem was, “Michael was helping with the school play and he needs 9 m of fabric but he has only 12 cm. How much more fabric does Michael need?”

K: When I read that at first I was confused. I thought why would he only have 12 cm, I just doesn’t make sense.

R: So you didn’t have the problem worked out in advance?
K: No, because that’s what they were supposed to do Monday. So I did all the problems when I was writing my plans out for Tuesday. That’s why at the beginning of small group I asked them what they had done and they hadn’t done anything they were supposed to do on Monday.

R: When instructing them to solve the problem, you did remind them that centi is 1/100 of a meter. And one of the students said “we probably just divide”. And you reminded them again what a centimeter was. And then one of the students said “could we multiply?” At that point you started solving the problem out loud. You kept reiterating that a centimeter is 1/100 of a meter.

K: They don’t get that.

R: Why don’t you think they get it?

K: I don’t know. Because I get it - I do. I look at centi and I think 100.

R: Have they used the rulers? Have they used centimeter rulers at all?

K: No they haven’t.

R: What I could be it.

K: Will the only reason I get it was that I was able to memorize that a decimeter is 1/10 and a centimeter is 1/100 and a millimeter is 1/1000.

R: Yes, but perhaps getting a meter stick out and letting them actually count the centimeters

K: When we did the shot put activity they actually used meters to measure how far we through the shot put.

R: But I don’t think there was a connection here. You started with we have 12 cm so we need 88 more centimeters to get to 100. And then we need 100 more centimeters and so on.

K: It did work.

R: Yes it did. It was almost like counting change backwards.

K: I don’t know. I probably couldn’t do it again that way. I don’t know what I was doing, but somehow it worked. I don’t think backwards so I don’t know how that happened.

R: So you did it a different way with group two?

K: Yes and as I was solving it I was thinking to myself, how did I even get into that train of thought? I don’t even know.
R: But it was interesting to watch. You actually counted up. That’s exactly what you do when you make change. You know, if it’s a dollar 88 we say 89, 90. Then with the dime we say two dollars. That’s what you were doing. You were counting up like you were counting change.

K: I have no explanation for it.

R: You got the right answer. That just shows that there are multiple ways of solving a problem. That may have actually helped some students. You then moved to the powers of 10 and basically what you told them was to look at the exponent and then it’s one plus the number of zeros that the exponent represents. My question is, do they understand the concept of 10 to the third power?

K: Yes because that’s their shortcut. Before we did this I explained that if there was a three in the exponent you would see the 10 three times, 10×10×10. At first when we did tend to the second power they said 20. And so I explained to them that when you see the exponent you look at the number that’s being multiplied with that exponent and that’s how many times you would see the number.

R: So you have taught them that?

K: Yes, the way we were doing it then was the shortcut.

R: At that point you made up some problems like 5.23×10 to the second power. They figured the problems out and you discussed that this was the shortcut. One of the problems that you did, in my opinion, was really good and I wondered why you didn’t do more of them. You had this problem - 523÷10, but you didn’t know the power, equals 52.3. So you explain to them that it was 10 to the first power.

K: Yes I wanted them to see that you just move the decimal one place to the left.

R: Why didn’t you do more of those?

K: I really don’t know.

R: Another problem that you did was 426÷10 to the fifth power. The students really got stuck because they had to add so many zeros onto the left.

K: Yes, what I’ve been telling them is wherever you see that death is not already filled in, you fill it in with the zero. But they get confused if the decimal is going to the left. They seem to be comfortable adding zeros to the right to make the number bigger, but to make the number smaller is where they get confused.

R: So while everyone is in their groups, one group is working on their go math pages. The assignment today was to separate triangles from quadrilaterals and the pages discuss a lot of the vocabulary that you went over during whole group. Is there ever a time when you are Mrs. Mills go over the go math pages to prevent them from having so many questions while working on it? You had a lot of students that kept coming back to you asking questions.
K: No. She usually picks the go math pages. I think she just opens the book and picks them. I didn’t pick that page. I didn’t even see it before they ask me questions about it. I’ve never seen it.

R: And you said that you collect them at the end of the unit.

K: Yes, she has them turn it in for a class participation grade. They’re not actually graded, just so they did them.

R: Then you use them to prepare for small group?

K: That, and homework, and testing, it just depends. I just graded….. I graded 372 tests last night. That adds to me just wanting to die right now. And I was giving half of them 16 percents, 10 percents, and zeros. And I won’t write a zero on the paper. I won’t do it. I’ll just put retest.

R: Why?

K: Because to see a zero and know that you got nothing right…..

R: How many questions were on the test?

K: There were multiple tests that I graded. There were several sets for each class. And I think there were about 8 to 15 questions per test.

R: Were they on the same topic?

K: Metric conversions. There was one test about coordinates where only one person got a C in the rest got A’s and B’s. Even the low group. And I was really impressed with that.

R: So what you know from that?

K: We don’t need to cover coordinates anymore. But with metrics, I cannot physically bring myself to put a zero on someone’s paper. I can’t do it. Mrs. Mills asked me” why did the same pretest?” And I told her because I can’t put a zero on a paper. Because to look at it and see that you got not one thing right, if that was me I’d be like forget it.

R: So what do you do with that information then?

K: Well we are taking the test I graded last night and were going to use it for small group next week. We’re going to go through the test and break it down a question by question and then they are going to retake the test. Different numbers but same type of thing. It was really sad to grade those, because they get it. They understand how many times to do the decimal, they don’t understand the direction to move it. Some of them are moving it to the left and it should be to the right and stuff like that and so half the class failed. Maybe more than half. At least eight people got zeros. Absolutely nothing right.

R: Was that a unit that you taught completely?
K: Yes, metrics.

R: And what is your level of understanding on that? If you would’ve taken the test, what grade would you have received?

K: I get it because I’ve been teaching it. If I had taken that test the first week, I wouldn’t of past. The only reason I get it is because I’ve taught myself every single night how to do it. I showed them to different ways to do it and I think that’s where they are getting confused because there are different rules for each way.

R: So what are the two ways?

K: By powers of 10 and by jumping where they are just looking and jumping.

R: Those are two different types of questions. If the question asked for powers of 10 than they have to know that.

K: Well they could find the answer understanding the powers of 10. If you are converting 25 cm to meters….. They don’t understand the concept that a meter is bigger than a centimeter even though I’ve shown them rulers and I’ve shown them sticks.

R: Have they worked with some?

K: No. They don’t understand that there’s 100 cm centimeter. The concept of it, they don’t get. I like a away, used the jumping method to avoid the concept completely.

R: So do you think when you pull them back into small groups you might bring out some rulers?

K: I have to break it down completely. They don’t get the concept of it. Even though we did stuff where they could visualize it, they never actually measured except for the shot put activity. But they don’t understand that a kilometer is 1000 m. They don’t understand that. They are just looking at the numbers. So they’re looking at, if I am converting 20 m to kilometers - you can jump and you don’t have to know anything.

R: That’s right, but that’s a very low level of understanding. The concept just isn’t there.

K: Doing it that way was how I finally got it. That one jumping method was how I finally learned it. I had the lightbulb with the jumping method, which really doesn’t involve anything. But from there I was able to build on that. I figured out how to do it by looking at powers of 10. If a centimeter is 1/100 of a meter, you can look at the zeros and it tells you how many places to move the decimal. When you think about which way you move it, that’s when they have to know which one is smaller and that’s where they get really messed up. I know it’s my responsibility for them to learn, but there’s so many factors that tie into it like the homes they come from and what they are experiencing outside of school that ties into how they are during the day and so it’s hard to get them away from what’s been going on outside the classroom to focus them. That’s something I’ve had a struggle with, my little space cadets who just stare off into space all day
and try to get them to focus and to grasp and to understand when they are telling me, “will of the homeless shelter this is happening”. How do I take my emotion out of the situation and bring them back to math? I’ve been having a problem with that because I’ve never really had to experience stuff like that before. Did I tell you about the little boy and his mom? How do you take your emotion out of that? How to why help them focus? With internship that is been one thing that’s been really hard to do. Field study, you’re there once a week, you don’t know them on that personal level and so I find a lot of times that they are being distracted by their outside lives and it’s hard to tell them not to.

R: Is there anything else

K: I just want to sleep.

Audio Journal Week Six

Sorry it’s taken so long for me to get this to you. I had my half marathon this morning so I went home and I was getting everything done this weekend so it’s a busy weekend. But I didn’t really teach math at all last week except for what you saw but I can take you about testing. It was an interesting experience. I feel really bad for the kids because there’s so much pressure on them to do well and they know that. And it’s long, for the first three days they did three hours of practice test and then on the actual real day they had another three hours of the real test. So by Friday, they were just a done. When I talk to them about the FSA, and telling them that they have more coming up, they said “Wait, that’s not it?” So some of them didn’t know they had to do more and I just think they’re really stressed out and by the end of the week they were just not going to do anything. I mean we try to make it more fun for them just because they were not happy and you could tell in their attitudes that they were just burned out. So it’s hard to watch fifth grade feel like that. I think there’s a little too much pressure on them for testing but I had one of my students….. And where I saw this the most was in him and he is autistic and he is very very bright though, he’s very smart. It’s more social autism for him, but he was really upset during the FSA. We’re not supposed to talk to them, I was a proctor. He was crying and he wasn’t working so I went up to him and ask “S, what’s the problem?” And he told me, “I’m not going to do good, my life is over, and I’m never going to make it”. For him to say that, I looked at him and I said “S. It’s just a test, it’s just a test. You will make it, your life is not over. It’s just a test”. So the fact that they think that, it really breaks my heart for them. That’s about it, sorry there wasn’t much math.

College Supervisor and Preservice Teacher Second Post Lesson Conference Week Six

P: So tell me how you think the lesson went.

K: I thought it went well. They knew everything pretty well. I mean in the beginning I think that the way that the EQ was worded was slightly confusing and then not understanding the word attributes – I tried to help them figure out what that word meant and stuff like that. But then once we got into finding volume, I think they were pretty good at it.
P: Okay, you brought up something that I haven’t even thought about. You mentioned that they were struggling with the word attributes and understanding that. So in your own classroom think about when you’re doing something like that, are you going to have a space where you list math vocabulary?

K: A word wall is what I would want to have.

P: Okay, but then if it’s just a word wall does it connect with the definition? Do you see what I’m saying?

K: You can put the definition on it? Like if you do cards and stuff?

P: But is that a word wall if it has definitions?

K: What would that be called then?

P: A word wall is used when the students look at it to see how to spell the word or recognize the word.

K: Oh, when I was in first grade for my field studies she had like a big bulletin board and had the whole alphabet and under each letter was the word and the definition on a card.

P: Okay have never seen it with the definition. You could certainly do that

K: But it isn’t called a word wall

P: It is a word wall, I’ve just never seen it with the definitions on it. But what you could do is just have a math chart for each unit so right now you’re doing measurement and so you would have a measurement chart and as you come to those words and introduce them just like you did today, with the word attribute, you could write attribute on their and then describe it. It’s the characteristics or features. Like your attributes are you have green eyes. So one of my attributes is that I have green eyes. So what are some attributes of this shape?

K: Right.

P: So yeah so that’s something to definitely think about especially when you’re working with content that’s complex if you have to keep revisiting something.

K: Yes this is the first day we talked about volume. So, but for the first day, I mean once they knew what the word meant, I think it made a little bit more sense.

P: Okay so tell me what else she thought of the lesson? How else did you think it went?

K: I thought it went well. For the most part.
P: Okay so when we…. One of the things at the very end was a student said. The one student started sharing his shape and then the other student got up to describe it, the boy over here on the side,

K: T?

P: He sits in the front

K: Yeah T.

P: And then the other kid got up to talk about it? He said “well this is the length and this is the height and this is um…and he kept hesitating, I don’t think he necessarily understood the concept of width.

K: Mhm, how wide something is.

P: Yeah, and not the measurement, but he didn’t even understand what width is.

K: Okay

P: What I’m thinking is, to make it more powerful, because they’ve…they were definitely able to do the algorithm. They’re able to multiply. But is this about multiplication? What’s it about?

K: The concept of volume and what it’s measuring

P: Right, I think most of them were able to do the math, the algorithmic math. I am not sure that the majority of them actually understood the concept of volume. What I think might have been helpful is if you had had some boxes, or big boxes, or different size boxes that you picked up and had a box on each table. And talked about “what do we call this side? Or what do we call that?” Those kinds of things so that they can actually engage in a real 3-d shape. Because even when you were talking you said “ I’m not very good at drawing 3-d shapes.” It’s hard for you to draw it and visualize it, it’s definitely hard for me to draw it and visualize it. Math isn’t my subject either. It makes me nervous too. So anytime I can bring in something that’s hands-on and easy for them to see, I think that strengthens my lesson.

K: That’s what I was trying to use the cubes for.

P: Do you think it worked?

K: Kind of

P: Kind of. But I think really they still didn’t have a deep understanding of it. Try to make it applicable to the real world. I don’t know how to take this off, but some phone cases you can take off and this would have been a good one because it’s an Otterbox and its 3-d. It’s important to know the volume of this because it’s important to me to know whether or not my phone is going to fit in that. So it’s important to know the volume of the box if I’m shipping a Christmas
present across the country because I need to know what will fit in that box. I am not sure they understood that whole concept of what is volume.

P: Something else that A said..you said “what is the volume of this square?” Do we find the volume of a square?

K: Well it’s a cube, but you could find the volume of a square because you know that a cube...well you could find the volume knowing one side of a cube because that’s a square.

P: If it’s a square. But do you see the difference in what you just said? You were using cube and square interchangeably and they’re not interchangeable. So think about that too. It’s all about thinking about your language and really scripting it out in advance, especially when you struggle with that.

K: That’s usually what I do. I write everything out and I put quotations. I have it in the room, I can show you where I write out everything that I’m going to say. I don’t think I made that connection until you just said it.

P: I just want to start by saying there were a lot of good things in this lesson. I mean look at my chart, this is pluses and this is things I’d work on. So your management, you’re right on target with that. You wait for them to listen when you call their attention. When you handed out the manipulatives and they started chatted you said hands free, no touching the blocks, hands on your head. All of those things you have really grown and developed in your classroom management. I think that you can go in any class and you’ll be fine with that. You gave the definition of volume right up front, you used that visual timer for students when you were giving them time to work and then calling them back. You gave very specific feedback. I like the way, and I have some examples of that written down here if you need to see them, you used manipulatives and when you handed them out you started to talk and give directions and then when you realized they weren’t listening at all you stopped completely you said “manipulatives down, hands on your head” and you really were clear about your directions and that was really good. You used student constructions, so what they had built at the end, to talk about volume. So it became less teacher centered at that point and more student centered. That’s what we want, more about them than more about you. So it became more student centered. Just a couple things, I would start by asking “why does it matter than we understand volume?” And understanding that the volume is that space inside and if you’re talking about a 3-d object many times in the real world we need to know how much will fit in there. I'm even looking at the paper-towel holder there. I could find the volume of that shape, why do I need to know that? Because I need to know how many paper towels will fit in there. I need to know the volume of my phone case because I need to know what size phone will fit in it. I think starting even with that would be a very powerful way to start with them, rather than starting with this is just something that we have to do because we have to able to answer the question on a test. Do you see what I'm saying? Make it really always meaningful to them. Then just one other little thing, when you wrote your
problem and you had it written on your lesson plan about you had them building a fort, you knew you were going to use that in advance and if it were me, so that you don’t have your back turned to the class, I would have it on a chart ready to go and just slap it on a wall or have it already written up there because this class is very well behaved, but not every class is and so when you turn around to write this long math problem up on the board, who knows what little Lori is doing in the background. And you don’t know because you’re so focused on that. That’s just a little management tweak I would make, but overall your management is just really, really strong. So with the math make sure that you kind of investigate why do they need to know this? My suggestion would be to start with manipulatives perhaps and let them explore. First just let them play, because you had a kid who was building a transformer right?

K: E

P: E, right. He was building a transformer and you said “did you find the volume?” and he said “no, I was just showing you this because it’s really cool isn’t it?” All children are going to do that when you use manipulatives.

K: That’s why I tried to give them that time at the end to just kind of build and get that out and just play with them in a sense.

P: Consider flipping that. Consider saying okay, I am going to give you the manipulatives and I am going to give you 90 seconds to see what you can build with this. And just let them explore and play. Then say okay boys and girls, later maybe you’ll have some time to play these again but right now we want to look at these as a math tool. And be very specific. Say this is a tool that we are using in math to help us understand the concept of volume. Again it’s the whole 5 E model. Start with the engage…

K: That’s what this lesson was but it was the first E. It’s a 5 E lesson that I got from CPALMS and I can send you the link if you want it but it’s a 5 E lesson.

P: So to me it might have been better to start with the manipulatives and then go from that. Let them explore then let them build the 3-d figure then say “what do you notice about this shape?” I think you would have heard from some of them “it has length” and “it has height” and “it has width” and then you could have taken their language and that makes it more student centered. Taking their language and turning it around and developed it around the idea of finding volume. The majority of the lesson time was spent doing multiplication rather than talking about volume actually is. Next time you develop a math lesson I want you to think about that. Am I spending , if my goal is for them to understand volume, look at your lesson after you’ve built it or before you’ve built it and say “what do I need to spend the most time doing?” Does that make sense to you? You’re kind of looking like you’re not sure.

K: No I get it
P: You’re growing, you’re using the math vocabulary more. You used and confused a little bit the square and the cube so make sure you're aware of that. That you’re not using and confusing those things. But again make sure that if you’re objective is for them to study volume, you’re using the concept of volume and not focusing on the multiplication. That would be my suggestion. You're doing well. You're growing in your confidence in math…a little bit? But you're thinking through it aren’t you?

K: Mhm

P: So if you know that’s the area that you struggle with, you're going to have to do what to do it effectively?

K: More?

P: You're going to have to do more math but more doesn’t always mean better does it?

K: Well I try to really look at it and break it down. I send Ms. R pictures. I have a spiral where I write everything out and I break it down and I don’t have to do any of that for science or anything because I can talk about it and know it. But I actually have to work out problems and write down problems in order for me to get it.

P: So I think what you just said is you're working out the problems so you're working out the mathematical algorithms so what I want you to do for your next spiral sheet when you're planning a lesson is I want you to work out concept.

K: That’s what I don’t like

P: But that’s where you know you need to grow. Push yourself to do that. Okay if the concept if volume, what do I need to know about volume? Do some reading. Go to Khan Academy and look for what is volume. Find an old teacher’s manual if you can find one and see if you can get some ideas for that. Look for a visual model on the internet because the concepts are what are causing you a little bit of confusion and when you understand those concepts better then that’s going to strengthen your lesson. Questions? Thoughts? Tell me your thoughts. I can see you’re thinking something.

K: It’s all the same things that confuse me. I can do the multiplication and that’s fine but having them make the connections is where I always get messed up in everything. Even the lessons I’ve done previously, I’ll meet with Ms. R. and luckily I’ve had days where the lesson is still continuing so I’ll go back in and have them make that connection and then they’ll be like “oh”… and that’s where I always am lost.

P: And that’s okay. As a classroom teacher and I know math is not my strength and I know there’s another person on my grade level who I know is really strong in math I can say “hey, can you help me think about how I’m going to explain this to my kids? What visuals do I need to
help them understand that?” So seek out those other experts and don’t be afraid. Because we’re elementary teachers and we’re generalist. That means we’re supposed to know a whole lot about everything and that’s hard. So seek out people who can support you when you need that. You said it’s been like this the whole time and that’s okay, you're learning and growing. You're going to take this conversation and probably tomorrow when you teach another lesson on volume you're probably going to bring in some boxes and bring in some things to make the lesson stronger. We’re always learning and growing. When you quit learning and growing you’re pushing up daisies and you don’t want to be doing that. Don’t be afraid to say “I don’t know that but I’m going to learn that” And don’t be hard on yourself because that happens.

K: Ok, well, let me just cry right here.

P: So, you’re learning and your growing. And you have to be comfortable and realize that learning and growing is about stopping and saying “that lesson stunk. What can I do differently next time?” Because we’re human. Now this lesson did not stink, but I’m just saying that you will have those. I have those. And you just say “okay, what do I need to do differently?” And that’s the sign of a good teacher - one that’s always saying what can I do to make it better. Every day is a new day and you won’t be perfect all the time. You just have to keep learning and growing and when you’re tired you have to take a break sometimes. And that means even with everything else you have going on, and this really has nothing to do with your lesson, but it has to do with being an effective teacher. You have to find balance. When you take your own classroom, you may make a plan and say, “I’m going to stay late two or three days a week but on the other two days I’m going home because I’m important.” And if you don’t, you’re going to get overwhelmed and you’re going to get tired and you won’t to be as effective.

K: Yes

P: So that’s just kind of personal advice but it’s very important ‘cause you don’t want to burn out.

K: I know, if that was a science lesson I wouldn’t come in here and cry but with math, it’s just like…….. When you tell me all these things, I’m going to try them, but I feel like I’ll never get it. And I feel like the kids will never get it because I don’t get it. And so they have testing in two weeks and if they don’t do well, it’s my fault.

P: No, so let’s talk about that. What don’t you think they’ll get?

K: I mean if there’s like. I think they understand content and doing algorithms and stuff like that, but when it comes to like actual questions where they have to know like in-depth about something or like the actual concept of something, I don’t know if they’ll get that because I don’t get it so I’ve never really done well with talking about it with them.
P: So if you read did this lesson tomorrow, which we know you are still working on volume, what would you do differently?

K: Probably give them more real world examples and tell them where they would be using it and why they need to know it and stuff like that. And then probably have more items for them. They have crates in the classroom that textbooks go in and that I thought about when I was falling asleep last night because all I think about is math, that I could use. And I thought about this crates and I didn’t interrupt doing it because I didn’t want to disrupt where they were with of their books out and stuff like that. But I could’ve done that because then those crates are actually like…. There are holes in them that are like cubes so you can see and you can count and stuff like that.

P: So we could take these individual then and put them inside the crate then we could actually count the volume. What about bringing in just shoeboxes? Do you have any old shoeboxes?

K: No, but I can find some.

P: Just get a couple of shoeboxes, maybe a boot box and a little baby shoe box, some different shoeboxes that you could bring in and you could use that. The one student actually said “oh look at this” and he started using the tissue box and that right there was a big clue that they needed that visual. That was very early in the lesson. So think about that too. Make sure that you integrate and use visuals because even though that group is high, they needed the visuals. So the next class you teach is not as high in math so the visuals are going to be even more important to them. But it’s okay, every teacher I know cries at least once a year.

K: I feel like I cry once a day.

P: That’s okay. When we think we’ve arrived, we need to change something. Can I ask you about your conversation with the principal?

K: Yes, it was about 10 o’clock the other night and she called me. I thought there was something wrong with Mrs. Mills and there was going to be a substitute the next day or something like that. She told me that one of the teachers had just called her and it wouldn’t be back for the rest of the year. The principal asked me if I could take over that class tomorrow. I told her no.

P: Yes, you told me all that.

K: So I was honored and she was telling me how great she thought I was in so I was honored that she wanted me to start and I told her that there’s a process we have to go through and I would have to be released by the college so she told me that she would get a substitute until the release date and then I could take over after that. And I said okay. But she didn’t really ask me, she kind of just told me. And I didn’t want to be the intern that says no. Because she likes me. She wrote me a recommendation letter and to get a recommendation letter from a principal is like. I was
blown away. So I don’t want to say no and then I hadn’t exactly said yes, but she wrote a letter home to the parents saying that I was there new teacher and so I felt trapped and I had to do it.

P: If you don’t want to do it, we can take care of that.

K: I thought about it more and I’m just stressed out about finding a place to live for that extra month after graduation because I’m not from here. And I won’t have friends here, because all of my friends will graduate and so it’s like thinking about stuff like that not about the classroom. I think I’ll go in there and be comfortable, I’ll be fine. But I feel like I didn’t have a choice.

P: So where are you going to live?

K: I don’t know. I’ve been asking around. That’s part of it. I felt like I wasn’t given a choice. Most people would be like, why are you even questioning it, but it’s just.

P: It’s a lot to deal with.

K: It’s a lot

P: In my opinion, that letter should of never gone home.

K: And my name wasn’t even spelled right. So I was like, well, whatever.

P: Okay, so you have decided to do it?

K: Yes

P: So it’s going to be your classroom until the end of the year?

K: Yes

P: And you will have spring break to get it like you want it?

K: I start next week. I’m supposed to.

P: Well, we still have to do one more observation.

K: Will you be here Tuesday?

P: Yes, but I have two other observations, I can observe you at 8 o’clock in the morning.

K: It would be math.

P: Okay, Tuesday at eight?

K: Yes, it might even still be volume because the lesson is supposed to last for five days and today was the first day.
P: Okay, I will be there at 7:50 AM.

**College Supervisor Interview Week Six**

R: I saw that you had a discussion with the cooperating teacher today, can you share anything with me about that?

P: I asked the cooperating teacher if she had been able to plan with K and she said that she had looked over her plan so I took that to mean that she had not really assisted her with planning. There was no conversation about what she might do differently. And then I asked her about possibly co-teaching with K to help build her confidence and perhaps when she saw that K hadn’t done something that she would do, that she would go ahead and do that and that they would kind of bounce off of each other and that K would learn from that. She didn’t seem comfortable with it at all. So as a supervisor I know that we need to do some more training with the mentor teachers about what disco teaching look like an even what does planning together look like. It’s not just saying here’s my lesson plan and it doesn’t look good. It’s bouncing ideas back and forth and talking about content. And it’s also talking about what students need to learn.

R: So do you feel like she was open to any of that?

P: No I felt like she was a little bit defensive because I felt like she was trying to protect K rather than help her grow. I feel like that she felt that my comments were evaluative in a negative way, not constructive feedback.

**Preservice Teacher Interview Week Six**

R: This lesson was about volume using cubes. So tell me about the decision-making that went into planning this lesson? We know how you decided on the content, but how did you decide on how you would teach it and what you would do with students?

K: I wanted to use manipulatives, I wanted to use cubes because we did that in the math methods course, which probably answers another question. It makes it seem more fun for them and there was so much testing going on last week. It was a week full of testing and I wanted it to be something they might enjoy. That’s why I did the cubes.

R: Did you think it might help with the concept of volume?

K: Well, now it would because I understand the concept of volume myself. But at the time, I wasn’t really thinking about it that way.

R: Okay so describe your strengths and weaknesses with this lesson.
K: I thought it was all weakness. I thought it was terrible. It was really an off week for me, I don’t know why.

R: Did you feel confident with volume going into the lesson?

K: Yes, because I only thought about it as length times width times height. I didn’t think about any other aspect of it.

R: But that goes back to something you said a few weeks ago.

K: About the algorithm?

R: About concepts and rules. Remember when you said, “if it’s a rule or a formula I can do it”.

K: Yeah, and that’s the thing. That’s what I was doing. Then when I met with Mrs. P and the whole thing was I wasn’t teaching them the conceptual part of it, which is what they need, it was like, I pretty much beat around the Bush with the whole lesson. So I don’t think there was much that was strength at all.

R: So tell me about your instructional strategies. You used cubes, blocks. Did you feel any strengths or weaknesses in using those?

K: I think using the cubes was a strength because it was a manipulative and something that they could use themselves. I think the way that I did it could’ve been better because I was asked planning it to them as looking at the measurements not thinking about how many cubes were inside the figure itself.

R: Okay you mention the connection you made to the mathematics methods course. Is there anything else you would like to tell me?

K: I don’t think so

R: When you started the lesson you started telling them about L times W times H. You then asked S about attributes of a figure that you would use finding L times W times H. S got up out of his seat and said “I have to use a tissue box”. Why do you think he used that?

K: It was a manipulative for him.

R: Yes, and he was using vocabulary such as faces and edges. When he was finished explaining you asked him to guess the length, the height, in the width of the tissue box. My question is, why didn’t you actually measure the box?

K: I don’t know. A lot of times with that class, whole group is only supposed to be 20 minutes and I always go over by like 15 or 20 minutes and so sometimes I just kind of like pass by things that they say that would be beneficial but it’s because when the principle comes in you should be doing small group by 8:30 AM, no later than 8:30.
R: So do you feel pressure in that way

K: Yeah I feel like I can’t elaborate or do certain activities that I might want to do because you’re not supposed to take more than 20 minutes for a whole group lesson which is hard.

R: Oh, because that was a real teachable moment. But it was missed, I guess because you felt the need to press on.

K: I really can’t blame it all on that though. I wasn’t confident in what I would’ve responded to him with so….

R: I saw that when you call on students, and tell me if I’m wrong, the more unsure you are, the higher level student you call on.

K: For sure! Heck yeah! Yeah! Because then I know they’re going to be right so I don’t have to explain it.

R: You call on S quite a bit, and you call on J,

K: And D

R: Yes and L. I can see that you call on those higher students quite a bit if you are unsure of the lesson. Okay, you wrote a question on the board – Mrs. C is building a fort from cardboard boxes. The length is to the height is three the width is two. What is the volume? The students got the answer right away because they just multiplied the three numbers together. But there were no units and no concept involved.

K: No, I didn’t think about that.

R: And then you started talking about a square. And you said “if you know the length of a side of the square…

K: That was where I confused square and cube

R: Yes. Can we find the volume? And L actually said “no”

K: I think more than one person said no.

R: Well I heard him.

K: I’m pretty sure that more than one person said no, because today I went back over that and drew a cube and said that a square is one face of a cube. You can use those measurements to find the volume of the cube

R: Good, so you took what Mrs. P said in your post conference and made corrections the following day. How did the students react to that?
K: They said “oh”. And that was it. I always get scared they’re going to be like “why did you do it wrong?” Because they will say things like that. Even today, I did a problem wrong and they told me and I said okay and I erased it. It wasn’t really noticeable.

R: But they seem to like you. I don’t think that when they say it they mean to hurt your feelings.

K: They don’t at all, there’s just no filter with fifth grade and they say what they feel and that freaks me out. As I make a lot of mistakes.

R: Going on, the students were giving you examples of what kinds of figures you could use to find volume. One of the students that a trailer, and one said a table. And you said “perfect”. I was wondering how a table can be measured to show volume?

K: I was thinking of their desk

R: That would’ve made sense

K: When he said that, I instantly thought desk.

R: Yes, and measuring that would’ve been good.

K: We actually……. I wish you could see the second block. You should see the difference between the two blocks. Because after the first block, I change things for the second block that would work better. I feel like my confidence level is so different in the second block so you are seen though Raw math.

R: More examples were given in the students did the procedures correctly to find volume.

K: But it was just procedural and that was all I taught. Just procedure.

R: Yes, but they attempted to make some connections, but it was difficult. Then you pass out the blocks. And I noticed that there was also no connection made to counting the blocks. Tell me about that.

K: I didn’t think about it at all. I didn’t even know that the volume of the cube would be the number of blocks in the cube. I had no idea. I should’ve had the students count them.

R: So the students use the cubes to build 3-D shapes for finding volume. There were some weird shapes being made in the beginning. One student made the tower which was not really showing what you wanted it to show. What do you think went wrong?

K: Yeah I didn’t give very clear directions.

R: As the students were working, some seem to be having a lot of fun with their blocks. And you made the statement, “everyone needs to be paying attention or I will take the blocks away”. Do you remember saying that?
K: Probably

R: So what you think about that?

K: I don’t know, I meant it.

R: So the students were using them for other things besides building a 3-D shape to find volume. Keep thinking it through.

K: I mean, I think that, if you’re asking the reason they weren’t paying attention is because the directions were really….. I think once they got the blocks they thought “I don’t really know what to do but I’m going to build something” their heard me say build something. I didn’t really specify how I wanted them to do it and stuff.

R: I don’t think they were seeing the blocks as a math tool.

K: No they weren’t. Maybe I should have given them a chance to play with the blocks before I wanted them to build a 3-D shape.

R: Okay one question that you asked the students was to decide on a unit for their 3-D shape. You asked them to decide on centimeters, meters, or whatever. But while watching them, it didn’t appear that the students had the concept of how big a centimeter is or how big an inch is and I was wondering does it make it more difficult for them approximating a measurement not knowing those units?

K: Yeah I think so.

R: One of the examples was the pool and the student said it was 56 feet deep.

K: Yes, I remember saying “wow, that’s a big pool!”

R: When the students were making the 3-D shapes many of them made a shape with a width of one. They were struggling to understand multiplying L times H times W when the width was always one. Sometimes the length was one as well – like R’s tower.

K: My directions just were clear with that.

R: Okay, so I’m going to ask you something personal. If you feel like you don’t want to answer, that’s okay, just let me know. While you were teaching, Mrs. P went over to Mrs. M and said some things, which is an unusual. So at the end of your lesson, you went over to the desk and you were getting your materials and things ready and you and Mrs. M had a short conversation. Do you remember what that was about?

K: Yes, it was about what Mrs. P said to her.

R: How did she feel about the conversation?
K: She didn’t like it. She took it as an insult against me and that was how she portrayed it to me. Which I think is the whole reason I was completely upset going into the conference after the lesson. And I had a little breakdown. But she told me that…… I don’t want to talk bad about her.

R: No, I don’t want you to.

K: She told me that Mrs. P seemed like she was trying to find things that I’m bad at and that she was asking Mrs. M what I’m not doing well at. “Well there’s got to be something” and things like that. Well she told me that right when I went over to talk to her so I was kind of hurt and I was already moody so that’s why I went into the conference pretty much wanting to cry right from the start. So that didn’t help the situation and I think that Mrs. P – everything she says is to help me. I know that. After talking to her, it was a lot better conversation. I think that when Mrs. M and I had that conversation, it completely changed my whole mindset and I just felt like my lesson failed because she said that. Mrs. M is very protective over me.

R: Mrs. Mills has given you a lot of encouragement.

K: She’s not good at giving me things I need to fix though. She never does it. I have to ask. Mrs. P gave me things that I needed to work on last week and I did a much better lesson this week.

R: When you were talking to Mrs. Mills, I saw your face change. It didn’t look like you were mad or upset, but like someone had burst your bubble. You look like you were deflated. I want to ask you a question that I will ask Mrs. Mills. In her final interview. Can you describe your planning time with Mrs. M before you took the lead in teaching?

K: There wasn’t really me doing much planning. She would go over with me – then again I started completely on my own at week two so I jumped right in to it, which was fine because I had been with her before so I was comfortable with her. But I didn’t have time to work with her to plan. The first week I was in there walking around helping her, similar to what you would do in field studies, getting to know them, like jumping in on lessons here and there. But I never implemented plans or anything like that.

R: As you began taking over did the planning process change in any way?

K: Yes. She told me how to do it, and from there I pretty much did a completely. On my own. I would run it by her…..

R: But was it the skeletal type plans that I was seeing when I first started?

K: Yes. In the plans online there would be a standard and then I would go from that standard.

R: So research tells us that cooperating teachers provide support in three main areas. They provide support in lesson planning, emotional support, and academic support. What would you say is Mrs. Mills’s strength?
K: Emotional support

R: And why you think that? Can you give me an example of a time she provided emotional support for you?

K: She always, always encourages me. She always tells me that I’m doing good with something, the kids love me, that she only wanted a full-time intern because it was me, things like that. And if I’m being hard on myself, she’ll turn it around and complement me and so definitely emotional support, but academic as well because if I don’t understand something, I’ll ask her actual show me how to do it. And I’ll get it.

R: Did she ever take the initiative to sit down with your plans and go over that with you ahead of time?

K: No not really, but if I asked her she would always help me.

R: Do you have anything else you would like to tell me?

K: I didn’t feel as bad about it until I talked to my teacher.

R: Do you mean when you went over to the side was talking with Mrs. Mills?

K: Yes.

R: I noted in the post conference that you seem to shut down with Mrs. P. You got really quiet in there. Was it because of that conversation with Mrs. M?

K: Kind of, and because I knew that talking was going to make me upset and I didn’t want to cry. And then I ended up crying. I felt, I don’t know. Just the way that it was portrayed, I know that she means well, and that she such a help, it was just the way that it was portrayed made me feel like a failure and Mrs. M told me that Mrs. P said that she didn’t think I was ready to take over my own class. And that was really hurtful because everyone else seems….. I mean if the principle seems to think so and everyone else seems to think so, but my supervisor doesn’t think so, maybe I’m not. Maybe I’m not good enough.

R: Well…..

K: She asked me if I felt ready and I said that I did feel ready because I know that I can control a classroom and I know that I can teach them.

R: Management is your strength.

K: I think that it was just after having that conversation, I was just kind of like what’s the point? And I didn’t want to talk about it. I didn’t want to. And I was dreading going to that meeting.

R: Did you feel better after the meeting?
K: No.

R: Not at all?

K: No. I had Oreos. She did send me an email that night and I was happy that she sent me that. I know that she means well, I really do. It was just what Mrs. M had said. Any nice thing Mrs. P said, I didn’t want to hear it because I felt like……. I don’t know. The differences between my cooperating teacher and my supervisor, and then having them being spoken to me, it’s just not a good feeling when my teacher is saying one thing and my supervisor is saying another thing. It makes my head spin. That was a very frustrating day.

**Audio Journal Week Seven**

Hello and happy Friday. Today was the last day with my kids and it was sad. They were really sweet and meet me this huge binder full of letters and it was very, very sweet. Today we did kind of a fun activity. We did in overall volume review. It was the last day of volume, thank God because we’ve been doing it for what seems like an eternity. They did center activities and I gave them all different items. I gave cubes, I gave them a cooler, I gave them the book, and I gave them a box of cookies and they rotated in their teams to each center and found the volume of each item. I told them they could do it however they wanted as long as they explained what worked best for them. They did a really good job with it and I think the level of understanding has really increased, especially with volume. They’re pretty much of volume experts. It went really well. It was a really good last day and am glad that my last volume lesson with them was successful, especially compared to my first one. So that’s it I hope you have a good weekend.

**Cooperating Teacher Final Interview Week Seven**

R: Can you describe the planning time you had with Kelly before she took the lead in teaching?

M: She would plan with us. We have a set planning schedule, implemented at our school.

R: For the grade level?

M: Yes. Every Tuesday. So it’s grade level planning. Every Tuesday we plan the math, every Thursday is ELA, and Friday is for science and any grade level business we need to discuss is always a part of that.

R: So this is after school planning?

M: Well, it’s during block. And then if she has questions, you know, we always stay after school..

R: So is it planning for a week at a time? Or more?

M: We try….. Our principal likes us two months ahead.
R: Two months ahead?

M: So we try our best to do that. Sometimes we are, sometimes were not. It’s hard.

R: So I would think that if you’re planning to months ahead, that the planning is basically what you are doing as far as the topic, your standard, materials…. 

M: Whole group instruction, yes everything.

R: So the details in the planning may come later?

M: Yes.

R: As Kelly began to take over teaching, did that planning process change in any way?

M: Well, maybe a little. At our last planning day that we had she did most of the math planning. We kind of looked at what she was doing and what she had done and she kind of just went with it and did good.

R: In my readings, research tells us that cooperating teachers provide support in lesson planning, emotional support, and academic content. So what area would you say is your strength?

M: Probably the emotional. She’s very hard on herself and she needs that confidence to teach this kind of math and she can do it.

R: Can you provide an example of a time that you provided emotional support?

M: Last week you know when she thought, when she had her observation, she thought she did horribly and she thought she didn’t do anything right but she did. She absolutely did. I said “If you weren’t doing things right, they wouldn’t have hired you, you wouldn’t have made it to the last round of TFA. You’re doing fine”.

R: Can you provide an example of a time you provided academic support?

M: I showed her how to plan for small groups and look at IBTP

R: What is IBTP?

M: Almost like discovery, broken down into standards.

R: Do you know what it stands for?

M: I don’t off the top of my head.

R: That’s okay.

M: And you can see where the kids need that extra support.
R: So you taught her how to look at the data?
M: And plan for small groups.
R: Good. Okay, you said when we first met that Kelly was your first full-time intern.
M: Yes.
R: Now that this experience is almost over, what have you learned about being a cooperating teacher?
M: I really enjoy it. I enjoy seeing her grow and succeed and do well and I really like it.
R: Good. So what, if anything, would you do differently with the next intern you have?
M: It’s hard to say, you know I think a lot of it depends on the intern really. Kelly’s done really well so I’ve kind of let her maybe do things earlier than normal. I’ve really kind of let her take over. It would just depend on the intern.

PST Final Interview Week Seven

R: Overall in your internship, how comfortable did you feel while you were planning for lessons?
K: I didn’t feel like I had much help with planning. Mrs. Mills showed me how to do it and then kind of left me to do it and so I didn’t really know how to do it best. I started with trying things and changing things, which was fine, I was learning from myself. But I didn’t know the best way to go about it and so it took me a long time to actually realize how to plan correctly. Up until now pretty much. Even though I’ve been planning for the past five or six weeks, so……
R: Have you found a plan that works for you?
K: I’ve been trying to develop one with the notes that I write out. I’ve been trying to do that and that’s been helpful. It’s not as much as the College lesson but it’s not just a couple of things on it either.
R: Overall, how comfortable did you feel while you were implementing the lessons?
K: It depended on what I was teaching. With the kids, I feel very comfortable in the classroom and I feel very comfortable with the students. With myself in math, I honestly get happy and get excited when it’s over and we move on to science.
R: Do you feel the relief?
K: Yes I do. Just because it makes me nervous and I get worried that I’m going to mess it up and I can tell a difference in my confidence level since I started because I’ve learned different strategies and stuff to make that nervousness and anxiety better.

R: Do you think of the anxiety has increased, lessened, or stayed the same?

K: It hasn’t increased. I think with certain situations, like an observation, I get anxious but that’s with any observation. I tend to think about math every second of the day now which bothers me. But I try to look at it differently and I’ve tried to not stress myself out about it so I think the anxiety aspect is gone down just because I’ve been surrounded by it so much that I haven’t really had a choice. Because I can’t be anxious 24/seven every single day. So I’ve tried to look at it differently, look at problems differently, and not look at a mistake as a failure, which is what caused the whole thing to begin with.

R: Describe your best moment when teaching a math lesson.

K: Well, all the good things happen when you are not there. But actually, something that happened today, it might not of been the best moment, but I thought it was a good moment, was we were talking about the vocabulary words (height, width, length) and I gave a human as an example. I said “looking at height is like looking from the floor to the top of your head so vertically, how tall you are. And your length like across from arm to arm, and then your width, turning to the side and showing them.” And they were like, “what if you were laying down, would that change?” So I lay down on the floor and I let them stand around me and I said, “how would you measure my height?” And they answered from my feet to my head. But I said “no, remember we talked about from vertical from the ground up”. They said “while, your height is now tiny compared to what it was before”. And I said “so from my feet to my head, what’s that now?” And they said it was the length. And one of the students came around to where my feet were and explained that the width was from one side of my body to the other and what’s in between. They all had a lightbulb come on and so many people said that they got it. Hearing them say that they got it after doing that and after we’ve been doing this for two weeks was really good. Hearing them say that they got it because I laid on the floor and tried to think outside the box and do something differently, it was a proud to teacher moment.

R: Good. So describe your worst moment when teaching a math lesson

K: Does it have to be during the lesson? Because I really think my worst moment was with Mrs. Mills last week when I had just finished my lesson and she told me things Mrs. P had said.

R: So when you felt like you had done…..

K: Terrible

R: So what exactly did Mrs. Mills say?
K: She told me that Mrs. Perez said that she wanted me to team teach with you and then she told me that she was digging and digging for things that I do wrong. And that I am not ready to have my own class. And that was what she told me right after I finish the lesson that I wasn’t so confident with and then I had to go into the post observation conference with Mrs. Perez. It was really like a slap in the face, I guess. I thought “why am I even doing this if that’s what she thinks.” It was taken the wrong way, unfortunately, and that’s not how it should of been taken but that made me feel like why am I even bothering if that’s how people are going to see it. It was probably one of the worst moments as I had never felt like a failure since my middle school math days until that moment.

R: Did you feel like all the work that you had put in for this semester

K: I felt like that hearing the words that someone doesn’t think I’m ready when I thought I was, it was like, maybe I’m not maybe I shouldn’t do it. Maybe I’ll never be good at it. So when I had my break down with Mrs. Perez I thought “I’m never going to be good at it”. And I thought I was finally getting better and then I heard that and I thought, well maybe not.

R: Do you feel better about it now?

K: Yes, I do. That was just a bad day. But after today’s lesson, I know that there are things I could’ve changed but I felt much more confident. I know that there’s not a perfect teacher that does things right all the time but I know that I should just see continual progress of growth with me and the students. I know that. But at that moment it made me feel like the confidence I had built was gone.

R: Describe what you think has influenced your lesson planning the most.

K: The students. Because I can see what works for them and what doesn’t and that helps me to determine what I want to do.

R: Give me an example.

K: Like when I am standing up there talking and doing problems on the board that I want them to copy down, there is not much engagement. They don’t really want to participate and half of them don’t. So then I will look at that and say “okay, well how can I change that? What else can I do or add to it to make them more engaged?” It’s hard to be excited about math. So looking at their understanding and how they are doing has helped me to tweak things and determine how to go about things.

R: Describe what you think has influenced your implementation of math lessons.

K: Probably my own mistakes. I see what I do and how it doesn’t work and then I tried to change it. For example last week and this week. Seeing what didn’t work and then while planning this next lesson, trying to look at what failed and change it.
R: Is there anything else you want to tell me about your internship?

K: It’s not what I expected. I’m like a nut case. I’m on and emotional roller coaster every day. I don’t think field studies prepares you. I really don’t. It’s one day a week and sometimes you sit there and you really don’t do anything. You go help the kids and you plan a lesson here in there, but you are not prepared for what you get into in your internship. Because you do everything and you are exhausted and it’s not just a Monday through Friday job. Even in internship it’s not. You do things on the weekends. I don’t think I was prepared for what I was taking on and I think it was a shock the first couple of weeks and it made me question whether I wanted to do it or not. So I think it was being able to overcome the emotional part of it and the stressful part of it and look at the student part of it and look at those moments where they are so happy because they get something that I did for them and stuff like that. But I think I was not prepared. Going into it, I had no idea what was coming. Not that it’s terrible, it’s just it’s different. It’s the real world.

Post Observation Conference Week Seven

P: Kelly, tell me how you thought your lesson went today.

K: I thought it went well, better than last week. I felt more comfortable, and more prepared since I planned it out like five days in advance. I felt like I had a lot of time to really look at it and make sure I was hitting the points I needed to hit and I felt like it was more rigorous for them so there wasn’t……. It was more challenging but in a way that they needed. And I thought that….. Cause last week I know that there was a lot of confusion so I tried to hit those points and make it more clear with the vocabulary words and how we are looking for the amount of space inside an object and where you can use that in the real world so they can make those connections. I struggled with the connections.

P: Okay. I thought it was a very good lesson. I think it involved problem-solving and the problem-solving engaged the kids. I think the level of rigor was much higher, not, when I say rigor I’m not talking about bigger numbers. I’m talking about the level of…

K: Thinking required

P: Yes, that seem to be much higher than in the previous lessons. Because in the previous lessons the thinking was all about the numbers. This time it was about solving that problem.

K: Because that’s what I struggle with, and so….. Sitting with you last week, I realize that I purposefully don’t do it because I know that……. And even in the middle of the lesson today I made a mistake today and they pointed out and I just changed it. But it’s because I’m scared to make mistakes in front of them because in fifth grade they call you out on it.

P: But that’s okay because you say “you know what guys? I’m just check in to see if you’re paying attention.” They don’t know if you’re not doing that. Right?
K: A lot of times I will tell them that I am proof that you can make a mistake and fix it.

P: And that’s okay too. Especially with the high kids that you have in that first class, many times don’t understand the value of making a mistake and learning from it. So you are teaching them something really really important. Not just doing the math.

K: I realize that I often times avoid the concept part of it because I can do numbers but when it’s the concept, that’s when I get nervous.

P: And that’s something that I noticed today too. There was a point in the lesson where you shifted back away from the concept to the numbers because I thought, “okay, that’s where she’s comfortable”. And I noticed that.

K: That is where I’m comfortable. I tried really hard to go out of that and hit more on the concept and not on the numbers.

P: Yes, I’m proud of you for doing that. You stepped out of the comfort zone and your kids need that. They need to understand that conceptual piece so that they don’t grow up like you and be scared to death of math. Okay? Okay let’s see, they kept talking at the beginning about length times width times height and you did ask them if order made a difference. So you were talking about….

K: Commutative property

P: Yes, commutative property. So you brought that vocabulary in there which is important. And then you said, I wrote this down, “I want you to think beyond the length times width times height”. And B said, “we need to know how much will fill that shape.” Then you started with the activator and you had them right the units. My question was, when you had them right the units 4 x 4 x 3, have you considered having them draw?

K: I didn’t think…… They’ve done drawings before but I didn’t think about having them draw it out but that probably would of been good to help them see where the units were coming from.

P: Yes, I think one of the ways to check for understanding might be when they are answering their essential question in their interactives….. What I used to tell my students was “use numbers, pictures, and words”. So maybe with your students that are so dependent upon the numbers is say, “you can only use pictures and words”. Challenge them to see if they can explain what volume is about without using numbers.

K: Okay

P: And help them because you talked about how volume is taking up space. So you brought them back to that. I have a big smiley face on my paper.
K: Yes they were so hooked on length times width times height because that’s what I was doing and so I was trying really hard to bring them back to the concept piece of it.

P: And you did a great job with that. You did a really good job. Another way you might say it instead of numbers, pictures, and words is “show, tell, explain, and prove”. Show me what volume is maybe even without using the words length times width times height. That’s how you find it, but what are you finding? You are finding how much it takes to fill up that space. That’s just something to add to what you are already doing and I think you did a great job with this lesson. It was really good because you asked, “what is this number telling us? And how many cubes are in the figure?” So you were using the language that you are trying to elicit from them but they were stuck on that.

K: Yes

P: And then someone in the class finally said “it’s the amount of stuff that inside”. And then you had them talk with their partner and put it in their own words which is good. And I heard a couple of kids say “no, in your words!” So that was good, they are thinking. You called on students to share and S said “how much stuff can fit inside?” You used real-world things so I know you have the concept now. You said “okay let’s look at these cabinets, if I’m building these cabinets I need to know how much volume there is inside so I can determine how many textbooks they can hold” and you said “or this file cabinet, how many files will fit inside of here? That’s what I need to find out, with volume”. So you made it real to them. It wasn’t just about the length times width times height.

K: Right.

P: And then you did a vocabulary review in which you made really good use of pictures with length and width and height. You asked them why they needed to know that and some of their ideas were a little off but when they talked about construction and the TV fitting in the box, and someone said a pool and you said an office building…… So those were good things. And then you connected it back to S’s tissue box. When you did that, what did S talk about?

K: I don’t remember.

P: He said, “Yeah, we looked at the length because it had length times width times height”. So he was trying to show that it had those dimensions that you were looking for but he still didn’t connected to telling us how many tissues we can fit in the box. Or how much space there is to fit tissues in the box.

K: Right.

P: So he was still hung up on dimensions but at least he was looking at the three-dimensional shape.
K: And I wish that you could see the difference between the first class and second-class. That gives me a chance to fix things and so in the second-class I reminded them that with a two-dimensional figure we are finding area. And with a three-dimensional figure we are finding volume. And I reminded them the difference between those. They were getting confused with area and volume so I reminded them the difference is there. I can see a difference in myself between the first class in the second-class.

P: Absolutely. And that is why….. Remember I said last week that you were really hard on yourself? You are going to grow and get better at this the more you do it. But I also know that this lesson was much stronger than the last lesson because I think you spent more time in the planning process.

K: Yes

P: So knowing that that area is where you struggle then that’s where you’re going to have to spend your time.

K: Yes

P: You gave them steps to follow to find the solutions to their problems. You are doing really good with management you’re not using the same thing over and over. Class class is fine but after a while they will tune it out.

K: I change it up.

P: Yes. You are mixing that up doing the red Robin and the hands on your head voices off. And especially on a day like today where it’s out of the norm and they didn’t have to wear uniforms, it’s a holiday, you have to really reiterate your expectations right at the beginning. “Boys and girls when I say hands on your head voices off, that means that you close your mouth”.

K: That’s something that I just started doing last week. It’s actually really worked for them because sometimes if I do the class class they will be fidgeting around their task, just not talking. But when their hands are on their head, I know that they are not doing anything but focusing. So that is something that is worked pretty well.

P: I think it’s really effective. And it was effective today and so like tomorrow maybe since they were so antsy today remind them when they come in tomorrow “boys and girls, let’s talk about the expectations for today”.

K: They didn’t earn their granola bars.

P: Really?

K: No.
P: It killed them didn’t it?

K: Yes, they were upset. And I told them that they had an expectation and they knew that from the start and they didn’t meet it.

P: That’s good.

K: A couple of times I almost just gave it to them but I said no, I’m not going to do it.

P: I’m proud of you. So, are you going to bring them in tomorrow and say……

K: I left them in the room so they will have another chance to do it tomorrow.

P: Good, I think that’s great. That’s good, a you are getting that teachers self in there that is saying, “I’m going to be firm and consistent even though they won’t always like me”.

K: I know I was thinking they’re going to be mad but I can’t worry about them getting upset and saying “well, you said we could have it”. But they were so misbehaved that why would I reward them?

P: You said that they could earn it and they didn’t earn it. So you can reiterate that to them.

K: Yes

P: It wasn’t a gift. It was something they had to earn and they didn’t earn it. But you really use the problem-solving strategies by introducing that hands-on with the granola bars in the box and you said that there is more than one way to solve it. One thing that I think might have strengthened it a little bit is……. Because it was still pretty teacher centered. A way to make it more student centered, at least the explanation part, was if you could have had the document camera on and had students come up and put it up underneath and explain their thinking rather than them saying it and you repeating it because when table 2 was talking table 4 wasn’t listening.

K: Right, yes.

P: So just think about incorporating those things.

K: Yes, one thing that stinks with whole group is it is only supposed to be 25 minutes long and it’s impossible to fit an entire lesson where I want them to do hands-on things in 25 minutes and have them engaged and have them answering questions. Like today it was 45 minutes because I have to stretch it to do activities like this.

P: So think about where could you cut? Instead of spending 10 minutes talking about what they think the answer to the essential question is, spend five minutes and then move on.

K: Yeah
P: And just quickly go through those kind of things and get to the hands-on stuff because that’s the more important stuff.

K: Yeah, that’s where they can touch things and feel things and……

P: Yes, and that’s where they build that understanding. And then they can go back and answer that a central question and have some real sense of what they’re talking about with the content.

K: Okay

P: You did ask if anyone else did this differently. And a couple said that they used inches instead of centimeters and so they were trying to go back to the measurement piece again which is okay if they understand the concept. I noted that you had a lot of rich discussion in small groups as you went around and listened about how they found out how much space was in the box. But then at the end, the discussion all went back to algorithms again.

K: Right

P: And so try to find a way to balance that. How do you know who understands that it was about the filling of the space and who was still stuck on just the algorithm. So I think maybe if you have them right in their interactives, “explain what volume is using numbers pictures and words” that will give you a better idea of……

K: I could do that for the activator tomorrow.

P: Yes. Who understands that it’s about how much space that is in that shape?

K: Yeah

P: You did a really good job when you were talking about measurement and you held up their granola bar and you held up the ruler next to it to help them see how you measure because even though that’s the high-class, I’m not sure they all know where to start with the ruler and everything. That’s just a common misunderstanding. You ask kids to tell you how they solved it and how do they get it. This 931÷25 is something like 26 or something?

K: Yeah that was off.

P: That was off so something……

K: The other class did it right.

P: So what you might do with that first class tomorrow is say, “boys and girls, you know what I went back and did the math on this and found that it is 26. So if it says that we should be able to fit 26 granola bars……” Maybe take one of the boxes and try to stuff 26 granola bars into it. And say, “what happens when we get our measurement wrong?” Then we have incorrect information that could cause a real problem especially, let’s say that I’m shipping something to my best
friend who lives in Atlanta and I have this box and everything doesn’t fit in it. What do I do, I can’t send her everything she needs? So make it real but talk about it. And again that’s kind of going back to what you said at the beginning helping them be comfortable with mistakes. If we make a mistake we learn from it and we do better next time. It’s okay, that’s life. But overall, I thought it was a really, really well done lesson. And I was happy to see you taking risk. That’s what I want you to do. I want you to feel comfortable enough to say, “I’m going to try this hands-on. I’ve got good management skills so I know I can make the management piece of it work. I want to see what kind of learning happens with my students.”

K: Yeah. I could tell a difference today. Definitely. So….

P: Yes, I could definitely tell a difference. I thought it was well done. How did they do on their papers?

K: I only looked at a couple of them that they did really good. There were a lot of 100s.

P: So they are understanding the concept?

K: Yes, I mean this is my lowest. They did really well on this.

P: So they are understanding the concept so maybe start with your activator tomorrow and say, “use numbers, pictures, and words, explain to me what volume is”. Not “how do I find it” but “what is it”.

K: Numbers, pictures, and words (Kelly writes down the directions). They are all so stuck on the length times width times height.

P: Because they know how to find it. They’ve got that down, but what is it? What is it that I am finding? And I think that that will help them. They may say, “length times width times height”, but this is what I used to tell me how much space is in something.

K: Okay

P: Okay, so do you feel good now?

K: Yes. Last week was just a rough week.

P: I know and I want you to understand that everything that I say is to help you be your best. If I let you just stay where you are then you are not growing. And that’s the whole point of this is to help you grow. Okay?

K: Okay.

P: So if you need help starting in your new room, call me or text me.
K: I start Monday. I’m nervous, I mean I’m not nervous about teaching the kids. These kids don’t want me to leave and they know that I am and I will only be three doors down. And they have told me, “you’re going to hate it. They are going to be so bad because they are not going to be like us”. They are all telling me I’m going to hate it and I know they’re saying that because they don’t want me to go. But it makes me nervous that… Also the substitute that is in there is very old school and she will make the students go stand in the corner if they do something wrong and so that may be why they are misbehaving.

P: Something to think about is, on Monday when you start, pretend like it’s the beginning of the year. This is your own classroom, so say, “boys and girls, we’re going to go over our rules and expectations”. I called them guidelines for success.

K: I was going to make a poster or chart paper or something and do something like that just because I don’t want them to think that I’m just a substitute that they can walk all over because I’m going to be here for the next 2 ½ months.

P: Yes, something you could do that is interactive is give everyone a sheet of paper or give each table a sheet of paper and have them answer what makes a good student and what makes a good teacher. And then use that to make your class rules.

K: Something that we did in, I forget his class we did it in, but we were in our own teams and we picked the five most important rules and then each team shared and then overall the class picked the five most important so right there it’s been picking and not me. So that way if they are not following the rules, I’ll remind them that they chose the rules so we need to make sure we are sticking to them. I may do something like that.

P: And remember, they’ve had substitutes now for a couple of weeks. Public praise, private discipline. “I really like the way everyone in table 1 is following the first three rules”, or “I really like the way A is making good choices and respecting others”. But then little C over there is not. Don’t call him out, just privately walk over and say, “are you following rule number two?”. Or whatever it is that he’s not doing because that makes a big difference - they see that you care enough not to embarrass or humiliate them. Now, will there be some that test you? Yes. But for the most part, Public praise, private discipline.

Preservice Teacher Interview Week Seven

R: I’m going to start with a couple of questions that I’ve been thinking about. You mentioned that you had to “up the rigor”. What does that mean?

K: Higher order thinking, extended thinking, more in-depth questioning.

R: Give me an example
K: With volume, just doing the algorithm wasn’t enough, but upping the rigor would be taking it to questions like what is volume? Why do we need to find volume? How can you find it in different figures? Where should we use it? It’s knowing more than just length times width times height. Things like that, and that’s what the principal told us to after the formal observation.

R: so let me clear this up in my mind, when you had your conference last week with Mrs. Perez and she went over that the students need to know more than just the algorithm and then you came back with today’s lesson, which was different, do you see a different level of rigor?

K: Yes, I felt a lot more confident today. I could tell within myself… I mean there are still a lot of things I wasn’t confident about but with the kids, I thought there was a lot more in-depth thinking and it wasn’t just me brushing the surface. From what Mrs. Perez said last week, I was trying to implement that this week. I went more concept based, even though I hate it. But I tried it.

R: Do you think you will get more comfortable with it?

K: Yes, I am more comfortable with it now that I did it today. It was just stepping out in doing it.

R: So in previous lessons when you said you had to “up the rigor” it wasn’t like this was it?

K: No.

R: So, I guess what I’m trying to establish is, I feel like after today’s lesson you know what that rigor is supposed to be, but I’m not sure you really knew what it was before.

K: I was thinking like, harder problems. Bigger numbers. I know that using bigger numbers is still using an algorithm it’s just lengthier. I think after today, it was a little difficult to step out and do the concept based because that’s what I don’t like and that’s what I try to avoid, but realizing that that’s what I was trying to avoid and that’s what they need to know because they weren’t getting it. They weren’t getting the concept at all. But I didn’t want to teach it like this.

R: A few weeks ago you told me that you got your lesson idea from Pinterest. I think it was the ice cream and weight lesson.

K: Well that was a lesson that I just came up with. With today’s lesson, there was a C Palms lesson about empty boxes, to have the students measure and I wanted it to be something where there was like not a reward, but something else involved to make them want to do it.

R: So the Cpalms lesson was with empty boxes and you transferred it to the granola boxes.

K: Yes and we use a lot of candy in that class so I was trying to make it a little more healthy. There was something in the and they could have received for completing the lesson. They didn’t because their behavior was so bad.
R: What do you think your strengths and weaknesses were in this lesson?

K: I took the time to actually think about the best way to do it. I mean the best way for the students. So I went through more of implementing the lesson, creating the PowerPoint, and stuff like that to go along with it.

R: The PowerPoint seemed to help tremendously. It not only help to you to know what you were doing, it helps the students because they had a visual.

K: Yes, I know it helped their focus. They had something to look at and not just listen to. So I thought having the PowerPoint was a strength. I think it kept the students more engaged and got them involved.

R: Is the lesson plan that you wrote for Mrs. Perez also in the regular lesson plan format?

K: No

R: I know you said that you usually plan a couple of weeks in advance.

K: Yes, but I changed it. Well, what was in there was the C Palms lesson about the boxes.

R: No, I’m just talking about the format of the lesson plan. To somewhere in your regular lesson plan have the standard and……..

K: Yes, it has the standard, activating strategy, whole group, graphic organizers, small group…..

R: Do you have a plan printed out for this?

K: It’s on the computer, in the system. It’s like a very very brief outline.

R: Well that made me wonder, we all know that no one likes to fill out the complete college lesson plan.

K: But it makes you think about it more.

R: Yes, it does. Tell me about how you thought differently using the lesson plan from the college for today’s lesson.

K: I had to break it down more. I thought about the different pieces of it instead of just thinking of it as activator, whole group, and small group…….. Which is what we do.

R: So what kinds of things did you think about?

K: Facilitating different types of learning like discussion, hands-on, visual, things like that. I wanted there to be differentiated types of learning with that. I wanted there to be questioning. I wrote different questions that I would ask them and put those in the plan.
R: Yes, I saw that - how did you find the volume? What are the different ways you can find volume? How do you know? Is there another way to find volume using measurements that you can think of?

K: It was more of like - it made me question the lesson I was doing instead of just glancing over the plans for the day I had to actually break them down and think my way through it which is how the PowerPoint stemmed from the lesson.

R: Did you make any connections to the mathematics methods course?

K: I always make connections with the hands-on stuff because that’s what I liked. And I always remember the good days in the class when we did stuff that I could touch.

R: You are explaining volume during the lesson and you said “how many connecting cubes are in my figure?” 4×4×3

K: I was trying to touch on what I had done previously

R: You were doing the formula. Then you actually said “what does volume mean?” You got into that and someone said “the amount that’s inside”. But you asked about the 48, what was the unit? You have them come up with inches, so it was inches cubed. My question was, why did you decide on inches?

K: I just let them pick.

R: So what if they would have said yards?

K: Can you do that? Does it matter?

R: I guess my point is…. Tell the students that if one cube is 1 inch then we use inches cubed. If the one cube is 1 cm then we use centimeters cubed. It’s whatever is represented by one unit.

K: Interesting

R: Did you discuss this at all with Mrs. Mills?

K: Yes. I went over the PowerPoint with her and what I was going to do. I told her all of it.

R: Did she have any suggestions?

K: No. Not really. She usually doesn’t. She asked about the students doing the prediction because that’s what she always does and that was in there so she said it looks good.

R: All right. When the students were measuring for the volume of the granola box, there was a lot of great discussion going on. They were really saying some interesting things. I was listening
to one particular group and I heard A trying to make some suggestions. He always seems to find some type of shortcut.

K: Him and I both

R: So he was actually taking the granola bar and laying it on the box and aligning it up and he was trying to measure it. And his group got really aggravated with him because they were measuring like they thought they were supposed to do. So I tried to get him to share. I walked over to him and said “you should raise your hand and tell your teacher that you found another way” he looked at me and his eyes welled up with tears and he said “my group wouldn’t let me do that!” I didn’t push them at all, but that would’ve been a really good discussion to have. What are some other ways we could find the volume of this box and how many granola bars would fit in here? What A was doing was problem-solving. It looked like he was taking the easy way out, but he wasn’t because he was problem-solving.

K: I actually talked to him during small group. I pulled him aside and asked him what he was trying to do with the granola bar and the box. He said that he wanted to do something different but nobody else wanted to do that I asked him what he wanted to do and he said that he was using the granola bars and placing them on the box and trying to think about how many he could see fitting in there. And I told him what he was doing was really good. And I told him next time he should share because I think the class would really benefit from that. He replied “you think that was good?” I said “yes I do”. He seemed very happy that someone had noticed because his team was shutting him down the whole time. He told me that no one would let him talk in his group.

R: He seems to approach problems differently.

K: He does.

R: But that doesn’t seem to be valued, at least it wasn’t in his group. The algorithm is what they valued in that group. Why do you think they valued that?

K: Because it’s what they’ve been taught.

R: You’re probably right. It’s what they’ve been taught so they couldn’t see anyone else who was thinking outside of the box. And he was trying to think outside of the box.

K: So that would’ve been something good to point out in front of everyone else.

R: Next, you did some estimating by measuring the bar. You actually measured the bar in front of the class. And then someone gave you some measurements of their granola box. I’m not sure that was accurate.

K: No, because once we did the problem, I said to myself “that is not right.”
R: It was 931

K: It ended up being 26

R: Yes, 26.6. But when you went back and ask that same group what their answer was, they said 12. But they gave you 931.

K: I think they just guessed.

R: Why didn’t you ask them what numbers they used to get that answer?

K: I don’t know. In the second class, I ask someone to measure the box in the bars in front of the class and it ended up being 12.

R: Is there anything else you would like to add?

K: No, except I think this lesson went much better.

Audio Journal First Week of Sub Job Week Eight

Hi. I’m going to try to keep this less than two minutes. It’s probably not going to happen though. I feel like I’m failing these kids. They are really really really misbehaved. The sub that was in there before me - she was very old-school and she would make them write 100 sentences saying “I will follow directions” and and I found hundreds of papers with all the sentences and so there was no discipline at all except for that. She also made them stand in corners. Their full-time teacher who was there before the sub was a first-year teacher I and the other teachers told that she was very disorganized and there wasn’t much structure and so I am a very organized person. I need to have structure and I come in here and I’m trying to implement a rewards program and I’m trying to give them incentives and trying to remind them how much I believe in them and they just don’t care. I got kicked today. One of the kids kicked me and I sent him to the office with a referral and he told me that he didn’t care because I’m not even a real teacher. I know that they are just kids so it doesn’t really matter what they say, but it’s just frustrating to go from a class where my kids are great and all to a class where there’s just no control, no structure. And during the math FSA I’m looking over their shoulders and watching answer questions and I wonder if they’ve been taught anything. And that makes me nervous because I feel like there’s so much pressure on me to teach them all this math because they can’t do anything. I mean nothing. They don’t know 1×1. It’s stuff that they should know that now I feel like I am pressured to teach them and I’m just a little overwhelmed and it’s only day four. So I thought that I would give you a little voice recording to get it out and make myself feel better. Okay, sorry, that’s kind of a lot. Have a good afternoon.

PST Full-Time Substitute Interview Week Nine

R: Okay today were going to talk about the first time I observed you in your own classroom.
K: The worst week of my life…

R: You are now a full time substitute. So tell me how the transition was to begin with.

K: Well, the first week they were testing and the principal was my proctor. So it was like - I didn’t do anything. I walked around. I mean that we had testing almost every day except for Friday so it was very easy with the principal being in the room. I was like, wow these kids are angels. And then after testing, our first week back we had two field trips in one week. And so that was the week you came and they were “off the chain”. Every day we didn’t have a field trip, “why are we here?” I had questions like “if we already took the capital FSA then why do we have to be here?” “I don’t want to learn” and things like that. They thought that now that testing was over it was just a free for all. Especially with two field trips in one week. I really think they think of learning just as learning for a test. And teachers teach to a test. So I understand why they think that because it’s all about “you have to know this for the test”. And so I cried four out of five days that week on my way home. Four out of five.

R: Was behavior the reason why?

K: It was disrespect, it was behavior, it was them just not getting it and me being so frustrated and there was a select few who really wanted to get it and I would have to keep yelling at someone or keep getting on to someone so I couldn’t teach. And then I would get frustrated and not even remember what I was teaching. They would spend the whole day getting yelled at and not actually doing things.

R: Yet, one of your strengths in your internship was your management.

K: Yes, and that’s what I was always told. And so going in this classroom and feeling like a failure with management was hard.

R: So what made you pick yourself up and make some changes?

K: I don’t really have a choice. I mean I’m not a quitter and I won’t quit. I can’t do that to them. And it was just like I need to figure out how to deal with it because I’m going to be in there for another seven weeks and like it or not, that’s how it’s going to be. I asked Mrs. P for advice, along with some other people, and figuring out things from other teachers, and I called parents. I was too scared to do it but I said forget it I’m just going to do it. I had a kid use some very inappropriate language to me. I don’t know if I can say this.

R: Go ahead

K: He told me __________

R: Did you tell that to the parent?
K: I called the parent and I said, “He was really using inappropriate language and he said some inappropriate things to me” and they said, “what did he say?” And I didn’t want to say it and so I said “it was just inappropriate”. And she said, “no, what did he say?” And I told her. And she said, “oh my God, I’m so sorry”. I had to say that to a parent. I had to tell a parent that her child told me to______. I was mortified! But I call the parents because I needed to. I told him that his parents worked until 10 o’clock. I told him I would just leave a message. He said, “they won’t call you back”. I said, “yes they will”. They answered when I called the first time. The mom did - but to think that - my fifth graders would have never, ever said something like that to me.

R: That’s probably because they’ve had so many different people in that classroom and you were just one of the many.

K: I think now they realize….. Like, this morning one of them said, “you’re the best teacher I’ve ever had”. And I’ve had more than one teacher tell me that they can see a difference in them and that’s what makes me want to keep going and to make changes is that the kids feel a difference. We were learning about R controlled syllables this morning and I am so bad at that kind of stuff. I love to write and I love English, but grammar - not my favorite.

R: That’s phonics.

K: Well, phonics. See, I don’t even know what it is. Phonics. It confuses me, there is so much to it. And so I was teaching them R controlled and one of the students who was really quiet raised her hand and said, “you are making this really easy for us”. And so it’s like little things like that….. And I will tell them, I will make it a point to tell them about my life. I’ll tell them things that happened, and things that I do so that that way they feel like they are connecting with me and stuff like that. So like yesterday I had a first grader - I didn’t put any makeup on because I didn’t have time because I woke up late - and so he comes up to me and goes.. A kid I had never talked to comes up to me and goes, “are you okay?” I said, “yes, why?” He said, “you look terrible”. I was like “cool”. So I told my students that and they thought it was hilarious. They said, “you are so pretty”. Like telling them things about my life I think is helping to bond with them.

R: You are building relationships with them.

K: I show them pictures of my dog and stuff like that and so they know about me and know that I’m not just a sub for a week. So it’s better.

R: Well I feel like this lesson probably did reflect the poor week you had.

K: Poor everything

R: I’m just going to ask you a few questions generally about the lesson. Let’s talk about the lesson planning. Tell me about the decision making that went into planning the lesson. Like, how
did you decide on the content, the instructional strategies, and the tasks that you did with the students?

K: We use the standards and I planned with the grade level. They did most of the planning really because I’m new.

R: Is it the same type of lesson plan that you did in your internship?

K: Nope. It’s totally different. Well the online thing is the same but we use the go math textbooks. In the classroom now it is easier to use. It is a lot easier. But there are some things about it that I just don’t like. Some things don’t work with the kids.

R: Remember, your textbook is a resource like C palms.

K: We used a C palms resource on Monday and Tuesday with pro tractors. I printed pro tractors and we cut them out. It was more interactive. I let the kids cut them out and play with the protractors and they liked that and they got it.

R: Didn’t your fifth grade teacher say that they weren’t allowed to use Go Math?

K: Yes. I don’t know if the teachers just do it because they can – because testing is over. Apparently Go Math isn’t aligned with the curriculum and with testing. But it’s so helpful. It breaks things down.

R: So

R: Ok, so for this lesson, you planned with the grade level. What went into the decisions for the instructional strategies?

K: We decided on the instructional strategies as a grade level. I’m really just doing what they planned. I try to make it my own and do what’s best for my students but the ideas come from the grade level.

R: You opened with “What’s My Place, What’s My Value”

K: Yes, we usually do calendar at the end of the day but we haven’t been getting to it.

R: So that’s calendar math?

K: Yes, it’s calendar, but it’s different than calendar from 5th grade. We haven’t been getting to it because the end of the day just wasn’t going well. So I wanted to give them time to do it.

R: Who made the graphic organizer for that?

K: One of the other teachers – she emailed it to us.

R: Because I wondered….it said “numbers only”, but you are supposed to use words.
K: I crossed it out and put words only 'cause I was like, no.

R: Ok. When you wrote the number in expanded form, do you remember what you started with? The number was 11,476.

K: Did I start with 11,000 and not 10,000?

R: Yes

K: And I think I messed up the rounding too.

R: Yes

K: I knew I did.

R: You said to “round down” or “round up”

K: I think I learned it that way.

R: Well, you either round up or the number stays the same. If the number is 11,476 and you wanted to round to the nearest thousand, the number rounds to 11,000. The 1 in the thousands place stays the same.

K: Really, are you sure?

R: Yes, one of the students actually said something during your explanation. He asked “Why didn’t the number stay 11,000?” You paused and then said that it could be 10,000 or 11,000.

K: (laughing) I was like, whatever.

R: One of the girls gave a saying that another teacher told her, “Five and above, give it a shove. Four and below, let it go”.

K: I always thought that it meant let it go down. That’s so weird that you leave it the same because I didn’t learn it like that. Well, I’ve been doing that wrong for 2 weeks now. Tomorrow when I do this, they’re going to say, “What?”

R: The next part of the lesson was on using protractors which was really difficult because you didn’t have any protractors.

K: Yes, it was terrible. I used the virtual protractor on the board but it didn’t go well.

R: Yes, you seemed to be having trouble lining up the protractor with the vertex of the angle.

K: I lined up right on some, but then on others I didn’t.

R: Yes, you’re right.
K: I knew that I didn’t line it up right with some because I was so flustered. I think I tend to overcomplicate the problems that I don’t understand. Then the kids get confused. Especially with this lesson it was really hard because one of the other fourth grade teachers told me that we have protractors to use and then it turned it we didn’t. We had a different activity planned than what we did. We had an activity where they each got a protractor and a piece of paper with angles on it.

K: There are no protractors in fourth grade at all. Well another grade was using them and there’s only a class set for one class in the school. So I barely looked at that plan because I didn’t know we weren’t using the protractors until lunch. So when I knew that, I thought, “This is going to be terrible”. And so I really didn’t even know what I was doing.

R: OK – you did a word problem about someone in a wheelchair.

K: Yes, I could not draw.

R: The problem said that the ramp needed a 5 degree angle so you drew a ramp and then you measured the ramp that you drew with the protractor. It measured 30 degrees. So then you focused on how many degrees we need to adjust this ramp to make it 5 degrees. The problem asked the students to draw a ramp with an angle of 5 degrees; however your focus became subtraction. 30-5. So what do you think the students thought the answer to the problem was?

K: They thought it was 25.

R: The students didn’t draw at all.

K: This whole unit was messed up. Even on the summative assessment they weren’t allowed to use protractors but they had to measure angles. The students were very confused. I fumbled my way through the lesson and it was bad.

R: Is there anything else you would like to tell me about this lesson?

K: It was horrible and I would like a do-over.

### PST Second Week in Sub Position Interview Week Ten

R: Tell me about the decision making that went into planning the lesson. Like, how did you decide on the content, the instructional strategies, and the tasks that you did with the students?

K: I planned with the grade level and we used the Go Math book for this lesson. Using the book can be a lot less stressful. Before I was having to find all my own stuff, but with the book, you can just use that and it helps because it gives lots of examples and even helps me learn how to do it.

R: Tell me about the decision making that went into implementing the lesson.
K: Well, I used the idea in the Go Math text book for multiplying numbers. It talked about the area model and when I looked at it, it was pretty easy to understand. I showed them how to divide up the numbers like 57 into 50 and 7 and put them in the right places and match them up to multiply and then to add them. They seemed to really get it.

R: What are your strengths and weaknesses as you see them in this lesson?

K: I think I really knew what I was doing and did a good job showing examples and helping them at the board. I was pretty confident with the area model so I think it went well.

R: What connections if any, did you make between your mathematics course work and this lesson?

K: Hmmm. I’m not really sure because in the math course we really did a lot of hand-on stuff and this lesson really didn’t do that.

R: Is there anything else you would like to tell me about the planning or implementation of this lesson?

K: I do think that using the Go Math book makes it easier to teach math because there are examples to look at. I also think that the lesson went well. This week was much better than last week. I implemented a new discipline chart and it is really working. They are so much better than they were last week. Just having them under control helps with teaching……..and I’m not crying any more.

R: Well, this is our last time meeting.

K: I’m kind of sad about that. This is been like therapy for me.

R: I’m glad I helped! (laughing)
**APPENDIX C: SAMPLE LESSON PLANS**

<table>
<thead>
<tr>
<th>Day 100: Feb 3</th>
<th>Day 101: Feb. 4</th>
<th>Day 102: Feb 5</th>
<th>Day 103: Feb 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEQ: How do I create a line plot to display data using fractions of a unit and solve problems using the information from the graph?</td>
<td>LEQ: How can I create and analyze patterns and relationships between corresponding terms?</td>
<td>LEQ: How can I create and analyze patterns and relationships between corresponding terms?</td>
<td>LEQ: How can I create and analyze patterns and relationships between corresponding terms?</td>
</tr>
<tr>
<td>MAFS.5.MD.2.2</td>
<td>MAFS.5.OA.2.3</td>
<td>MAFS.5.OA.2.3</td>
<td>MAFS.5.OA.2.3</td>
</tr>
<tr>
<td>Formative assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In what other real life situations could we use line plots</td>
<td>Complete the pattern: 3,6,12,<em><strong>,</strong></em>,___</td>
<td>Plot the following: (3,1), (5.4)</td>
<td></td>
</tr>
<tr>
<td>T puts masking tape on the floor creating the x-axis and y-axis. There are sports for kids to choose from: soccer, basketball, baseball, football, tennis. Students go stand in category, then must talk and figure out the fractional amount.</td>
<td><a href="http://www.cpalms.org/Public/Preview/Resource/Preview/46840">http://www.cpalms.org/Public/Preview/Resource/Preview/46840</a></td>
<td><a href="http://www.cpalms.org/Public/Preview/Resource/Preview/46840">http://www.cpalms.org/Public/Preview/Resource/Preview/46840</a></td>
<td><a href="http://www.cpalms.org/Public/Preview/Resource/Preview/46840">http://www.cpalms.org/Public/Preview/Resource/Preview/46840</a></td>
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<tr>
<td>Pattern, interval, line graph, ordered pair, origin, scale, x-coordinate, y-coordinate, x-axis, y-axis, quadrant, coordinate plane, graph, point, axes</td>
<td>Pattern, interval, line graph, ordered pair, origin, scale, x-coordinate, y-coordinate, x-axis, y-axis, quadrant, coordinate plane, graph, point, axes</td>
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<td>Pattern, interval, line graph, ordered pair, origin, scale, x-coordinate, y-coordinate, x-axis, y-axis, quadrant, coordinate plane, graph, point, axes</td>
</tr>
<tr>
<td>Students will share their elaboration</td>
<td>Ticket out the door. S will create their own pattern and explain their rule.</td>
<td>Pass the pen to answer EQ</td>
<td>Answer EQ independently</td>
</tr>
<tr>
<td>Name: XXXXXXXX</td>
<td>Course Title: XXXXXXXX</td>
<td></td>
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<tr>
<td>Subject Area of Lesson: Math</td>
<td>Grade Level: 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concept (Topic) of Lesson: Finding Volume</td>
<td>Total Length of Lesson: 45 minutes</td>
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</tr>
</tbody>
</table>

**FL Standards**
(Write the benchmark number and description.) Find these on the DOE website or on the Polk County School website [http://www.cpalms.org/Standards/FLStandardSearch.aspx](http://www.cpalms.org/Standards/FLStandardSearch.aspx). If you locate the essential questions first, you can just match the code number on the DOE.

MAFS.5.MD.3.3
Measure volumes by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.

**Objective Question**
With answers that you expect to receive from the students. They must match the number of standards above. Make sure that the answers you give are written from the perspective of the student – in their language. This will become your goal. You now want to gear your instruction toward the answer you want students to give at the end of the lessons.

How can I measure volume using cubic units?

**ESOL Strategies**
You must include these strategies under the assumption that there are ELL students in the classroom. Please list both the code and the description given.

A.1 Provide a climate of warmth and caring which nurtures a sense of comfort.
A.4 Use as many of the senses as possible to present information to students.
A.7 Arrange small discussion and talking activities that permit students to practice verbal skills.
E.2 Use manipulatives to help students visualize the math concepts.
E.4 Teach math concepts and computation procedures through games and kinesthetic activities.

**Materials/Technology/ Equipment**
List all.

Power point presentation
Teams
Ruler
Granola bar
Granola bar box
Smart board
Math interactive

**Introduction to the lesson**
This shouldn’t take too long, but should be effective. This is used to activate background knowledge, introduce vocabulary (if needed at this time), and create an

Students will create their 2-5 line boxes and write their prediction for the

Time: 15 min
excitement of learning what is about to be taught. Use videos, games, graphic organizers, etc….. to do this.

<table>
<thead>
<tr>
<th>essential question. We will then review a problem that talks about connecting cubes and dive into what these cubes are telling us. Vocabulary review will come next.</th>
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</thead>
</table>

Vocabulary Necessary for Students to Understand the Lesson: Be sure to give words and meanings.

| Volume: the amount of space something takes up  
Length: the distance across an object or thing  
Width: How wide an object is  
Height: How tall an object is |
|---|

When? During the activating strategy

Teaching Strategies List strategies used throughout the lesson.

| Objective question 1  
(Now think – What do the students need to know to be able to answer this question at the end of the lesson in an assessment?) |
|---|

<table>
<thead>
<tr>
<th>How can I measure volume using cubic units?</th>
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</thead>
</table>

Instruction and/or Inquiry based learning strategy Explanation and Modeling

<table>
<thead>
<tr>
<th>To introduce the lesson we will have a discussion about the vocabulary as well as where we may use volume in the real world.</th>
</tr>
</thead>
</table>

| Time: 10 min |

Practice Opportunity with feedback from peers and/or teacher (guided practice)
Paired or group activities and discussion that will provide feedback from peers and/or teacher.

<table>
<thead>
<tr>
<th>Students will each be given granola bars and boxes in teams, they will all have the opportunity to find the volume of the box. They will then be able to determine how many granola bars can fit into each box.</th>
</tr>
</thead>
</table>

| Time: 10 min |

Differentiated Instruction: 
Address ELLs, Students with difficulties, and Advanced students. Remember content, process, product.

<table>
<thead>
<tr>
<th>Student teams will be able to share their findings. From here I will give feedback for each team. We will</th>
</tr>
</thead>
</table>
discuss how teams went about finding volume and the amount of bars, and how different ways it would be easier for different students.

| What higher order thinking will the students be practicing during this teaching strategy? What higher order thinking will the students be practicing during this teaching strategy? Think about Bloom’s Taxonomy and Webb’s depth of knowledge. | At the end of the lesson we will discuss why it is important to not only understand that you must multiply to find volume, but also to understand what exactly volume is, and where we may need to use it.  
- How did you find the volume?  
- What are the correct units to use and how do you know?  
- Is there another way to find volume using measurements that you can think of? | 5 min |
|---|---|---|
| **Wrap up/Closure**  
This step is extremely important!!! The students need to actually answer the objectives that you started within this unit. Remember you wrote answers in the beginning that you wanted the students to answer when the lesson was completely finished. Now, can they answer them – either orally or in written form? There are creative ways to do this…..try to think of some. | Students will each be given a sticky note to answer the question “What is volume”. They will then be able to post their answers once they have been checked. | Time: 5 min |
| **Summative Assessment**  
How does this lesson fit with the summative assessment? | The “which box?” assessment will be taken for review. This will give a clear understanding of how the students are doing with comprehension | Time: |
| Remediation | The lesson will be continued into Thursday, where we will be building upon the content knowledge. If students are struggling with the lesson today they will be given a mini lesson as well as practice problems based on volume during small groups. |
| What will you do with the students who do not meet the mastery measurement level? | |
APPENDIX D: IRB DOCUMENTS

Letter of Approval

January 22, 2015

Lori Rakes
Teaching and Learning
Tampa, FL 33812

RE: Expedited Approval for Initial Review
IRB#: Pro00020304

Title: Help! I have to teach math: The nature of a preservice teacher’s experiences in enacting mathematics instruction in a final internship

Study Approval Period: 1/22/2015 to 1/22/2016

Dear Dr. Rakes:

On 1/22/2015, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s): Research Protocol
Consent/Assent Document(s)*: Adult Minimal Risk Consent Form.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:
(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

Informed Consent Form

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below. We are asking you to take part in a research study called: Help! I have to teach math: The nature of a preservice teacher’s experiences in enacting mathematics instruction during the final internship.
The person who is in charge of this research study is Lori Rakes. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Diane Yendol-Hoppey. The research will be conducted at Kathleen Elementary School.

**Purpose of the study**
The purpose of this study is to:

- Describe the experiences of one preservice teacher, self-identified as having mathematics anxiety, as she enacts mathematics instruction in a fifth grade elementary classroom.
- This study is being conducted by a doctoral candidate as her dissertation to fulfill the degree requirements.

**Why are you being asked to take part?**
We are asking you to take part in this research study because you are a part of a learning triad – the preservice teacher, the cooperating teacher, or the supervising teacher. The cooperating teacher and the supervising teacher all provide assistance and learning opportunities to the preservice teacher. In this case, the preservice teacher is one that has self-identified as having mathematics anxiety.

**Study Procedures: What will happen during this study?**
If you take part in this study, you will be asked to:

**Preservice Teacher:**
- Provide lesson plans for the weekly mathematics lesson being observed.
- Participate in a weekly lesson observation.
- Submit an audio journal at least once each week.
- Participate in an initial interview, weekly interviews after observed math lessons, and a final interview.

**Cooperating Teacher:**
- Participate in an interview to provide contextual information.

**Supervising Teacher:**
- Participate in an interview to provide contextual information.
- Participate in interviews about the mathematics lessons implemented by the preservice teacher.

**Total Number of Participants**
A total of 3 individuals will participate in the study at all sites.

**Alternatives / Voluntary Participation / Withdrawal**
You do not have to participate in this research study. You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study. Choose if you wish to participate or not will not affect your job at the college (college supervisor), your position at the school (classroom teacher), or your grade for your internship (preservice teacher).
Benefits
You will receive no benefit(s) by participating in this research study. You will not receive extra credit for participating in this study.

Risks or Discomfort
This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation
You will receive no payment or other compensation for taking part in this study. You will not receive extra credit for participating in this study.

Privacy and Confidentiality
We will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:
- The Research Team which consists of the Principal Investigator and the Peer Reviewer, who will periodically check the data for trustworthiness and ethical purposes. The peer reviewer is a doctoral student who is studying elementary education.
- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and your safety.
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.
We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints
If you have any questions, concerns or complaints about this study, or experience an unanticipated problem, call Lori Rakes at 863-602-0127.
If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638.

Consent to Take Part in this Research Study
It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true.
I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

______________________________  __________________________
Signature of Person Taking Part in Study                     Date

______________________________
Printed Name of Person Taking Part in Study
Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/she understands:

- What the study is about;
- What procedures will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. This subject does not have a medical/psychological problem that would compromise comprehension and therefore make it hard to understand what is being explained and can, therefore, give legally effective informed consent.

__________________________________________________  _______________
Signature of Person obtaining Informed Consent        Date

______________________________________________________________
Printed Name of Person Obtaining Informed Consent
IRB Certification

Collaborative Institutional Training Initiative (CITI)
Human Research Curriculum Completion Report
Printed on 09/01/2014

Lori Rakos (ID: 3143827)
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Education
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09/19/2014

Social / Behavioral Investigators and Key Personnel
Course/Stage
Passed On
Reference ID: 1347668

Required Modules
Module 1 - Introduction to Human Subjects Research
Module 2 - IRB and Confidentiality
Module 3 - Assessing Risk
Module 4 - Research with Children
Module 5 - Research in Institutional Settings
Module 6 - Human Subjects and Ethical Principles
Module 7 - Federal Regulations for Protecting Research Subjects
Module 8 - Informed Consent
Module 9 - Research with Prisoners
Module 10 - Research in Educational Settings
Module 11 - Research in Other Institutional Settings

Date Completed
09/01/14
09/01/14
08/31/14
09/01/14
09/01/14
09/01/14
09/01/14
09/01/14
09/01/14
09/01/14
09/01/14

For this Completion Report to be valid, the learner is/are must be affiliated with a CITI Program/participating institution or be a paid independent learner. All information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Brannon, Ph.D.
Professor, University of Miami
Director, CITI Program Course Coordinator
Peer Reviewer Acknowledgement

I, Katie Arndt, served as peer reviewer for Lori Rakes as she completed her dissertation entitled: Help! I have to teach math: The nature of the experiences of a preservice teacher as she enacted mathematics instruction in the final internship. Lori and I conferenced through Skype and phone conversations two times and met face-to-face three times during Lori’s data collection and analysis process. I provided feedback, checking interview questions and by coding documents to compare with Lori’s interpretation of the data. We also met to discuss possible ways to describe the analysis in the dissertation.

Katie Arndt, Doctoral Candidate, USF
ABOUT THE AUTHOR

Lori Rakes received her Bachelor’s Degree in Elementary Education which launched her career as a classroom teacher for 23 years. After being recognized as a highly effective teacher, she began facilitating teacher workshops in her school district, sharing instructional strategies with teachers for use in their classrooms. In 2010, she earned a Master’s Degree in Educational Leadership. Interested in working in a teacher education program, she began her doctoral program in 2011 at the University of South Florida. She has a research agenda that includes interests in teacher education and professional development for teachers.

Lori Rakes can be contacted at rakeslori@gmail.com