PROFESSIONAL DEVELOPMENT: A CASE STUDY OF EARLY CHILDHOOD TEACHERS’ IMPLEMENTATION OF A MATH INITIATIVE INTO DAILY PRACTICE

Dissertation

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PROFESSIONAL DEVELOPMENT: A CASE STUDY OF EARLY CHILDHOOD TEACHERS’ IMPLEMENTATION OF A MATH INITIATIVE INTO DAILY PRACTICE

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EARLY CHILDHOOD EDUCATION

ABSTRACT

Professional development is intended to improve teaching practices. Every year school districts spend money sending teachers to professional development trainings. This study looked at a specific mathematics professional development training that took place in the southeastern United States during the summers of 2007 and 2008. This qualitative case study research study sought to answer the question: How do teachers describe their perceptions of how they implement what they learned in professional development into their teaching practices? The sub questions for this study were: 1) what elements of the professional development do teachers describe as being the most beneficial in helping them make changes in their teaching practices? 2) How do the teachers describe how the changes in their teaching practices have influenced their students’ mathematical understanding?

The researcher collected multiple sources of data: 1) focus group interview, 2) individual interviews, 3) e-mailed follow-up questions and clarifying questions and 4) the reviewed curriculum guides and math overviews for kindergarten
and first grade. All of the data was compiled and thoroughly reviewed to determine the four themes of this study. The four themes that were found during this study were: 1) purpose of math 2) resources 3) coaching and 4) team support. Team support and using wikis to support implementation were new findings in this study. This study found that training as a team provides teachers with a common language and bond that promotes change in their classroom practices. Also using wiki technology to provide resources, support and connection among teachers is extremely beneficial to teachers as they implement changes to their classroom practices.

The findings of this study will hopefully provide direction for future research and help schools and districts review the importance of teachers attending professional development trainings with their peers.
DEDICATION

For Marc and Ryan
Thank you for all of your love, support and encouragement through this process
ACKNOWLEDGEMENTS

I could never have done this without the love and support of so many wonderful people. I would like to thank my husband Marc and daughter Ryan for giving me the time and support that I have needed to accomplish this without feeling guilty about the many hours spent researching and writing. Allowing me to believe I was providing you both with special Daddy time. You have provided me tremendous strength and inspiration to follow my dreams. I can never thank you enough.

Thank you to my parents, Shelley and Frank Lindstrom Jr. for believing in me and encouraging me to always pursue my dreams. I would also like to thank my sister, Kristen Murphree and my brother, Tom Lindstrom for listening, or pretending to listen to me talk about school and research when the question had simply been “how are you doing today?” And a special thank you to Kristen for reading and editing for me along the way. And thank you to Janice and Paul Scholl and Sarah Scholl, my in-laws, for being interested in my research and supporting me along the way.

I would to acknowledge my committee for all of the teaching, support and encouragement during this process. Dr. Jerry Aldridge for being available at all times to talk, read
and help revise my work, not to mention always having a very entertaining story to lighten the tone. Dr. Lois Christensen for graciously opening her home as the central meeting spot for many hours of revisions and editing. Dr. Deborah Camp, Dr. Lynn Kirkland and Dr. Maryann Manning for teaching me so many things about education and helping me become the educator I am.

Laura Bloom, Aubretta Curry and Judy Rapp, my cohort, we have all traveled this trail together. I could never have done it without each of you. Finally I would like to thank Dr. Fancher and the wonderful faculty and staff that I have had the privilege of working with. You have all done so much to encourage me and help keep me going. I can never thank you all enough.
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LIST OF ABBREVIATIONS

IRB- Institutional Review Board

MMI- Mobile Math Initiative

NAEYC- National Association for the Education of Young Children

NCTM- National Council of Mathematics Teachers

UAB- University of Alabama at Birmingham
CHAPTER 1: INTRODUCTION

Introduction

Teachers are at the center of educational reform. We must focus on high quality professional development to improve teaching. Guskey (2000) describes professional development as the activities and the processes planned to improve the professional knowledge, skills, and feelings of educators so that they are able to improve the learning of the students. "High quality professional development is at the center of every modern proposal to enhance education" (Guskey, 2000, p. 16). Diane Sweeney (2003) notes that if we want teachers to take the time to go to professional development, it needs to meet their needs. One shot conferences may offer a few good ideas, but ongoing intensive and supported professional development is what is needed to have a lasting impact on classroom practices (Sweeney, 2003). Learning and implementing a new teaching strategy into your daily teaching repertoire doesn’t just happen. It requires learning and is easiest to add a new strategy through guided practice (Stronge, Turker, & Hindman, 2004).
The National Council of Teachers of Mathematics (NCTM) published a set of national standards for mathematics in 1989 (Kilpatrick, 2003). In the 1980’s, children in the United States were deemed unprepared to meet modern challenges according to NCTM and the national mathematics assessment scores. Because of the increase in accountability and rigorous assessments, there is a growing list of mathematics objectives to be addressed at each grade level. There lacks a clear focus on how to teach the topic for in-depth understanding. As a response to this concern in 2006, NCTM published the *Curriculum Focal Points for pre-kindergarten through Grade 8 Mathematics: A Quest for coherence* (NCTM, 2006). The Focal Points intend to provide a more focused coherent mathematics curriculum.

There is evidence indicating that what the students learn about mathematics content is directly related to what teachers do in the classroom (Mewborn, 2003). Mathematics instruction has shifted from memorized facts and procedures to a belief that students need opportunities to construct their own strategies and ideas about mathematics. The learning environment for teaching mathematics has also changed from simply completing problems by following a set procedure to an environment where students are encouraged...
to explore and discuss strategies, question and work through confusions (Cameron, Hersch, & Fosnot, 2004).

There are many different types of professional development activities and formats for trainings. This study will focus on the professional development techniques used in the Mobile Math Initiative (MMI). Some of the professional learning strategies used to help improve classroom practices are: in-depth professional development training (10 days), peer teaching, adult mathematics education, continued coaching support, classroom observations and follow-up training sessions (one hour and 3 days). Each of these elements of professional development will be reviewed in-depth in chapter two.

To enhance all students’ learning, a focus on teaching is vital (Guskey, 2000; Joyce & Showers, 1995; McDiarmid, David, Kannapel, Corcoran & Coe, 1997). “Just as one cannot expect students to learn something simply by being told that it is so, one cannot expect teachers to change their teaching practices simply because they have been told to do so” (Mewborn, 2003, p. 49). As mathematics is highlighted in many school districts, mathematics professional development must be looked at too. This researcher will look at how teachers implement what they learned in a ten day mathematics workshop into their classroom practices and
how the teachers perceive how the training has influenced their students' mathematical understanding.

Problem for the study

As school leaders focus on mathematics achievement, their attention also shifts to teachers’ teaching practices in the mathematics classroom. What the teacher does in the classroom has a direct impact on the students’ knowledge and skill (Marzano, Pickering & Pollock, 2001). Because of this, there is a need to provide professional development in the area of mathematics. It takes more than requiring attendance at a workshop to bring about lasting change in the classroom. I studied a group of teachers as they began to make changes in their teaching practices one and two years after attending a ten day professional development session. What are they implementing in their classroom? How has the ten days influenced their instructional practices?

Purpose of the study

Professional development is intended to change, improve or enhance classroom teaching practices. After teachers spend ten days in an intense mathematics workshop, how do they implement their new ideas into their classroom practices? The purpose of this study will be to learn how
teachers describe their perceptions of how they implement what they learned in professional development training into their teaching practices.

Questions

The central focus for this study sought to answer the questions: How do teachers describe their perceptions of how they implement what they learned in professional development into their teaching practices? Sub questions for this research were:

1. What elements of the professional development do teachers describe as being the most beneficial in helping them make changes in their teaching practices?

2. How do the teachers describe how the changes in their teaching practices have influenced their students’ mathematical understanding?

Study Limitations

There are a few limitations to this study that need to be noted. The first limitation is that the study was conducted within only one school district. This limits the study to the views and beliefs that are norms within this district. The district where the study was conducted strongly values and encourages professional development for
the teachers. This may limit the outcomes of this study.

Another limitation to this study is that all of the participants were Caucasian females and this study only reflects the thoughts of the participants involved within the study. This study can only be transferable to other similar settings and populations.

During this study, the district involved dissolved their contract with MMI and choose to develop their own math initiative for future years. Also during this process, two of the math coaches took new positions and left openings for math coaches that were unable to be filled during the course of this study.

A final limitation to this study is my involvement and connections with MMI. I served for two years as a math coach. Although I am no longer a math coach during this study, my connection with the professional development is well known by the participants.

Significance of the Study

Professional development is essential to bring about change in teaching practices. This study will help to look at the significance of the specific math initiative training and how teachers implement what they learned into their classroom practices. I also sought to better
understand what elements of professional development have the greatest influence on classroom instruction.

This research provides information that may help drive future professional development activities. It may also assist districts to determine what types of professional development will most benefit their teachers.

Definition of terms

Team refers to a group of teachers who teach the same grade level at the same school. To be considered a team there must be more than one teacher who teaches the same grade together at the same school.

Professional development is any type of professional training intended to improve teaching practices. There are many forms of professional development that are explained in detail in chapter 2.

Wiki is a website, which in the case of this study, is used to post teacher resources, curriculum guides, and math assessments. The wiki in this study is used only as a teacher resource.

Mobile Math Initiative (MMI) is an intensive professional development training that focused on mathematics instruction. MMI is the professional development that was the focus of this study.
Organization of the Study

Chapter one is an introduction to this study. Chapter one states the research problem, purpose of the study, research questions and describes the limitations of the study. Chapter two is a review of the literature that builds the foundation and rational for the need of this study. Chapter three details the methods used in this study for collecting data and data analysis. Chapter three also explains the ethical considerations, the role of the research in the study and introduces the individual participants and sites involved in the study. Chapter four describes the findings of the study and to detail the themes. Chapter five provides a discussion of the study, describes the major findings of the study, and describes recommendations and implications for future research.

Summary

We must focus on quality professional development to improve teaching. Professional development is intended to improve the professional knowledge and skills of educators so they are able to improve the learning of their students. There are many different types of professional development. This study will focus on the professional development techniques used in the Mobile Math Initiative (MMI).
The central focus for this study was: How do teachers describe their perceptions of how they implement what they learned in professional development into their teaching practices? Sub questions for this research were:

1. What elements of the professional development do teachers describe as being the most beneficial in helping them make changes in their teaching practices?
2. How do the teachers describe how the changes in their teaching practices have influenced their students’ mathematical understanding?
CHAPTER 2: REVIEW OF THE LITERATURE

There are many factors that may influence student success; however the individual teacher has a powerful effect on her students’ learning (Marzano, Pickering & Pollock, 2001). A study conducted by Wright, Horn and Sanders (1997), found that the classroom teacher is “the most important factor affecting student learning” (p. 63). These findings indicate that more can be done to advance education by improving teacher effectiveness.

High quality professional development is at the heart of nearly every plan for improving education (Guskey, 1986). This study focused on professional development in mathematics. This chapter defines professional development and then reviews different types of professional development. Next, mathematics instruction will be detailed beginning with the history of mathematics education standards and then best teaching practices. Finally, the specific mathematics professional development model involved in the study is detailed.
Professional Development

The history of professional development can be traced back to the early 19th century (Richey, 1957). It is characterized by criticism, conflict and disorder (Guskey, 1986). In 1957, Corey stated that there is a need for professional development, but much of what is offered is uninspiring and ineffective. In more recent years, much research has been conducted to look at high quality professional development and the types of professional development that brings about the most lasting improvement in student learning.

According to Guskey (2000), the defining characteristics of professional development were, “it is an intentional process, it is an ongoing process, it is a systematic process” (p. 16). Guskey (2000) noted that intentional professional development must have a clear and worthwhile goal and be able to assess that the goal has been met. Professional development is not something that occurs three or four days during the school year but is rather an ongoing process of learning and support as the new techniques are implemented and refined. When professional development is looked at systematically, organizational changes and individual changes are able to
be supportive and students make more gains (Sparks & Hirsh, 1997).

Although reflection is not a form of professional development, it is essential to bring about change in classroom practices. Reflection is described as careful thought or consideration, reconsidering previous actions or events (Cruickshank, 1987). Reflection is also an important element that needs to accompany professional development to bring about lasting change in the classroom (Tom, 1992). Many researchers found that reflection binds theory to practice (Grimmett, MacKinnon, Erickson & Rieckson, 1990; Tom 1992).

In many states, including Alabama, teachers are required to have a set number of professional development hours a year in order to keep their teaching certificate active. This type of requirement is thought to only add to the perception that professional development is a series of unrelated workshops with little or no follow-up (Guskey, 2000). The guiding questions that should determine the professional development plan for a teacher should be, what do I need to improve my teaching practices (McDiarmid, David, Kannapel, Corcoran & Coe, 1997)?

A national professional development study was conducted by Garet, Porter, Desimone, Birman and Yoon
(2001) using 1,027 participants. The basis of their study was that teachers are at the center of educational reform and that we must focus on high quality professional development to improve teaching. There are numerous researchers who have studied professional development. However there is “relatively little systematic research that has been conducted on the effects of professional development on improvements in teaching or on student outcomes” (p. 917). The participants in Garet’s study were asked to complete a detailed survey about the different types of professional development that they have participated in and the impact on their instruction. The survey items looked at the form of the activity, the duration of the activity, the degree of collective participation, content focus of the activity, the amount of active learning and the degree of communication among participants. The study findings were “both content knowledge and coherence have substantial positive effects on enhanced knowledge and skills” (p. 933).

The researchers also found that teachers who participated in professional development activities that were consonant to other experiences and expectations were more likely to change teaching practices. This study was a beginning in pinpointing what elements of professional
development have the greatest impact on classroom practices. Results of their study were that if professional development is to be utilized to improve classroom instruction, it is best with opportunities with the characteristics that have been shown to foster improvements in teaching and learning (Garet, et. al., 2001).

Hollins (2006) inquired about professional development in urban schools. Changing classroom instructional practice is at the center of improving education for under-served and underachieving students. To truly improve classroom instruction in urban schools, Hollins suggested that “transform their culture of practice from one that assumes that barriers to learning reside in the students to one that expects teachers to collectively assume responsibility for making sure all students learn” (p. 48). This qualitative study focused on the urban literacy project and aimed to provide a process for teachers to address their own professional development and improve literacy instruction. For a school to be chosen to participate, they had to have 100% commitment from all of the teachers in the school. Teacher leaders were selected to lead and manage meetings. Teachers met to share successes and challenges in improving student literacy and to talk about professional literature or to listen to a
The group guided their own professional development and chose what they wanted to focus on in the area of literacy. By the middle of the second year of the study, the way the teachers talked about the students' reflected changes in the teachers’ thinking and instructional practice. Standardized test scores were analyzed to determine if the teachers’ students involved in the professional development had higher test scores than the teachers not involved. Teachers who remained in the study for three years showed improvements in their ability to teach reading and increase student achievement (Hollins, 2006). Developing a learning community among the teachers is one element of professional development that has a positive impact on teacher learning and, in turn, on student achievement according to Hollins work.

There are many studies that focus on types of professional development. However, few studies have looked at how teachers implement what they learned in professional development courses into their classroom practices. Figure 1 describes some of the research that has been examined in preparation for this study.

Figure 1: Professional Development Studies
| Researchers                          | Focus of the study | Outcomes                                                                 
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<td>Changing teaching</td>
<td>What students learn in the classroom is directly related to what teachers do in the classroom</td>
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<td>practices</td>
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<td>Wright, Horn and Sanders (1997)</td>
<td>Importance of the teacher</td>
<td>Found that the classroom teacher is the most important factor that affects student learning</td>
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<td>Garet, Porter, Desimone, Birman and Yoon (2001)</td>
<td>How does professional development impact instruction</td>
<td>Professional development that is coherent with other experiences were more likely to change teaching practices</td>
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<td><strong>Qualitative Studies</strong></td>
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<tr>
<td>Hollins (2006)</td>
<td>Looked at professional development in urban</td>
<td>Schools need a culture were all assume responsibility for making sure students learn</td>
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<td>Schools</td>
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<tr>
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<td>Kohler (1997)</td>
<td>Peer Coaching</td>
<td>Peer coaching helps teachers strengthen and develop new teaching strategies at a faster rate</td>
</tr>
<tr>
<td>Bowman &amp; McCormick (2000)</td>
<td>Peer Coaching</td>
<td>Training in peer coaching techniques is extremely productive</td>
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Forms of Professional Development

There are many different forms of professional development ranging from traditional one shot professional development seminars, book studies, in-depth courses with continued support meetings, peer or instructional coaches, and the list goes on. One shot professional development seminars are where a teacher attends one day training and then returns to the classroom with no follow up to the training. Book studies are where a group of teachers read and discuss a professional book in depth. In-depth courses
are the professional development courses with continual support that extend over many days and have follow-up support after the initial course. Peer or instructional coaching is an example of when a peer or expert works alongside the teacher to help plan, observe and provide feedback about the teaching.

This section reviews what researchers have written about professional development and the impact on teaching practices. The literature is broken down into several sections. The first section focused on one-shot professional development seminars. The second section reviews research surrounding in-depth professional development courses. The next section focuses on peer teaching and instructional coaching as a form of ongoing professional development. The final section looks at professional development that is focused around teachers’ content knowledge.

**One-shot Seminars**

One-shot workshops that are based on the latest educational fad do not seem to cause lasting change in the classroom. “One reason for their failure is that as a rule, they offer no guidance on how the new strategies fit with those advocated in years past” (Guskey, 2000 p. 19).
Professional development that is considered to be a one-shot seminar or an isolated activity is consistently considered to be ineffective. Professional development needs to be viewed as a process not an isolated event (Loucks-Horsley, Harding, Arbuckle, Murray, Dubea & Williams, 1987). Researchers agree that one shot professional development activities do not bring about lasting change in the classroom (Cooley, 1997; Guskey & Huberman, 1995; Joyce & Showers, 1995; McDiarmid, et. al., 1997; National Commission on Teaching and America’s Future, 1996).

The research that has been conducted focused on one-shot professional development revealed that one-shot professional development does not have a lasting impact on classroom instruction (Cooley, 1997; Guskey & Huberman, 1995; Joyce & Showers, 1995; McDiarmid, et. al., 1997; National Commission on Teaching and America’s Future, 1996). One-shot professional development is often encouraged to meet a number of required hours for the year. This does not seem to help teachers improve their classroom teaching practices (McDiarmid, et. al., 1997). One-shot professional development “reinforces the perception of professional development as separate from ongoing, day-to-day tasks of educators” (Guskey, 2000, p. 15). Guskey also
noted that one-shot professional development “undermines opportunities to build a school culture of continuous learning for all” (p. 15).

For professional development to have a lasting impact on classroom practices, it must be on-going and “accompanied by appropriate follow-up activities” (p. 15). Although one-shot large professional development seminars are a cost efficient form of professional development it is not the form of professional development that has a lasting impact on teaching practices (Joyce & Showers, 1995).

Professional Development Seminars

Trainings or seminars are considered to be the most cost effective way of getting information to a large group of people. The format of trainings can include large group presentations, seminars, workshops and demonstrations. They generally include a theoretical base, model skills and provide practice and feedback (Joyce & Showers, 2002). This type of training provides a common base for future experiences and helps build a common vocabulary and shared content base. The noted short comings of trainings are that they offer little or no choice or individualization. However, trainings can be beneficial if they are followed
with additional professional development activities (Guskey, 1996; Joyce & Showers, 2002).

The most beneficial training sessions are planned with clear learning goals and objectives in mind and offer follow-up support as teacher implement new practices (Joyce & Showers, 2002). Fullan and Hargreaves (1992) note that professional development needs to be a systematic process driven by intended outcomes. The most successful models of professional development combine skills and content along with mentorship, coaching and reflection.

Peer Coaching

Peer coaching is another form of professional development. Peer coaching is considered job-embedded professional development (Joyce & Showers, 1996; Rhodes & Beneiche, 2002) and is a growing trend across Alabama. Different people have different definitions of peer coaching. For some, it is simply peers who observe each other and provide feedback (Bowman and McCormick, 2000; Opitz, 2001). For others, the coach is an expert in the field (Kohler, Crilley, Shearer and Good 1997; West & Staub, 2003). Research has been conducted on both versions of peer coaching.
Kohler, Crilley, Shearer and Good (1997) define their version of peer coaching as the coach being considered an expert in the field. Their model differs from reciprocal peer coaching where the peers observe each other. Peer coaching is described “in contrast to the traditional methods of staff development that relied on one shot in-service training” (p. 240). Furthermore, they go on to state that there is a need to create professional development that promotes recurrent learning and expertise. This study focused on four elementary school teachers who worked with an expert coach. The teachers planned with the coach, and then were observed by the coach and debriefed with the coach on a regular basis. The results of the study indicated, “that procedural refinements can be formally examined on a daily basis, are more likely to occur under conditions of collaboration than independence, and can be sustained and even extended over time” (p.246). Peer coaching appears to help teachers develop and strengthen their teaching strategies at a faster rate than teaching in isolation.

Bowman and McCormick (2000) compared peer coaching to Vygotsky’s zone of proximal development. They thought that the peer coach helps to scaffold the teachers’ thinking and helps them strengthen their teaching strategies more than
they could do alone. Bowman and McCormick researched the impact of peer coaching on teaching practices of undergraduate student teachers. They focused their research around “(a) development of clarity skills, (b) pedagogical reasoning and actions, and (c) attitudes towards several aspects of the field experience” (p. 256). There were two groups of student teachers involved in the study, the control group and experimental group. The experimental group received training in peer coaching techniques focused around how to observe and to provide meaningful feedback. Lessons and interviews were videoed and audio recorded as a pre and a post data collection procedure. During the study, the experimental group attended training seminars that focused around the research ideas. The researchers found, “assistance from peers who have been trained to provide support can be extremely productive in achieving field experience goals. In this study, students functioning as novices were able to scaffold and be scaffold by other novices” (Bowman & McCormick, 2000, p 261). The researchers found that peer coaching had a positive impact on the student teachers’ teaching and attitudes.

West and Staub (2003) describe content focused coaching as, “A professional development model designed to promote student learning and achievement by having a coach
and teacher work jointly in specific settings” (p. 1). Coaching is on-going job embedded professional development. It “is not a quick fix for bad teachers. Instead, it provides structures for ongoing professional development” (p. 3). Figure 2 describes West and Staub (2003) goals of content focused coaching.

**Figure 2: Goals of content focused coaching**

<table>
<thead>
<tr>
<th>Goals of Content Focused Coaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Helps teachers design and implement lessons</td>
</tr>
<tr>
<td>• Is content specific</td>
</tr>
<tr>
<td>• Is based on a set of core issues of learning and teaching</td>
</tr>
<tr>
<td>• Foster professional habits of mind</td>
</tr>
<tr>
<td>• Enriches teachers content knowledge</td>
</tr>
<tr>
<td>• Encourages communication among teachers about teaching and learning</td>
</tr>
</tbody>
</table>

(West & Staub, 2003)

Improving the quality of education not only involves helping veteran teachers develop and fine tune new teaching practices, but also universities helping undergraduate,
potential teachers, learn and implement best teaching practices.

The shift in focus from teaching to learning, coupled with producing knowledgeable, skillful teachers, was the goal of a collaborative project in which a university and a public school district tried to improve student achievement by implementing a field-based pre-service teacher education program (Linek, Fleener, Fazio, Laverne, & Klakamp, 2003, p. 78).

This study focuses on a relationship between a university and a school district and was conducted over a five year time period. Baseline data was collected the first year and then each year following to determine the long term impact on student achievement.

The researchers found that, “Teaming appeared to be critical for pre-service and in-service teachers when they talked about influencing the classroom environment” (p. 84). Teaming would be another form of peer coaching and shows the importance of teacher collaboration to help improve teaching practices. The results sustain the belief that teacher education and professional development are superb ways to advance student success (Linek, et al, 2003).

**Content Knowledge**

The assumption has long been that the mathematics taught in elementary school deals with topics that aren’t suitable for advanced study.
Unfortunately, this means that teachers have had extremely limited opportunities to study the mathematics they actually have to teach. Their knowledge, in large part, is based on their own early schooling, which typically focused on computation skills, not understanding. (Burns, 2000, p. xv)

Teachers need opportunities to think about the math that they teach. “When staff developers allow teachers to grapple with mathematical ideas, the resulting professional learning is also personal and often powerful” (Sweetland & Fogarty, 2008, p. 72). Many teachers know the procedures for the math that they teach, but have a weak understanding of the conceptual basis (Carpenter, Fennema, Peterson & Carey, 1988; Hill, Rowan, & Ball, 2005; Kilpatrick, Swafford, & Findell, 2001; West & Staub, 2003).

“Researchers have conducted a number of studies of teachers’ knowledge. Most of them have focused on teachers’ knowledge of mathematics content, often measured by the number of college mathematics courses completed or a score on a standardized test” (Carpenter, et al, 1988, p. 385). Many early childhood educators have been required to take a minimum number of mathematics content courses (Fosnot & Dolk, 2001; Korthagen & Kessel, 1999; Ma, 1999). “Today, teachers in the United States are required to take more college mathematics than ever before, yet the gap between the needed and actual content understanding seems to be
widening” (Fosnot & Dolk, 2001). What teachers understand about numbers and the number systems contributes to their ability to ask students mathematically significant and thought-provoking questions (Chapin & Johnson, 2000).

Reflection and Professional Development

Morgan (2007) described reflection as, “deliberate analysis of information gained through observation in order to inform future practice and promote the development of a philosophy regarding the act of teaching” (p. 8). Although reflection is not a form of professional development, it is an important element of meaningful professional development. Reflection is necessary for implementing new ideas into regular practices (Cruikshank & Applegate, 1981). Having experiences and opportunities to reflect on new ideas improves performance (Adler, 1994; Schon, 1983). Lasley (1992) explained reflection as the capability to think about teaching in creative ways. During or after attending professional development, it is essential to have time to reflect on the new ideas, try the new strategies and then reflect and refine the ideas again. Raines and Shadiow (1995) believe the reflection is more than simply thinking about what has been done. To truly be reflective,
one must be aware of the connections of theory and practice.

Reflection deepens the teachers understanding and connections to new ideas. When attending professional development sessions, teachers who have opportunities to implement what they have learned and reflect on the new practices strengthen their new skills and practices (Fullan & Hargreaves, 1992; Stoll, 1992). Professional development that excludes the element of reflection does not bring about lasting change (Gitlin, 1997; Miller & Heiman, 1987).

Mathematics Standards

This section will look at research related to mathematic and mathematic instruction. This section will look at 1) mathematics standards, 2) math in early childhood education, 3) teachers’ knowledge and 4) underlying theories of mathematics in early childhood education. Figure 3 outlines the research and literature that is reviewed in this section.

Table: Research and Literature Related to Mathematics

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Focus of the literature</th>
<th>Outcomes</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Bay (2001)</td>
<td>Developing number sense</td>
<td>Children need to see problems in real context</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Kamii (1989)</td>
<td>Children’s problem solving</td>
<td>Children need opportunities to think about solving problems and developing their own strategies</td>
</tr>
<tr>
<td>Zemelman, Daniels and Hyde (1998)</td>
<td>Best practices for teaching mathematics</td>
<td>Children need opportunities to think and talk about mathematics</td>
</tr>
<tr>
<td>Charles and Lobato (1998)</td>
<td>Numerically Powerful children</td>
<td>Teachers need to help children develop meaning of numbers and operations</td>
</tr>
<tr>
<td>Parker and Mitchell (2006)</td>
<td>Mathematics instruction in early childhood education</td>
<td>Children need frequent opportunities to solve problems and reason mathematically</td>
</tr>
<tr>
<td>Copley (2000)</td>
<td>Teacher mathematical knowledge</td>
<td>Mathematics brings about anxiety for many Many early childhood teachers have had limited opportunities to study mathematics in-depth.</td>
</tr>
</tbody>
</table>
In the 1980s, the school children in the United States were considered unprepared to meet the challenges of current times (Kilpatrick, 2003). In 1989, the National Council of Teachers of Mathematics published *Curriculum and Evaluation Standards for School Mathematics*. In 1991, they published *Professional Standards for Teaching Mathematics* and in 1995 *Assessment Standards for School Mathematics*. "These three documents represent a historically important first attempt by a professional organization to develop and articulate explicit and extensive goals for teachers and policymakers. Since their first release, they have given focus, coherence, and new ideas to efforts to improve mathematics education" (NCTM, 2005, p. ix). The documents were revised and republished in 2000 resulting in the *Principals and Standards for School Mathematics* often referred to as the *Principals and Standards*. The *Principal
and Standards are based on a wealth of research about teaching and learning mathematics (Kilpatrick, 2003).

The Principal and Standards for School Mathematics is founded on the vision where all students are engaging in high quality mathematics. To achieve this ambitious vision, mathematics instruction must be built on a strong math curriculum taught by knowledgeable and competent teachers (NCTM, 2005). “The need to understand and be able to use mathematics in everyday life and in the workplace has never been greater and will continue to increase” (p. 4). Much attention is continued to be placed on mathematics instruction and professional development for teachers.

In 2006, the NCTM released the Focal Points.

As states and local school districts implement more rigorous assessment and accountability systems, teachers often face long lists of mathematics topics or learning expectations to address at each grade level, with many topics repeating from year to year. Lacking clear, consistent priorities and focus, teachers stretch to find the time to present important mathematical topics effectively and in depth (NCTM, 2006, p.vii).

As a response to this issue, The National Council of Teachers of Mathematics (NCTM) published the Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence. The Focal Points build on the Principals and Standards (2000) and offers “a starting point in a dialogue on what is important at
Mathematics Instruction in Early Childhood Classrooms

Mathematics is a complex and multifaceted discipline that has importance in many areas of human endeavor. It helps us understand the world we live in, from the natural environment to the latest technologies. We use it daily to analyze situations and to solve problems. If the study of mathematics is to be valuable for students, they must learn that mathematics is an important and powerful tool that helps them explore and make sense of the world (Richardson, 2002, p.3).

Children in today’s classroom will need to learn to work and live in an era that is rapidly changing. They will work in a job market that requires people to be creative problem solvers and to be able to reason. Mathematical understanding is a key to many future opportunities (Steen, 1989). Yet as the world around us changes rapidly, classroom instruction is slow to keep up.

The elementary and middle school mathematics curriculum in the United States is often considered disjointed, repetitive and superficial (Balfanz, Mac Iver & Byrnes, 2006). An element of the vision of the NCTM Standards is for all students to receive high quality mathematics instruction taught by competent teachers with a
high level of mathematics content knowledge (NCTM, 2005). The Principals and Standards describe particular elements that must be in place to provide high quality mathematics instruction. Mathematics curriculum is one of these elements. The Principal and Standards note that curriculum must be focused on essential mathematics and well articulated across the grades. The math curriculum is not a set of isolated and unrelated activities.

Bay (2001) stated, “One of the most important lessons that I have learned as a teacher is that seemingly boring problems on paper can come alive if I can find a way to lift them off the page” (p. 448). Children need to see problems in real context and have opportunities to think and reason mathematically. Kamii and Joseph (1989) explained that when children are given opportunities to think about solving problems and develop their own strategies for solving problems, the strategies that they use are intuitive and a natural part of their thinking. This also helps build self confidence. When students are made to memorize procedures, children often begin to distrust their own thinking and depend simply on a memorized procedure and not mathematical understandings.

A math class where students are building in-depth understandings of mathematical ideas would look like this:
Students would be actively engaged in mathematics and have opportunities to see the power and usefulness of math in their lives, they would feel confident as problem solvers and be able to communicate their mathematical ideas to others (Zemelman, Daniels & Hyde, 1998). Math is no longer a silent learning time where students practice pages of problems to learn the set procedure, but is rather a time where children are thinking and talking about their mathematical ideas and understanding and applying their knowledge to meaningful problems.

In a mathematics classroom where students are constructing their mathematical knowledge, the role of the teacher takes on a new form. The teacher is no longer the lecturer and holder of knowledge but becomes a facilitator and questioner. The teacher joins the investigations alongside the class and asks questions to help deepen and strengthen the students’ understandings. The teacher naturally demonstrates how adult learners approach mathematical problems (Daniels & Bizar, 2005).

Charles and Lobato (1998) note that there is a need to help children to become numerically powerful. They describe a numerically powerful student as one who, “develops meaning of numbers and operations, looks for relationships among numbers and operations, understands computational
strategies and uses them appropriately and efficiently, and makes sense of numerical and quantitative situations” (p. 2). They also list characteristics of classrooms that promote numerical power. Figure 4 describes classroom practices that promote numerical power according to Charles and Lobato.

**Figure 4: Classroom Practices that Promote Numerical Power**

<table>
<thead>
<tr>
<th>Classroom Practices that Promote Numerical Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Children have opportunities to develop meaning for numbers and operations and to explore numerical relationships before they are asked to learn basic facts</td>
</tr>
<tr>
<td>• Teachers provide ample opportunities for students to estimate and use mental math strategies</td>
</tr>
<tr>
<td>• Teachers promote creativity through the problems the pose and by allowing multiple solution approaches</td>
</tr>
<tr>
<td>• Children communicate their reasoning during class conversations</td>
</tr>
<tr>
<td>• Teachers implore and attend to children’s non-standard and partial ideas</td>
</tr>
<tr>
<td>• Teachers create an environment of where making sense of math is a primary focus</td>
</tr>
<tr>
<td>• Concepts and procedures are taught through problem-solving activities</td>
</tr>
</tbody>
</table>
solving experiences.

- Children demonstrate numerical reasoning during classroom activities, assessment, practice and homework
- Teachers help children connect numbers and the quantity that the number represents
- Autonomy is encouraged and developed by relying on logic and reasoning rather than the teacher for the correct answer (Charles & Lobato, 1998)

Teaching mathematics should be inquiry and problem based. Assessment should inform the instruction and students should have ample time to engage in and solve problems (Wright, Strahger, Stafford & Martland, 2006). Teaching and learning are seen as inseparable, for teaching to have truly taken place learning must have accrued (Fosnot & Dolk, 2001). Wiggins (1989) stated, “the problem of student ignorance is really about adult ignorance as to how thoughtful and long-lasting understanding is achieved” (p. 45).

It is amazing what children are able to do when they are given frequent opportunities to solve problems and reason with numbers. When students have such frequent opportunities, they are able to solve sophisticated
problems with relative ease. When math instruction is focused on learning only a standard algorithm, children often learn that math is not meant to make sense and is simply about memorizing a procedure. This causes many children to feel that they are no good at math. However, if children are taught to reason and solve problems, they build in-depth meaningful relationships and understand how mathematics makes sense. They become confident mathematicians (Parker & Mitchell, 2006).

When children have frequent opportunities to reason with and think about numbers while solving problems, it is often amazing what they are able to do. When given opportunities to solve problems by reasoning and thinking about numbers, it is amazing how sophisticated their thinking is (Parker & Mitchell, 2006). National Council for Teachers of Mathematics (2005) advocates for classrooms that are places that students can engage in tasks and experiences that are designed to connect and deepen their knowledge.

Richardson (1997) believes that it is important for young children to have access to a variety of manipulatives. “To understand the mathematics they are working with, children need to be actively involved with materials” (p. 4). Fosnot and Dolk (2001) agree that
Manipulatives are a very valuable tool in early childhood education when children are learning to count and model problems.

Mathematics education should be student centered and understanding should be the goal of what is taught. Children should have a variety of tools and models to refer to and teachers need to understand how these tools and models can help and hurt children’s understanding. Learning tools are not the magic cure to helping children understand mathematics, just a tool (Van de Walle & Lovin, 2006).

Teachers Knowledge

For many adults and teachers, the term “mathematics” brings to mind rote procedures for getting answers. For many, it also brings anxiety rooted in their learning experiences (Copley, 2000; Hill, Rowan, & Ball, 2005). Many teachers teaching kindergarten through 8th grade have not had the opportunity to study mathematics in-depth. It has long since been believed that mathematics taught in elementary school does not require an in-depth understanding in order to teach the content. Sadly this means that most elementary school teachers have not been taught higher level mathematics and have only limited instruction in the math that they teach (Burns, 2000;
Teaching is another element of the Principal and Standards document. The Principals and Standards (2005) describe how essential it is for teachers to understand their students’ knowledge and to be able to challenge and support the students as needed. Teachers must also have a solid understanding of the mathematics content they are teaching. Learning is also an essential element of the Principals and Standards. For students to learn mathematics, they must also develop an understanding of the content by actively building understandings from experiences.

According to a study conducted by Silver, Mesa, Morris, Star and Benken (2009), few teachers provide students with mathematical tasks that would be considered cognitively demanding.

Mathematics instruction and instructional tasks tend to emphasize low-level rather than high-level cognitive processes (i.e., memorizing and recalling facts and procedures rather than reasoning about and connecting ideas or solving complex problems), require students to work alone and in silence (with little opportunity for discussion and collaboration), focus attention on a narrow band of mathematics content (i.e., arithmetic in the elementary and middle grades), do little to help students develop a deep understanding of mathematical ideas (rarely asking for explanations, using physical models, or calling for connections to real-world situations) (p. 503).
Even teachers who are National Board Certified have a difficult time spotlighting cognitively demanding tasks.

Children need opportunities to think about mathematics in order to develop an understanding of mathematics. The teachers’ job is to encourage that thinking (Bellido, Walker & Wayland, 2005). This is a new role for many teachers in the math classroom. Teachers must have opportunities to refine their questioning skills. Teachers must also understand the content they are teaching to be able to ask more meaningful questions to help their students build deeper understandings.

Teachers have to be able to teach mathematics in ways that will inspire students’ mathematical understandings and curiosities (Burns, 2000; Fosnot & Dolk, 2001; NAEYC & NCTM, 2002; Richardson, 1984). In order to do this, teachers need to have a deep understanding of mathematical content, be flexible thinkers and have insight into their students’ understandings (Cavey, Mahavier, Parker, & White, 2007). To help teachers develop their own mathematical understandings and to be able to better interpret students’ work and empower students to think and reason mathematically, teachers ought to have similar experiences. Teachers need to be able to think and reason mathematically

Underlying Theory of Mathematics Education in Early Childhood Education

What I cannot create, I do not understand.

-Richard Feynman, physicist

There are many theorists that contributed to the underlying theory of mathematics education, such as Vygotsky(1978), Piaget(1955), and Kamii(1998). The theoretical foundation is the constructivist theory. Adult and child learners all construct new knowledge through complex engaging interactions between prior knowledge and beliefs and new experiences. Constructivism involves making mental relationships among ideas (Kamii, 2000).

A base of Vygotsky’s (1978) work is social interactions. According to Berk and Winsler (1995), Vygotsky wrote about the importance of social interactions on building knowledge and the role of questioning to deepen understandings. Both of these ideas, social interactions and questioning are essential elements for mathematics instruction.

Zone of proximal development (ZPD) is a term related to Vygotsky (1934). ZPD refers to what one is able to do
alone compared to what they are able to do with guidance or collaboration with peers or adults (Kozulin, Gindis, Ageyev, & Miller, 2003). In mathematics instruction, students are encouraged to collaborate and teachers to ask questions.

Piaget (1955) described three types of knowledge, social, physical and logico-mathematical. Social knowledge is the knowledge that must be acquired socially, things that one learns by being told such as names and labels (Kamii, 1982; Kamii, 2000; Labinowicz, 1980; Peterson & Felton-Collins, 1986, Piaget, 2001; Piaget & Inhelder, 2000). Physical knowledge "is knowledge of objects in external reality. The color and weight of counters or any other object are examples of physical knowledge" (Kamii, 2000, p. 5). "Logico-mathematical knowledge consists of mental relationships, and the ultimate source of these relationships is each individual’s mind" (Kamii & Joseph, 2004, p.5). Logico-mathematical knowledge is knowledge constructed by the individual. Knowledge of number is constructed or logico-mathematical knowledge (Kamii, 1982; Kamii, 2000; Labinowicz, 1980; Peterson & Felton-Collins, 1986). Rote counting is social knowledge but understanding fiveness is logico-mathematical knowledge. Kamii and Piaget advocate for a learning environment that provides children
opportunities to think, reason and build relationships to construct knowledge (Kamii, 1982; Kamii, 2000; Labinowicz, 1980; Peterson & Felton-Collins, 1986).

Ruth Parker (1993), Cathy Fosnot (2001), Maarten Dolk (2001) and Kathy Richardson (1997) have written many books and articles that detail mathematics education in early childhood education and their beliefs about how children come to understand mathematic concepts. Parker (1993) stated that mathematics instruction that is based only on the rote practice of skills produces children who are only able to follow set procedures. For children to be successful in today’s society and job market, they need to learn to think and reason mathematically. Parker (1993) believes that the NCTM standards put mathematical thinking and understanding as the goal of mathematics education.

Fosnot and Dolk (2001) have published a series of books that detail mathematics instruction in elementary classrooms. They look at teaching for understanding and explain the importance of children being able to solve problems and explain their thinking. The mathematics classroom today is an active environment where children are actively engaged in solving real life problems. In classrooms, children should be collaborating with peers or working individually to find solutions and record
meaningful explanations of their thinking (Fosnot & Dolk, 2001).

Richardson (1984) wrote, “Children’s first experiences with number influence the way they deal with mathematics the rest of their lives. Mathematics will be useful for children if we teach it in ways that makes sense to them” (p. i). Mathematics must be meaningful for children to make lasting connections and develop a true understanding of how numbers are connected. Richardson describes the ideal mathematics learning environment for early childhood as,

Encourages thoughtfulness, engages children’s thinking, provokes questions, stimulates a search for meaning, encourages children to look for connections and relationships, helps children make sense of and understand the mathematics in which they are engaged (p. 3).

This kind of learning environment provides the foundation for becoming a mathematical thinker.

In 2002, the National Association for the Education of Young Children (NAEYC) and the National Council of Teachers of Mathematics (NCTM) adopted a joint position statement on early childhood mathematics. It states,

High-quality, challenging, and accessible mathematics education for 3- to 6-year-old children is a vital foundation for future mathematics learning. In every early childhood setting, children should experience effective, research-based curriculum and teaching practices. Such high-quality classroom practice requires policies, organizational supports, and adequate resources that enable teachers to do this

NAEYC and NCTM provide recommendations for teaching mathematics to young children. Mathematics education should enhance children’s natural curiosity and interest as well as their disposition to make sense of the world around them. Mathematics should also build on children’s prior knowledge, experience and individual learning styles. Mathematics in early childhood should strengthen children’s ability to solve problems and communicate mathematical ideas. Mathematics should be naturally integrated with other activities and curriculum areas (NAEYC & NCTM, 2002).

Mathematics Initiative

Teacher education is essential to bring about lasting change in the classroom. Teachers must be reeducated and supported as they begin to extend and deepen the content of their math program (Russell, 1997). In a county in southern Alabama, a group of educators and leaders came together to look at how they could improve students mathematical knowledge. This group decided to focus on four elementary schools called the Maysville schools. The group worked with Math Works in Maryland to develop a professional development model to train the teachers in the area of
mathematics content and instruction. They decided that the professional development course would take place during two weeks over one summer, followed by a three day session the following summer. The teachers learned about teaching pedagogy (teaching and learning theory), mathematical content knowledge (adult math) and best practice teaching strategies. The first three days of the training focused on pedagogy, teaching strategies and mathematical content knowledge. The teachers then had the opportunity to practice what they were learning on a small group of students. The teachers worked together in pairs to plan and teach five one-hour long lessons. As they taught, they also had a coach (DOP- debriefer, observer and planner) observe them, provide feedback, and help them plan for the next lesson.

At the end of the ten days, the teachers were given time to plan for the start of the coming school year. The schools were supported with two part time math coaches that were available to help them as they began to implement their new ideas in their classrooms. The teachers met twice a month for planning time led by their math coach focused around mathematics. The teachers also attended quarterly professional development sessions. Classroom observations
were conducted to help provide feedback to the professional development organizers, teachers and administrators.

In 2004, organizers decided to provide professional development for other areas in the state. A few other districts joined the math initiative expansion and began to have their teachers participate in the professional development.

This study focused on one of the districts that was involved in the math initiative explanation. This study looked at the elements of the professional development trainings such as in-depth professional development, follow-up sessions, adult content knowledge, coaching support and team planning. This study sought to understand how teachers implement the new techniques into their classroom practices and what types of professional development are the most beneficial.

Summary

Although there are many different way to provide teachers in-service professional development opportunities, researchers found that the types of professional development that have the largest impact on student learning is the staff development that occurs every day, is
job embedded, and encourages shared responsibility for the learning (Sparks, 2000)

Professional development and mathematics instruction are both topics that have received much attention in recent years. However, there is limited research focused on this specific math initiative in the southeastern United States. This study may provide organizers and school districts involved more insight into how teachers implemented what they learned during the math initiative into their daily routines.
CHAPTER 3: METHODS

Design of the Study

Qualitative research is conducted in a subjective manner (Creswell, 2007). A qualitative researcher seeks to understand the central phenomenon. Qualitative research is also described as,

multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 1994, p.2).

A key characteristic of qualitative research consists of an investigative approach in which the researcher collects complete views of participants in the form of language or images.

Tradition of Case Study

The qualitative tradition for this study is the tradition of case study. Case study allowed me to explore thoroughly the experience of a small group of teachers and how they describe their perceptions of how they implement
what they learned in professional development into their teaching practices (Yin, 2003). Case studies must be bounded by a program, an event, a person, a process, an institution, or a social group (Merriam, 1988; Yin, 2003). Because I studied the event, MMI and this event were bounded by time and location the case study tradition best matched the topic and questions being researched. I allowed the question and topic to determine the tradition to be used. This study is bound by time and attendance to the MMI training and follow-up support professional development training.

Selection of the Site and Participants

This study took place in a Southeastern United States school district. The site was selected because of the district’s participation in the Mobile Math Initiative (MMI). The participants attended the two week initial MMI training and follow-up trainings. Participation in this study was voluntary. The kindergarten teachers’ training was during the summer of 2007 and first grade teachers’ training was during the summer of 2008. The teachers who attended the trainings were e-mailed (see appendix B) to ask for volunteers to participate in the study. Twelve of the teachers were e-mailed and five volunteered to
participate in the study. The teachers selected were entering their first or second year of implementation.

**Data Collection**

The case study tradition requires multiple data sources to be used. I used 1) a focus group interview, 2) individual interviews, 3) e-mailed follow-up questions and clarifying questions and 4) the reviewed curriculum guides and math overviews.

The participants participated in a focus group interview in February 2009 at Eastside Elementary School where they talked about their experiences with Mobile Math Initiative (MMI) training and how they have implemented what they learned in their classroom. The focus group questions were based on the sub questions and targeted the teachers' experiences with the training and how they implemented what they had learned in their classroom. A focus group interview protocol (appendix C) was developed, yet I was able to ask follow-up questions from the participants' responses.

The information that I learned during the focus group interview then guided the individual interviews with each participant (see appendix D). During the focus group interview and as I transcribed, I kept a selected list of
questions and ideas. This list became the guide for the individual interview. I also asked more questions during the interview as needed based on the participants responses. For example, if a participant responded, but I was still unclear then another question was asked at that time. As I transcribed the individual interviews, the participants were e-mailed questions that came to mind. And as I categorized information into themes, if I had more questions or needed more information, I again e-mailed the participants questions. The participants responded to the questions via e-mail and then I e-mailed more questions as needed.

I also reviewed math curriculum guides and unit overviews that were on the elementary math wiki. These guides were used by the teachers as the basis for their lesson plans.

Data Analysis

Data analysis is an organized search for meaning in the data collected during the research (Hatch, 2002). Data analysis consisted of preparing and organizing the data and then looking for patterns and coding for the common themes found within the data (Creswell, 2007). I then represented the themes and codes in charts, tables and discussions.
(Hatch, 2002). Data analysis was a crucial way to process the data that was collected so that what I learned could be conveyed to others.

During the data analysis, a detailed description of the case surfaces and I described the aspects of the case. After this description, I might focus on a few key issues not for generalizing beyond the case, but for understanding the complexity of the case (Creswell, 2007). The case study analysis is "rich in the context of the case" (p. 75) and details the elements of the case that come into view during the research.

All of the interviews were audio recorded and transcribed in their entirety. I then read and reread the transcriptions multiple times. During the first and second reading, I reviewed what the participants had stated. During the following readings, I began to highlight sections of text that contained commonly used words and phrases. Some of the common words were wiki, planning, and purpose.

I then electronically cut the sections of highlighted text out of the transcript and using a table in Word began to sort the highlighted text according to the commonly used terms or phrases. For example, every section of text pertaining to wikis, planning, or coaching were then
grouped together in the table. I then reread the grouped sections of text to make sure they contained common words, phrases, or ideas. I then gave each section a code name. The code name was usually the most commonly used word within the group of text or the word that I believed best described the participants' idea. The most common codes were: resources, wiki, planning, purpose, professional mentor, and team.

Once the sections of text were given codes, I reread all of the transcriptions to make sure none of the participants words had been overlooked or left out. I then reviewed the coded text and determined that a few codes and the supporting text complemented each other, indicating that they had a common meaning. The sections were resources, wiki, team support, and planning. These sections of text were then electronically rearranged to be next to each other in a chart. I believed that although these sections had a common idea they were separate ideas and could not be combined into the same code.

I then looked at the groups of texts and determined the theme names based on the common text and code names. The theme names were based on the code names and in some cases were expanded to provide a better snapshot of the information learned from the participants' words. Resources
and wiki were grouped together as sub themes and titled resources because I believed that wiki was a type of resource and best fit the title resources. Team and planning were grouped together as sub themes and called team support. The code purpose was expanded to purpose of mathematics to better describe the text. Professional mentor was revised to coaching.

Once all of the codes were sorted and titled I reviewed all of the data and specifically focused on the themes and codes making sure no text was inadvertently excluded. I also reviewed the curriculum guides and unit plans to find supporting evidence for the codes and themes.

Credibility

Case studies are a form of social research. There are four tests that are commonly used to establish credibility and dependability of the research (Lincoln & Guba, 1985; Yin, 2003). The four tests that Yin (2003) describes are, 1) construct validity, 2) internal validity, 3) external validity, 4) reliability. Figure 5 is a recreation of Yin’s figure describing each test and when in the research it should be used:

Figure 5: Case Study for Four Design Tests

<p>| Case Study Tactics for Four Design Tests |</p>
<table>
<thead>
<tr>
<th>Tests</th>
<th>Case study tactics</th>
<th>Phase of research that tactic occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct validity</td>
<td>- use multiple sources of evidence</td>
<td>- data collection</td>
</tr>
<tr>
<td></td>
<td>- establish chain of evidence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- have key informants review draft of report</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- data collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- composition</td>
</tr>
<tr>
<td>Internal validity</td>
<td>- do pattern matching</td>
<td>All during data analysis</td>
</tr>
<tr>
<td></td>
<td>- do explanation-building</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- address rival explanations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- use logic models</td>
<td></td>
</tr>
<tr>
<td>External validity</td>
<td>- use theory in single case studies</td>
<td>All during research design</td>
</tr>
<tr>
<td></td>
<td>- use replication in multiple-case studies</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>- use case study protocol</td>
<td>All during data collection</td>
</tr>
<tr>
<td></td>
<td>- develop case study</td>
<td></td>
</tr>
</tbody>
</table>
Construct validity is difficult in the case study tradition when the researcher uses biased judgment to collect data. To meet the standard of this test I must state exactly what is being studied and demonstrate that the measures being used reflect what is being studied (Yin, 2003). In this case study multiple sources of data were used and participants were given the opportunity to review transcriptions and drafts of the report.

Internal validity is only used with causal case studies (Yin, 2003). Internal validity looks at the relationship between variables (Lincoln & Guba, 1985). For this case study, I looked for patterns in the data that was collected and used this information to support the development of the themes.

External validity “deals with the problem of knowing whether a study’s findings are generalizable beyond the immediate case study” (Yin, 2003, p. 37). Because of the specific professional development training that was involved in this study and the specific site that was involved, the results of this case study would only be generalizable to like situations. Reliability is if given
the same circumstances, to what extent the research can be repeated (Bassey, 1999). This case study is considered reliable because if this study was repeated within the same circumstances, the results should be the same.

**Trustworthiness**

In qualitative research, a variety of verification procedures are used to establish trustworthiness and to guarantee credibility and dependability of the study (Lincoln & Guba, 1985; Merriam, 1988; Merriam, 1997). In this study, the data was verified using, 1) triangulation, 2) member checking, 3) peer review and 4) audit trail. This took place mainly during the data analysis of the research to establish trustworthiness to the findings (Lincoln & Guba, 1985; Merriam, 1988; Merriam, 1997).

**Triangulation**

"Triangulation of data is crucially important in naturalistic studies" (Lincoln & Guba, 1985, p. 283). Triangulation is the process of using multiple data sources to validate the findings (Creswell, 2007). This process involves using data from various sources to support a theme or viewpoint. For this study, the data sources included 1) focus group interview, 2) individual interviews, 3) e-
mailed follow-up and clarifying questions and 4) the reviewed curriculum guides and math overviews. All of these sources of data were used to increase the accuracy of the findings. One source of information should not be used unless it is triangulated with other sources (Lincoln & Guba, 1985).

**Member Checking**

Member checking is the process of having participants review the data and findings to check for accuracy and make sure their thoughts were accurately portrayed (Lincoln & Guba, 1985). This is considered one of the most critical techniques for establishing credibility of the findings (Lincoln & Guba, 1985). In this study, the participants were asked to review the transcripts and findings and to let I know if they believed the findings accurately represented their beliefs. None of the participants made corrections to the transcriptions or findings.

**Peer Debriefing**

Peer debriefing is the process of having a peer who is not connected to the study review and provided honest feedback along the way (Lincoln & Guba, 1985). This study
was peer debriefed by colleagues and committee members who reviewed the material and findings as the study progressed. Peer debriefing provided an outsiders view of the study and helped me review the study from multiple points of view. The peers reviewed the study, asked questions about the study, and offered suggestions for improvement. The dissertation committee reviewed the study periodically and provided feedback and guidance to me.

Audit Trail

Audit trail is the process of keeping and later reviewing accurate and organized records of the study. Lincoln and Guba (1985) recommend using an audit trail to enhance the credibility of a research study. All data, including notes, tape recorded interviews transcripts of interviews, math unit overviews, and all correspondence were kept. These documents are considered the audit trail and were maintained to increase the accuracy of data and findings.

Transferability

Lincoln and Guba (1985) findings of a study may or may not be applicable in other contexts. "The degree of transferability is a direct function of the similarity
between the two contexts” (Lincoln & Guba, 1985, p. 124). A case study provides information about the study and context through rich descriptions. If the context of the study is considered congruent to another context, then the hypotheses may be applicable. This study is only transferable to like settings and circumstances. Because of the specific nature of this study, it is only transferable to the same situation.

Ethical Considerations

Ethical considerations were made to protect the participants in the study. Institutional Review Board (IRB) approval was obtained (protocol number: X080616001). A copy of the IRB approval is attached in appendix A. An initial focus group interview was conducted with all five participants and audio recorded. Then individual interviews were conducted with each participant and audio recorded to assist with accurate transcriptions. The tapes, transcripts, lesson plans, and reflective journals were placed under lock and file in a secure location only known to me. Participants were identified only by pseudonyms that they provided. There was no identifiable information about person or specific location of any participant; however because of the focus group interview, all of the
participants know the identity of the other participants in the study.

The participants were informed of the study content and informed that the information collected by me would be used in a dissertation for the University of Alabama at Birmingham (UAB). The participants were also informed that if the study was at some time to be published, they would be notified. The participants were informed that they were free to withdraw from the research at any time without harming the relationship with me or UAB.

Role of the Researcher

I was a math coach employed in the district where the study took place when the teachers attended their trainings and is currently an assistant principal within the same district. I was a math coach for two years and worked to help teachers implement the practices that they learned during their Mobile Math Initiative Training. I was also the co-presenter for the teachers ten day Kindergarten MMI training and the site facilitator for the ten day first grade training and three day follow up training.

I believe that this professional development training offers teaching strategies that teachers at a range of experience levels can implement in their classrooms to help
improve their math. I also strongly believe that math should be taught in a manner that helps children construct meaningful understandings of the content. I believe that teachers must strive to help students become efficient, flexible and fluent with their math facts, and students must understand math content and not just memorize a collection of rules and algorithms.

I believe that many elementary teachers lack a strong understanding of math themselves which in turn influenced their teaching. I believe that the adult math section of the professional development training would be the element that the teachers found to be the least beneficial. I had no other preconceived ideas of what the study would reveal.

Description of Research Settings

This study took place in Central City Schools school district. The district is composed of ten elementary schools (kindergarten-5th grade), three middle schools (6th-8th grade), two high schools (9th-12th grades) and one alternative school. The district has around 12,500 students in grades Kindergarten through twelfth grade. Approximately 15% of the students qualify for the free or reduced lunch program. Thirty-five percent of the teachers teaching for Central City Schools have their Bachelor’s degree, 56% have
their Master’s degree and 9% have a sixth year certificate or a Doctorate level degree (Alabama Department of Education, 2009).

This study involved teachers from three of the elementary schools in Central city schools, East Side Elementary, Riverside Elementary and ABC Elementary School. Figure 6 provides an overview of each sites size and demographics.

**Figure 6: Site Demographics**

<table>
<thead>
<tr>
<th>School</th>
<th>Size</th>
<th>Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Side Elementary</td>
<td>550 students</td>
<td>67% Caucasian</td>
</tr>
<tr>
<td></td>
<td>40 teachers</td>
<td>13% African American</td>
</tr>
<tr>
<td></td>
<td>13 support staff</td>
<td>16% Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4% Asian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22% poverty</td>
</tr>
<tr>
<td>Riverside Elementary</td>
<td>750 students</td>
<td>68% Caucasian</td>
</tr>
<tr>
<td></td>
<td>50 teachers</td>
<td>17% African American</td>
</tr>
<tr>
<td></td>
<td>18 support staff</td>
<td>2% Hispanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13% Asian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-6% poverty</td>
</tr>
<tr>
<td>ABC School</td>
<td>480 students</td>
<td>62% Caucasian</td>
</tr>
</tbody>
</table>
Site A- East Side Elementary

Nora and Sarah both teach at East Side Elementary School. East Side Elementary is a diverse school. There are just over 550 students at East Side Elementary. Sixty-seven percent of the student population are Caucasian, 13% are African American, 16% are Hispanic and 4% are Asian. Twenty-two percent of the students qualify for the free or reduced lunch program. There are roughly 40 teachers and 13 support staff on the faculty. Thirty-seven percent of the faculty have a Bachelor’s degree in education, 54% have a Master’s degree and 9% have sixth year certificate or a Doctorate level degree.

Site B- Riverside Elementary

Two of the study participants are teachers at Riverside Elementary, Katie and Suzie. Riverside Elementary School is located in Central City School District.
Riverside is a fairly new school built in the late 1990’s. The school has approximately 750 students enrolled. Of these 750 students between 5 and 6 percent of the school qualify for free or reduced lunch program. Sixty-eight percent of the student population are Caucasian, 17% are African American, 2% are Hispanic and 13% are Asian. There are roughly 50 teachers and 18 support staff on the faculty. Thirty-seven percent of the faculty have a Bachelor’s degree in education, 57% have a Master’s degree and 6% have sixth year certificate or a Doctorate level degree.

Site C- ABC Elementary

Megan teaches at ABC Elementary School. ABC Elementary has approximately 480 students. Roughly 33% of the student body qualify for free and reduced lunch. The demographic break down of ABC Elementary school is 62% Caucasian, 18% African American, 16% Hispanic and 4% Asian. There are roughly 40 teachers and 13 support staff on the faculty. Thirty-nine percent of the faculty have a Bachelor’s degree in education, 57% have a Master’s degree and 4% have sixth year certificate or a Doctorate level degree.
Description of the Participants

There were five teachers from the three different schools that participated in this study. All of the teachers attended the math initiative training and have been implementing the strategies for at least 8 months. Figure 7 provides an overview of each participant, the school where they teach, years teaching, grade currently teaching and their favorite thing about teaching.

Figure 7: Participant Information

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
<th>Years teaching</th>
<th>Grade teaching</th>
<th>Favorite thing about teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katie</td>
<td>Riverside</td>
<td>5 years</td>
<td>K</td>
<td>Watching the children grow and watching them learn to think</td>
</tr>
<tr>
<td>Megan</td>
<td>ABC School</td>
<td>2 ½ years</td>
<td>K</td>
<td>Watching how my kindergarten kids grow and become so independent throughout the year</td>
</tr>
<tr>
<td>Nora</td>
<td>East Side</td>
<td>19 years</td>
<td>1st</td>
<td>the excitement the children have about</td>
</tr>
<tr>
<td>Teacher</td>
<td>School</td>
<td>Years</td>
<td>Grade</td>
<td>Favorite Part</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>Sarah</td>
<td>East Side</td>
<td>10</td>
<td>K</td>
<td>Engaging children in new things, watching them learn and be excited about new things</td>
</tr>
<tr>
<td>Suzie</td>
<td>Riverside</td>
<td>4</td>
<td>K</td>
<td>Definitely the ongoing interaction with young children. Kindergarten is an amazing year for both a teacher and child. It is very rewarding to be a part of building a child's foundation for education</td>
</tr>
</tbody>
</table>

**Participant A - Katie**

Katie is a teacher at Riverside Elementary School. She has been teaching for five years. She taught at East Side Elementary School for 3 years and then took seven years off to stay at home with her two children and taught 4 year old kindergarten. She is completing her second year at Riverside Elementary School. Katie has taught Kindergarten each year and attended the ten day kindergarten training before returning to the classroom at Riverside Elementary School. Katie is currently working on her Master’s in
Education in Literacy. Katie’s favorite subject to teach is mathematics, “I love when you can see them get it. I love the ah-ha moments”. When sharing how she feels about attending professional development, she stated, “Usually positive if it is not too long but lately I feel like we are spread too thin. I think we should pick one or two areas and work on them instead of trying to become an expert in everything”.

Participant B- Megan

Meagan is a Kindergarten teacher at ABC School. She has been teaching for two and a half years and has her Master’s in Education. Her favorite thing about teaching is “Watching how my kindergarten kids grow and become so independent throughout the year.” Her favorite subject to teach is science, but when teaching mathematics, she likes “being able to use manipulatives, play games and use number talks to teach math concepts.” When sharing how she feels about attending professional development, she stated, “I feel I am still learning so much about the way I teach and constantly try to improve so I enjoy attending professional development trainings.”
Participant C- Nora

Nora is a teacher at East Side Elementary School. She teaches 1st grade and has been teaching for 19 years. Nora has been at East Side teaching 1st grade for 3 years. Her highest degree is an educational specialist (Ed. S). Nora’s favorite thing about teaching is, “the excitement the children have about learning.” Her favorite subject to teach is reading and her favorite thing about teaching mathematics is, “I love posing a problem and watching the children as they try and figure it out and then listening to them explain their thinking.” When asked to share how she feels about attending professional development trainings she noted, “I like to attend training that I choose and that I feel will help me become better at my practice. I don't like to waste my time.”

Participant D- Sarah

Sarah has been teaching for ten years. She has been teaching at her current school for two years and currently teaches Kindergarten. She has a Bachelor’s degree in Education and her favorite thing about teaching is “Engaging children in new things, watching them learn and be excited about new things.” Sarah enjoys teaching all subjects. Her favorite part about teaching mathematics is,
"I love ‘when the penny drops’ and something makes sense for them. I love the sense of accomplishment they get from being able to explain their thinking, and being confident enough to ask questions and wonder about things. I love when they start making connections and thinking logically."

When sharing how she feels about attending professional development, she said, “I love to teach but I also love to learn.”

**Participant E- Suzie**

Suzie is a Kindergarten teacher at Riverside Elementary School. She has been teaching at Riverside Elementary for 4 years. She has her Master’s in Education. Her favorite thing about teaching is, “Definitely the ongoing interaction with young children. Kindergarten is an amazing year for both a teacher and child. It is very rewarding to be a part of building a child's foundation for education.” She loves to teach reading and math, “especially combining the two.” Suzie enjoys the hands on minds on aspect of mathematics. She loves to hear children explain their thinking. When asked how she feels about attending professional development trainings, she commented, “I have found them to be beneficial in many ways. It keeps educators informed about what is most
efficient and effective in the classroom. It also keeps up our momentum and excitement about teaching. This does not always apply to all professional development workshops. Overall, MMI was beneficial to me as an educator!"
CHAPTER 4: FINDINGS

This chapter describes the themes and sub themes that were identified from the data analysis. Data analysis consisted of organizing the data and identifying common themes within the data (Creswell, 2007). The themes and codes were then represented in charts, tables and discussions (Hatch, 2002). Data analysis was a crucial way to process the data that was collected so that what the researcher learned can be conveyed to others. This chapter will describe the findings of the study.

Themes

Through the data collected, four themes were indentified. The themes were 1) purpose of math 2) resources 3) coaching and 4) team support. The resources theme had the sub-themes of materials, and wiki. Team support had two sub themes, planning and team. The themes and sub themes were evident in a variety of data sources.

The following figure shows the themes and some of the supporting data.
## Figure 8: Themes, Sub Themes and Data

<table>
<thead>
<tr>
<th>Theme</th>
<th>Code</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resources</strong></td>
<td></td>
<td>MORGAN- I enjoyed the binder with all of the stuff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SARAH- I love the materials, I really like the games</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MORGAN- just having new ideas and having access to more things. If you don’t have it you can’t use it (what helped you make changes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SARAH- Books, professional books</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KATIE- I wish that we could have them more- it is a great resources (coaching)</td>
</tr>
<tr>
<td><strong>Wiki</strong></td>
<td></td>
<td>SUZIE- we always use the wiki to make sure we are doing what we are suppose to be doing and make sure we are not behind</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KATIE- I love the wiki</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NORA- we have a better direction especially with the math wiki</td>
</tr>
<tr>
<td><strong>Team</strong></td>
<td></td>
<td>SUZIE- the other people on my team were there with me and we can talk about what are you doing right now, and remember when we did this what did they mean</td>
</tr>
<tr>
<td><strong>Support</strong></td>
<td></td>
<td>KATIE- we all the time throw ideas off of each other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SUZIE- Having people to do it with and helping to be on the same page helped me make changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NORA- The team has more of a common language we talk more about math than we ever did before</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KATIE- we would each plan a lesson and the swap and we could say I tried this and this worked and I tried this let me know what works in your class</td>
</tr>
</tbody>
</table>
| Planning | Suzie- sharing there is a lot more sharing going on team wise It has increased since the training we are all on the same page and all going in the same direction and we are all trying to achieve that same thing. We also are more aware of our objective and we let the kids know this is what we are going to learn and let’s get on with it
|          | NORA- it made us come together as a team
| Purpose  | KATIE- when I taught before I had bits and pieces but I did not have the year laid out but now I feel comfortable that I covered what I need to cover I really like having the pacing guide
| Purpose of mathematics | KATIE- I never did a whole unit on patterns or any math topic. I would my unit and add math in rather than teach a unit of math does that make sense? The theme more drove the math than the math driving the math
| Purpose of mathematics | SUZIE- children guide the instruction more than I would have allowed in the past
| Purpose of mathematics | SUZIE- now I think more about why I’m doing it and before I was just desperate to do something. MMI helped me to think more why are we doing what we are doing and how will it help them build what they need later down the road
| Purpose of mathematics | NORA- we have a better direction especially with the math wiki
| Purpose of mathematics | MORGAN- I reflect a lot more on how it what did they get it do I need to teach more whereas before I thought I’ve covered it I can go on I was not thinking about each lesson now I think about each lesson and where I am going and what the children understand
| Purpose of mathematics | SARAH- sharing there is a lot more sharing going on team wise It has increased since the training we are all
on the same page and all going in the same direction and we are all trying to achieve that same thing we also are more aware of our objective and we let the kids know this is what we are going to learn and let’s get on with it

Sarah- Fluency is something we never did before and to think it is such a foundation for math why did we never do that before? Now I feel that when my kids are adding or 1 to 1 they know how many 4 is or 5 is it is practical and logical

<table>
<thead>
<tr>
<th>Coaching Professional mentor</th>
<th>NORA- Having the person and the debriefing about the lesson was very powerful</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KATIE- when the coach will come and model a lesson with my class and I can watch and listen my kids- when I’m not thinking what I’m going to say next it is neat to be behind the class and watch someone else teach it</td>
</tr>
<tr>
<td></td>
<td>SUZIE- having the coach come in and shares a lesson that I might not have thought about- I wish we could have more of that</td>
</tr>
<tr>
<td></td>
<td>SUZIE- I wish the coach was more accessible like come here every Monday and there Tues and we could know what to expect</td>
</tr>
<tr>
<td></td>
<td>Sarah- I just need to take more advantage</td>
</tr>
<tr>
<td></td>
<td>NORA- I’ve had her come in a few time and especially if I have a problem getting them to move on and she will come in and they get it and I think why couldn’t I do that</td>
</tr>
<tr>
<td></td>
<td>KATIE- I wish that we could have them more it is a great resources (coaching)</td>
</tr>
<tr>
<td></td>
<td>KATIE- I think they are different at different schools because I think the administration pushes what they do</td>
</tr>
</tbody>
</table>

Each of the themes and sub themes will be further explored individually in the following sections.
Theme 1: Purpose of Mathematics

After attending the professional development course, the participants realized when teaching math, they need to consider the purpose of the lesson. The participants also began to think about how what they are teaching in their grade level will be built on in future grades. These new ideas have changed the way the teachers approach planning and how they have chosen the lessons they teach. The participants now think more about the how, what, and why they are teaching each lesson. The training helped the teachers better understand the purpose of the math they teach.

The participants no longer see math as a collection of activities, but the building blocks for future math. The participants now teach mathematics units providing a variety of experiences surrounding a mathematical idea or concept. The teachers no longer jump around in math instruction but rather create experiences that will help the children construct mathematical knowledge. The participants all noted that they are much more thoughtful and reflective about the math they teach and more aware of what their students understand.

Math has a purpose and is built on from one area to the next. The participants now consider what the students
understand and consider this as they plan their mathematics instruction.

The professional development course helped the participants realize when teaching math, they must consider the purpose of the lesson. The participants also realized that they must think about how what they are teaching in their grade level will be built on by what is taught in future grades. This knowledge has changed the way the teachers approach their planning and how they chose the activities they will teach. Suzie said, "Now I think more about why I’m doing it and before I was just desperate to do something. MMI helped me to think more why are we doing what we are doing and how will it help them build what they need later down the road." She went on to say “I think about this in math, but it has flowed over to how I think about what I’m doing in all of the subjects. I constantly think why I am I doing this? What is my real purpose?"

The participants learned during their training that mathematics is not just a collecting of activities, but is the building blocks for future math. When they are teaching patterns in Kindergarten, they are laying the foundation for algebra in later grades. Megan commented, "I just thought patterns were fun and easy. I never realized how
they connect to algebra. I am much more thoughtful when I teach patterns now”.

Prior to the MMI training, the teacher noted how they would jump around in math. They would teach numbers one day and then patterns the next day followed by some geometry. They did not think that it mattered about the math content strand, but rather made their math activities fit their classroom theme. Now the teachers are more focused on teaching math content strands together, focusing their math time on one major idea at a time. Katie said, “I never did a whole unit on patterns or any math topic. I would teach my unit and add math in rather than teach a unit of math does that make sense? The theme more drove the math than the math driving the math. Now I plan units of math content. I feel like I use to jump around more and now I’m more focused”.

The teachers now stop and think about what they want their students to learn and not just what activities they want to teach. Math has more of a purpose than prior to the training. Morgan remarked, “I reflect a lot more on how it went, did they get it, do I need to teach more? Whereas before I thought I’ve covered it I can go on. I was not thinking about each lesson, now I think about each lesson and where I am going and what the children understand.”
Nora noted, “Now we have a better direction.” The teachers reflect on student understanding and what the purposes of their lessons are. In turn, this has influenced their instructional practices and changed their focus for math instruction.

**Theme 2: Resources**

As part of their participation in the MMI training, the participants received many resources. They received a resource binder with a wide range of resources ranging from professional articles to student activities and a set of manipulatives for their classroom. The manipulatives includes multilink cubes, dice, cards, geometric solids, dominos and much more. The teachers were also given access to an elementary mathematics wiki. The wiki is a private site that the teachers must request access to. The monthly teaching guides, games, data collection ideas, weekly overview and assessments are all posted on the wiki for the teachers to access.

The participants found these resources to be very beneficial as they made changes in their classroom practices. They also mentioned that just having the manipulatives is not what has made the most change, but being taught how to use the manipulatives. Some of the
participants commented on how they now know what to do with the materials in their classroom.

The teachers were also given access to an elementary mathematics wiki. The wiki is a private site that the teachers must request access to. It is broken down by grade level so the kindergarten teachers have a section for all of their ideas, and 1st grade with all of their ideas. The monthly guides, games, data collection ideas, weekly overview and assessments are posted. The wiki also gives them a glance into other classrooms through photo slide shows. They can see how teachers have things arranged and what they are displaying in their room. Suzie said that since she is a visual person, just seeing the pictures of the other classrooms gives her new ideas for her classroom. These specific resources are the sub themes for the resource theme, Resources and wiki.

The teachers found these resources to be very beneficial as they made changes in their classroom practices. Morgan mentioned, “Just having new ideas and having access to more things is helpful. If you don’t have it you can’t use it.” She also noted, “I enjoyed the binder with all of the stuff.”

The teachers all shared how valuable being provided the needed manipulatives for them to teach math has
impacted how and what they are teaching. They also mentioned that just having the manipulatives is not what has made the most change, but being taught how to use the manipulatives. Some of the participants commented on how now they know what to do with all of the materials that they have been given. If they had just been given the materials, they are not sure if they would have used them as effectively. Sarah said, “We got tons of manipulatives and the training taught us how to use them too. I never had all of the materials to teach many of the lessons in our series and now I do and I can use them”.

Each month a monthly planning guide was added to the math wiki for each grade level. The guide included an overview of the math unit that was to be taught, the big ideas they were teaching, a description of individual lessons, ways to differentiate the lesson, math game recommendations and copies of several games, and other resources. The participants explained that it was these guides that helped keep them from drowning during the year and helped keep them focused. The guides also helped keep all of the teachers close to the same lessons at the same time which helped because they could talk to their team members about how a lesson went and what they might want to try differently. Katie noted, “The guides were so huge. It
wasn’t just use this book, but use this book and these lessons, here is a summary and here are the lessons to use and additional resources. That helped with my planning and just knowing what to do”.

The wiki has helped with planning and has given all of the teachers in the district common information. Nora said, “We have a better direction especially with the math wiki.” Katie commented, “I love the wiki.” Suzie stated, “We always use the wiki to make sure we are doing what we are suppose to be doing what we are suppose to be doing and make sure we are not behind.”

Theme 3: Coaching

After attending the training, each school had access to two fourth time math coaches. One coach was for kindergarten through second grade teachers and the other for third through fifth grade teachers. Each school also had a half time technology coach and a full time reading coach. The coaches help the teachers in a variety of ways such as helping plan lessons, co teaching or modeling lessons. During the interviews with the participants, all talked about the value of having coaching support. The participants believed that the coaching support was one of the most valuable elements helping them implement new ideas.
into their classroom practices. Katie stated, “When the coach will come and model a lesson with my class and I can watch and listen my kids-- when I’m not thinking what I’m going to say next it is neat to be behind the class and watch someone else teach.” Suzie also shared, “having the coach come in and share a lesson that I might not have thought about- I wish we could have more of that.”

The participants also believed like this is a resource that would be beneficial to have more access to. Having a math coach that is shared among four schools limits the amount of time that the teachers have access to them. However, they all want more time with the coach. Katie commented, “I wish that we could have them (the math coaches) more. It is a great resource.” Suzie also mentioned it would be helpful if there was more of a set schedule for the coaches to be scheduled at each school. “I wish the coach was more accessible like come here every Monday and there Tues and we could know what to expect.”

Theme 4: Team Support

The final theme that was discovered is the importance of team training. The teachers discussed how valuable it was to have this shared experience with their teammates. The teams grew together as they learned new teaching
strategies, tried the new strategies, and shared with each other. The teams planned more together and shared success and failures with each other. Katie said, “We bounced ideas off each other and we would plan activities and swap them around to get new ideas. It was nice to be able to say where are you and how is this going with your kids. “

To participate in the training, each school must have at least eighty percent participation. The schools involved in this study were participating in their second round of training meaning that the teachers who participated in the training were all hired in the three years since the school’s first started training. Because of teacher turnover, none of the participants were the only teachers from their school to attend the training.

The teachers spent the last two days of the ten day training working as a team and with their coach to plan for the beginning of the school year. The teachers are required to meet as a grade level team with their math coach for at least 1 hour a month to work on planning and looking at student work samples. The participants all commented on how coming together as a team and knowing that everyone was trying the same thing was very beneficial. They believed that the training helped them come together as a team and made implementation less stressful. Katie said, “Being able
to go to my team and say how did this lesson go for you” and Nora added, “I feel like without my team and planning together I would have been lost, it made us come together as a team”. Working together with their teams has helped the participants have an extra level of support. Suzie stated, “Having people to do it with and helping to be on the same page helped me make changes.” Katie also stated, “I think 3 minds are better than 1. I could not remember all of the ideas that were shared and between the 3 of us one usually remembered how to play the game or different ideas that were suggested.” Nora agreed stating,

It helped having a team mate go through the training with me because we had common language and could talk about what we learned and were trying to implement. We brainstormed with each other throughout the year about things that worked, didn't work, how we could tweak an activity to make it work for our classes, and how we could differentiate activities.

Being comfortable with your peers and having a shared experience has helped the participants make changes in their teaching practices.

Training as a team also helped the teacher form a common bond and develop deeper relationships with each other. One participant stated, “I was new, so this really helped me get to know some of my team before we started the year.” Nora affirmed,
Training did help us get to know each other better. Just being in the same room for that length of time. Because we had this training in common, it helped us to find other areas where we were so much alike! We stepped outside the math box and also worked on writing together this year.

Attending the training with a colleague helped as the teachers returned to their school and began to make changes. Suzie commented, “When the coaches are not here we ask each other and help each other.”

Summary

Through the analysis of the data collected, I learned that after the training, all of the teachers were excited to teach mathematics and they found that in turn, their students were excited to learn about math. The teachers commented on how their students had fun in math and how they wished they had learned math in this way.

The teachers indicated that they now understand how math in kindergarten and 1st grade lays the foundation for math in future grades. They realize that there is a true purpose for what they are teaching. Math should not be a disjointed collection of cute and fun activities that match a random unit of study, but rather a collection of meaningful and engaging lessons where the students are able to construct new ideas and are provided opportunities to
explain their thinking to others. The teachers now ask themselves before they teach a lesson, what is the purpose? This question now helps drive their instruction.

The resources that the teachers now have access to has helped them implement the new techniques into their classroom. The teachers have all of the needed manipulatives and know how to use them. They also received a monthly planning guide to help them plan and have access to a wiki for more resources and support. The teachers have access to a math coach for support and because they were trained as a team, they have their other teacher team mates to share ideas with on a regular basis. Attending the training with school level peer has helped greatly as they implement new ideas into their classroom practices. The always have a peer to ask questions and share ideas.
CHAPTER 5: DISCUSSION

Professional development is intended to improve, enhance or transform teaching practices. I set out to learn how kindergarten and first grade teachers in the southeastern United States used the Mobile Math Initiative (MMI) professional development to improve classroom instruction.

The central focus for this study sought to answer the research questions: How do teachers describe their perceptions of how they implement what they learned from professional math development into their teaching practices? There were two sub questions:

1. What elements of the professional development do teachers describe as being the most beneficial in helping them make changes in their teaching practices?
2. How do the teachers describe how the changes in their teaching practices have influenced their students’ mathematical understanding?
Major Findings

Previous researchers have indicated the importance of ongoing professional development on classroom change (Cooley, 1997; Garet, et al, 2001; Guskey, 1986; Guskey, 2000; Hollins, 2006; Joyce & Showers, 1995; Joyce & Showers, 2002; McDiarmid, David, Kannapel, Corcoran & Coe, 1997). One day conferences may offer some good ideas, but it takes ongoing intensive professional development to make a lasting impact on instructional practices (Cooley, 1997; Guskey, 2000; Guskey & Huberman, 1995; Joyce & Showers, 1995; Loucks-Horsley, Harding, Arbuckle, Murray, Dubea & Williams, 1987; McDiarmid, David, Kannapel, Corcoran & Coe, 1997; National Commission on Teaching and America’s Future, 1996; Sweeney, 2004). Teachers need the opportunity to try out their new ideas in a safe environment and receive feedback about the new practice. It takes time to fine tune new practices and make the new ideas a part of daily practice. I found that the depth of this professional development with ongoing support helped teachers make instructional changes.

Results of one study indicated that if we want to use professional development to improve teaching, “we need to invest in activities that have the characteristics that
research shows foster improvements in teaching” (Garet, et al, 2001, p. 937). One of the key elements of successful professional development is ongoing professional development. This researcher has also found that the ongoing nature of the professional development has influenced teaching practices and has helped teachers to refine their teaching practices in mathematics.

A study by Hollins (2006) that looked at changing instructional practices in literature found that, “By the middle of the second year, the way the teachers as a community talked about the students reflected dramatic changes in the teachers’ beliefs and practices” (Hollins, 2006, p. 51). In this study, teachers entering the second year of implementation were more comfortable and confident about teaching math and more prepared to meet the students’ needs than during the first year of implementation.

There is a wealth of literature and research surrounding professional development. Previous researchers have found that for professional development to bring about lasting change in classroom practices it must be ongoing and provide support for the teachers (Cooley, 1997; Garet, Porter, Desimone, Birman & Yoon, 2001; Guskey, 1986; Guskey, 2000; Hollins, 2006; Joyce & Showers, 1995; Joyce &
Showers, 2002; McDiarmid, David, Kannapel, Corcoran & Coe, 1997). This study found similar results.

So what can we learn from this study that we did not previously know? The answer is team support and using wikis for common source of resources and support.

All five of the participants in this study referred to how helpful it was to have their team trained with them. Having a common experience helped to bond the team together and gave them constant and consistent support. The idea of having teams attend trainings together has not been explored in past research or literature.

Suzie commented, “I wish the coach was more accessible.” She went on to share, “When the coaches are not here we ask each other and help each other”. Sarah commented, “There are things that you forget and to be able to go to your team member and say, just remind me about (anything)… was great.”

For many professional development trainings, one or two teachers from a team are able to attend and then are asked to share what they learned with their team. The participants enjoyed going to these training and sharing their ideas, but they believed like being trained as a team gave them all a common experience to talk about and review with each other. Now they all had a common math language by
which they could discuss problems and issues around the new math initiative.

Because of this shared experience, the teachers believed that when they left the ten day training, they were closer to their colleagues than they had been. They also believed that having a common language to talk about mathematics helped them plan more effectively together and share more about how their math lessons proceeded for them and the children in their classrooms. Sarah said, “There is a consistence there within the team and parents don’t pitch one teacher against another. We are doing the same things, a little different but the same content.” Just as Wiggins (2005) advocates for a shared experience for students at the beginning of a unit of study, the same applies to teachers and professional development.

Attending the training as a team created a means of reflection for the participants. All of the participants articulated about going to their team mates and talking about various math lessons they had taught or asking to be reminded about specific mathematics strategies they learned during the training. Reflection is essential to bringing about change in classroom practices and helps bind teaching theory to practice (Cruickshank, 1987; Grimmett, MacKinnon, Erickson & Rieckson, 1990; Tom, 1992).
Previous research indicated how important support is for bringing about change in classroom practice (Cooley, 1997; Garet, Porter, Desimone, Birman & Yoon, 2001; Guskey, 1986; Guskey, 2000; Hollins, 2006; Joyce & Showers, 1995; Joyce & Showers, 2002; McDiarmid, David, Kannapel, Corcoran & Coe, 1997). However, none of the support that is referred to includes using wikis to help support teachers. This study found that having the wiki as a resource and form of support had made tremendous difference for the participants. Nora mentioned, “We have better direction, especially with the wiki.” Morgan shared, “The wiki lets me know what is going on across the district. I feel like it is helping keep all of us on track.” Katie said, “I love the wiki. I am very visual and having classroom pictures on there helps me get to see how other teachers are doing things.”

The math wiki is a private Web site that the teachers must request membership to be able to access the information. Once the teachers have access to the wiki, they are able to review and print unit overviews, number talk problem suggestions, math games, monthly math calendars for home use and many more teaching resources. Some grade level wiki pages have classroom photos that allow teachers to have a glimpse into other classrooms.
The wiki site is updated and managed by a few specific organizers made up of math coaches, technology coaches and administrators within the school system. The wiki has helped connect the participants with teachers across the district. This has become a very valued resource for the participants and has served as a resource and a support as they have made changes to their classroom practices.

Recommendations

This research study documents how important ongoing professional development coupled with continuous support is to make instructional change. It takes time, support, discussion and reflection for teachers to become comfortable with the changes and to feel successful in implementing the new instructional techniques. One recommendation is to encourage professional development trainers to conduct sessions for teams or cohorts. The teachers in this study came together as a team and had each other for support as they made changes in their instructional practice. This was consistently mentioned by each participant as an advantage of MMI.

Having a common lexicon helped encourage and support conversations, reflection and lesson planning concerning mathematics. The team mates all spoke about how they helped
each other reflect about what they learned and how they are implementing new ideas into their classroom instruction. They offered specific examples such as when they have a question about a lesson or how to play a game, they can easily ask their team mates.

When teams are trained together, they return to their classrooms on virtually the same page as the rest of their team. This aspect of the training assisted the teachers in the study to build bonds and gave them support when talking to families about the similarities and differences about mathematics instruction from one class to the next.

Using wiki sites as an instructional strategy to assist teachers to connect across a school district has been extremely valuable. The participants all noted how they seemed to be in one accord with other teachers in the district. The online resource also gave the participants access to valuable information that has helped them as they have implemented new ideas into their classroom practice. Utilizing a wiki or another type of Website to connect teachers is important according to the participants in the study.

The wiki not only helped connect teachers, but also helped the teacher learn and use a new technology resource. Once the teachers are comfortable with the wiki technology,
it would be valuable to develop student wiki pages. Having a student wiki page would integrate technology and mathematics as well as be an enjoyable and exciting resource for the students to use. This would be another means to offer elementary math learners’ autonomous means to write, reflect, and deeply think about mathematics.

Implications for Future Research

There are numerous possibilities for future researchers to pursue following this study. Research that examines how team or cohort training helps sustained implementation would add to the body of research and provide a necessary piece that appears to be missing. It would be interesting and may help determine if districts should spend the money to send several teachers to the same type of training in content area instruction. Does training as a team impact implementation and impact sustainability of professional development?

Another area of future research is examining teachers longitudinally as they begin to implement instruction training in a content area such as mathematics after one year, two years and three years. How do teachers describe the ways in which they implement and change and develop over time? Do teachers continue to implement the teaching
strategies or do they revert back to previous teaching practices? Do they grow, develop, and further reflect to become more effective as mathematics teachers as third year implementation in a program? An additional suggestion for further research would involve looking at students' understandings before and after the teachers' training. Does professional development influence students' understanding and achievement? How do teachers implement professional development instruction lessons differ from early childhood education, elementary education and secondary education? How do children describe the ways in which they learn about mathematics? Do they enjoy math more this year than they did last year?

Research surrounding using wikis or other online resources to support professional development would be beneficial in helping districts determine how to best support teachers after attending professional development training would certainly add to the body of mathematics research. Technology is rapidly changing and there is a very thin body of research in this area of technology that examines whether it supports teacher change and if so how. Researching if using wikis as a student resource to support mathematics instruction at home and school strengthens
student understanding is another direction for future research.

Summary

There is a great deal of research available that looks at professional development. This study found many of the same results as previous studies on professional development. Professional development in mathematics should be ongoing and provide support to bring about change in classroom practices. However, this study also found that although having an instructional coach is important and extremely beneficial to helping teachers make changes, being trained as a team provides continuous support. Team training gives all of the teachers on a team a common experience and a common language. Common experience also helps teams to bond together and develop a comfort level and trust with each other that allows them to ask questions and share freely among their team.

Although this researcher found the importance of team support and using wikis as a resource, this is just a beginning. Much more research is needed in this area.
REFERENCES


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Chicago, IL: University of Chicago Press.


Appendixes
Appendix A IRB Approval
Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and expires on October 26, 2010. The Assurance number is FWA00005960.

Principal Investigator: SCHOLL, KARA L
Co-Investigator(s): IVANKOVA, NATALIYA V
Protocol Number: X080616001
Protocol Title: Professional Development: A case study of teachers’ use of Mobile Math Initiative

The IRB reviewed and approved the above named project on 7/17/08. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.
IRB Approval Date: 7-17-08
Date IRB Approval Issued: 7/17/08

Marilyn Doss, M.A.
Vice Chair of the Institutional Review Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.
Appendix B Project Amendment Form
1. Contact Information
Principal Investigator's Name: Kara L. Scholl, BlazerID: kscholl E-mail: kscholl@uab.edu
Contact Person's Name: same as above, BlazerID: E-mail: 
Telephone: 205-479-2576 Fax: 205-439-2801
Campus Address: 

2. Protocol Identification
Protocol Title: Professional Development: A Case study of teachers' use of Mobile Math Initiative
IRB Protocol Number: X080616001

Current Status of Project (check only one):
☐ Currently in Progress (Number of participants entered)
☒ Study has not yet begun (No participants entered)
☐ Closed to participant enrollment (remains active)—
Number of participants on therapy/intervention:
Number of participants in long-term follow-up only:
☐ Closed to participant enrollment (data analysis only)—
Total number of participants enrolled:

This submission changes the status of this study in the following manner (check all that apply):
☑ Protocol Revision 
☑ Revised Consent Form 
☐ Addendum (new) consent form 
☐ Enrollment temporarily suspended by sponsor 
☐ Change in protocol personnel 
☐ Other, (specify) 

3. Reason for change
Briefly describe, and explain the reason for, the change. If normal, healthy controls are included, describe in detail how this change will affect those participants.
Include a copy of the protocol and any other documents affected by this change (e.g., consent form, questionnaire) with all the changes highlighted.
This study is about how teachers are implementing what they learned during a professional development course into their classroom practices. The reason the researcher would like to revise the study is that this study began as a class project and the researcher would like to extend the research to her dissertation. The revised timeline for the study will be from January 2009-July 2009.
The researcher would like to add additional participants and include kindergarten and 1st grade teachers in the study. The researcher would also like to change the title of the study to Professional Development: A case study of how teachers implement professional development into their classroom practices. Finally the co-investigator will change to Dr. Jerry Alridge.

4. Does this change revise or add a genetic or storage of samples component? ☐Yes ☒No
If yes, please see the Guidebook to assist you in revising or preparing your submission, or call the IRB office at 934-3789.

5. Does the change affect subject participation (e.g., procedures, risks, costs, location of services, etc.)? ☐Yes ☒No
If yes, Fiscal Approval Process (FAP)-designated units complete a FAP submission and send to fap@uab.edu. For more on the UAB FAP, see www.uab.edu/ohr.
6. Does the change affect the consent document(s)?
   If yes, briefly discuss the changes.
   Include the revised consent document with the changes highlighted.
   Will any participants need to be reconsented as a result of the changes?
   If yes, when will participants be reconsented?

Signature of Principal Investigator: [Signature]
Date: 12/20/08

APPROVED
Marilyn Doss, M.A.
Vice Chair – IRB

[Signature]
10/30/08
Appendix C Participant Recruitment E-mail
Dear fellow teacher,

I am conducting a study as part of my requirements for my dissertation at UAB. The study will involve participation in a focus group and individual follow-up interviews about the Mobile Math Initiative.

If you are interested in participating, or have more questions, please contact me at kscholl@uab.edu or 205 478-2576.

I look forward to hearing from you!

Kara Scholl
Appendix D Focus Group Interview Protocol
Focus Group Protocol

Time of interview:
Date:
Location:
Interviewer:
Interviewee 1:
Interviewee 2:
Interviewee 3:
Interviewee 4:
Interviewee 5:

Introduction: I want to thank you for taking time to talk with me today. The purpose of this study will be to learn how teachers describe their perceptions of how they implement what they learned in professional development course into their teaching practices. I am audio taping as well as taking notes. The audio tapes will be transcribed in their entirety for review by the researcher. At the conclusion of the interview, I will ask you for a pseudonym that you would like to use to protect your identity. Please be assured that confidentiality will be maintained throughout this study and the reporting process.

Icebreakers:
Let’s start off by getting to know each other. I know some of you have gotten to know each other during the MMI training, but would you please take a few minutes to introduce yourselves. Please tell your name, where you teach and anything else you would like to share.

Q1-Please tell me about your experience with the MMI training?

Q2- Describe a typical math lesson prior to MMI.

Q3- Describe a typical math lesson after MMI
   Describe what types of changes you made in your instruction after attending the 10 day training.

Q4- What helped you to make changes in your instruction?

Q5- What elements of the MMI professional development do you feel were the most influential on your instruction?
Q6-What elements of MMI professional development do you feel were less influential on your instructional practices?

Q7- How has having a math coach influenced your math instruction?

Q8- How have the follow-up trainings influenced your instruction?

Q9- How have you changed the way you plan your math instruction?

Q10- How has MMI affected how you feel about teaching math?

Q11- Is there anything you would like to tell me?

Conclusion:

Thank you for your time. I would like to set up a time that is convenient for you to conduct a follow-up interview. May I call you or e-mail you in the next few weeks to set up this interview?

Again, I want to assure you that confidentiality will be maintained throughout the study and the reporting process. At this time what name would you like for me to use when I reference you in this study?

Pseudonyms:

Thank you.
Appendix E Individual Interview Protocol
Interview Protocol

Time of interview:

Date:

Location:

Interviewer:

Interviewee:

Q1- Please tell me about your experience with the MMI training?

Q2- What elements of your MMI training do you feel influenced you to change your math instruction?

Q3- What elements of MMI training do you feel were less influential on your instructional practices?

Q4- How has having a math coach influenced your math instruction?

Q5- How have the follow-up trainings influenced your instruction?

Q6- How has attending MMI and having a math coach changed the way that you plan your math instruction?

Q7- How has MMI affected how you feel about teaching math?

80- Is there anything you would like to tell me?

Conclusion:

Thank you for your time. May I meet you again or e-mail you in the next few weeks if I need to clarify anything? Again, I want to assure you that confidentiality will be maintained throughout the study and the reporting process.

Thank you.
Appendix F IRB Consent Form
Informed Consent Document

TITLE OF RESEARCH: Professional Development: A case study of how teachers implement professional development into their classroom practices

IRB PROTOCOL NUMBER: X080616001

INVESTIGATOR: Kara Scholl

SPONSOR: University of Alabama at Birmingham, Curriculum and Instruction Department

You are invited to participate in a research study on how Kindergarten and 1st grade teachers in central Alabama schools use professional development training to improve their classroom instruction.

Explanation of Procedures
This study will be conducted as part of a dissertation requirement at the University of Alabama at Birmingham. The purpose of this study is to determine how kindergarten and 1st grade teachers in central Alabama schools use professional development program to improve their classroom instruction. There will be a focus group interview in January that will take place at a time and convenient to all participants.

Risks and Discomforts
There are no known risks or discomforts associated with this study. However, there is a risk of breach of confidentiality from participating in a focus group.

Benefits
You may not benefit directly from taking part in this study. However, this study may help us better understand how teachers in central Alabama schools use professional development to improve their classroom instruction?

Confidentiality
As participant, you will be asked to self-select a pseudonym to protect your privacy. These pseudonyms will be used instead of your name when the investigator reports on the research. The research will only be discussed by parties directly involved in the study. The audio tapes will be for the sole

Page 1 of 3
Consent Form Professional Development
Version Date 12/22/2008
purpose of accurate data collection, and your responses will be strictly confidential. During the research process, a qualitative research instructor and students will be able to access this information but your name will never appear on any collected data to protect your anonymity. The information from the interview will be used for recording and analysis purposes. All data, including the audio tapes and handwritten notes, will be stored in a locked, metal file cabinet, and will be destroyed three years after the research is completed. In any publication related to this research, no information which could potentially identify any participants will be disclosed. The following groups will have access to private information that identifies you by name: the Office for Human Research Protections (OHRP), and the University of Alabama at Birmingham (UAB) Institutional Review Board (IRB). Because you will be participating in a group discussion with other participants, there is a chance that your responses may not be kept confidential. All participants will be reminded of the need to respect the privacy of the other participants.

Refusal or Withdrawal without Penalty

Your taking part in this study is your choice. There will be no penalty if you decide not to be in the study. You are free to withdraw from this research study at any time. Your choice to leave the study will not affect your relationship with this institution.

Cost of Participation

There will be no cost to you from taking part in this study

Payment for Participation

You will receive no payment for participation in this study.

Alternatives

Your alternative is to not participate in this study.

Questions

You have the right to have any of your questions answered prior to agreeing to participate or at any time during the study by contacting the following principal researcher: Kara Scholl (kscholl@uab.edu) (205) 478-2576. If you have questions about your rights as a research participant, or concerns or complaints about the research, you may contact Ms. Sheila Moore. Ms. Moore is the Director of the Office of the Institutional Review Board for Human Use (OIRB). Ms. Moore may be reached at (205)934-3789.
or 1-800-822-8816. If calling the toll-free number, press the option for "all other calls" or for an operator/attendant and ask for extension 4-3789. Regular hours for the Office of the IRB are 8:00 a.m. to 5:00 p.m. CT, Monday through Friday. You may also call this number in the event the research staff cannot be reached or you wish to talk to someone else.

**Legal Rights**

You are not waiving any of your legal rights by signing this informed consent document.

**Signatures**

Your signature below indicates that you agree to participate in this study. You will receive a copy of this signed document.

<table>
<thead>
<tr>
<th>Signature of Participant</th>
<th>Date</th>
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<tr>
<td>Signature of Investigator</td>
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<td>Signature of Witness</td>
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<td>Signature of person obtaining consent (if other than the investigator)</td>
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Appendix G Alabama Standards for effective Professional Development
ALABAMA STANDARDS FOR EFFECTIVE PROFESSIONAL DEVELOPMENT

The following list of Standards for Effective Professional Development were adopted by the Alabama State Board of Education on June 13, 2002. These state standards are embedded in the NCLB definition of professional development in Title IX, Section 9101 (34). They should be used as a guide in developing your LEA Professional Development Plan and implementing activities under that plan.

Standard 1: Effective professional development organizes adults into learning communities whose goals are aligned with those of the school, the district, and the state.

Standard 2: Effective professional development requires knowledgeable and skillful school and district leaders who actively participate in and guide continuous instructional improvement.

Standard 3: Effective professional development requires resources to support adult learning and collaboration.

Standard 4: Effective professional development uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement.

Standard 5: Effective professional development uses multiple sources of information to guide improvement and demonstrate its impact.

Standard 6: Effective professional development prepares educators to apply research to decision making.

Standard 7: Effective professional development uses learning strategies appropriate to the intended goal.

Standard 8: Effective professional development applies knowledge about human learning and change.

Standard 9: Effective professional development provides educators with the knowledge and skills to collaborate.

Standard 10: Effective professional development prepares educators to understand and appreciate all students, create safe, orderly and supportive learning environments, and hold high expectations for their academic achievement.

Standard 11: Effective professional development deepens educators’ content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately.

Standard 12: Effective professional development provides educators with knowledge and skills to involve families and other stakeholders appropriately.