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Exploring Teacher Perceptions of Influential Facilitators of Elementary Mathematics Professional Development: A Mixed Methods Investigation

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EXPLORING TEACHER PERCEPTIONS OF INFLUENTIAL FACILITATORS OF ELEMENTARY MATHEMATICS PROFESSIONAL DEVELOPMENT: A MIXED METHODS INVESTIGATION

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ABSTRACT

This dissertation examines the role of the facilitator in elementary mathematics professional development. An exploratory sequential mixed methods design was utilized to answer the central research question: How do United States elementary school teachers perceive an influential facilitator of elementary mathematics professional development (EMPD)? Phase one of this study explored teacher perceptions through a phenomenological design, which informed the second phase of the study, the implementation of a survey instrument to elementary school mathematics teachers on a larger scale. This dissertation is divided into six chapters. Chapter One presents a rationale for examining the role of the facilitator in professional development. Chapter Two builds on this rationale by synthesizing and discussing the current literature relating to professional development. Chapter Three examines the procedures used in each phase of the mixed methods research design. Within this examination are the specific sampling, data collection, and data analysis procedures that were used to investigate the central research question. Chapters Four and Five present the results of each phase of the research design and Chapter Six provides a discussion of these results with implications for future research.

DEDICATION

First and foremost, I dedicate this study to my husband Alley who has provided unending love and support during this ultimate test of endurance and perseverance. We have found the formula for navigating our way through the dissertation process and maintaining a healthy marriage: living in separate homes.

Second, I dedicate this study to my parents, Ron and Joann, who have instilled in me the confidence and passion to pursue my goals and the understanding that one's main pursuit should be to support family and friends. It is your compassion, integrity, and carefree attitude that I hope to carry with me as I move forward.

Third, I dedicate this study to my niece and nephew, Gianna and Santino, who have already shown their promise as researchers. Their inquisitive nature and unique approaches to problem solving rival any existing methodologies. It is this curiosity that revives my passion for finding the "truth".

Finally, I dedicate this study to the kindergarten through fifth grade teachers across the United States who continuously seek ways to improve their own practice and to help students to achieve in mathematics. You are the main consumers of professional development and deserve the opportunity to be heard. I left the elementary classroom to attempt to give you a voice and I hope this study is a step towards accomplishing that goal.

ACKNOWLEDGMENTS

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CHAPTER ONE

"Our biggest long-term problem is not how we teach now but that we have no way of

getting better" (Stigler & Hiebert, 1997, p. 19).

Increasing accountability for teachers and students calling for the need to improve

student achievement has been a common theme in elementary schools across the United

States (Smith & Gorard, 2007; USDOE, 2007; Usiskin & Dossey, 2004). It is evident

based on standardized test scores (Smith & Gorard, 2007; NRC, 2001), international

studies of student achievement and instructional practices (Jacobs, Hiebert, Givvin,

Hollingsworth, Garnier, & Wearne, 2006; Hiebert, Stigler, Jacobs, Givvin, Garnier,

Smith, Hollingsworth, Manaster, Wearne, & Gallimore, 2005; Stigler & Hiebert, 2004;

Ma, 1999), and current research on mathematics education (Guarino, Hamilton,

Lockwood, & Rathbun, 2006; Hill, Rowan, & Ball, 2005; Hill & Ball, 2004; CBSM,

2001) that K-12 students in the United States are not as prepared to meet the challenge of

scientific innovation when compared to students in other nations (Miller, Sen, & Malley,

2007; Jacobs, et al., 2006; OERI, 1997). In order for students to compete in a global

market, it is necessary to foster the development of mathematical proficiency beginning

in early childhood and continuing throughout their academic careers (NRC, 2001). This

growing concern to increase student achievement has resulted in a push for research on

teacher quality (Smith & Gorard, 2007; Hezel Associates, 2007; Darling-Hammond &

Hammerness, 2005; Borko, 2004). Recommendations based on this research have pointed

to the use of professional development as a means of improving teacher quality (Yoon,

Duncan, Lee, Scarloss, & Shapley, 2007; Anderson & Olsen, 2006; Torff, Sessions, & Byrnes, 2005; Steyn, 2005). This dissertation adds to the literature on professional development in elementary mathematics by focusing on the role of the facilitator in influencing teachers to be engaged in professional development experiences. In Chapter One, a rationale for studying the characteristics and traits of facilitators of professional development is discussed. This discussion is divided into five areas: (1) the perspectives relating to professional development in elementary mathematics, (2) the significance of this research, (3) the research questions examined in this study, (4) definitions of terms, and (5) the theoretical framework guiding this study.

<div align="center">Perspectives</div>

It is evident that many schools in the United States are currently unprepared to meet the visions and goals for mathematics instruction set forth by organizations such as the National Council of Teachers of Mathematics (NCTM, 2000) or the National Research Council (NRC, 2001). These visions call for a shift in beliefs about the nature of teaching and learning mathematics (Wilkins, 2008; Philipp, Ambrose, Lamb, Sowder, Schappelle, Sowder, Thanheiser, & Chauvot, 2007; Cady, Meier, & Lubinski, 2006; Ambrose, 2004) along with a need to increase teachers' level of pedagogical content knowledge in mathematics (Hill, Ball, & Schilling, 2008; Osana, LaCroix, Tucker, & Desrosiers, 2006; Davis & Simmit, 2006; Capraro, Capraro, Parker, Kulm, & Raulerson, 2005). This transformation in mathematics instruction can be described as a movement away from instructional practices focusing on the transmittal of rules and procedures and towards instructional practices that allow students to construct meaning and

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understanding about mathematics as a dynamic system of concepts (Romberg, Carpenter, & Dremock, 2005; Fraivillig, 2002; Cobb, Yackel, Wood, Wheatley, & Merkel 1988; Erlwanger, 1973; Brownell, 1947). For these changes to occur, teachers require extensive professional development experiences designed to critically examine current instructional practices. Researchers at the National Research Council (NRC, 2001) reiterated this need for professional development when stating, "If the United States is serious about improving students' mathematical learning, it has no choice but to invest in more effective and sustained opportunities for teachers to learn" (p. 12).

The NRC cited five areas of mathematics that should be exposed to children in order for them to become mathematically proficient (NRC, 2001). These five areas include: (1) conceptual understanding, or the comprehension of concepts, operations, and relations; (2) procedural fluency, or the ability to carry out procedures with ease; (3) strategic competence, or the ability to formulate, represent, and solve problems; (4) adaptive reasoning, which includes logical thought, reflection, explanation, and justification; and (5) productive disposition, requiring teachers to instill the belief in their students that mathematics is useful and worthwhile (NRC, 2001). When the NRC examined the results of the National Association of Educational Progress (NAEP) assessments in 1996 to determine if students in the United States are mathematically proficient in all of these strands, they found that, "they [the students] are most proficient in aspects of procedural fluency and less proficient in conceptual understanding, strategic competence, adaptive reasoning, and productive disposition" (2001, p. 136). This analysis, along with results from international assessments such as the Third International

Mathematics and Science Study (TIMSS) indicate that teachers are still using instructional practices that do not align with the goals of the reform movement (Hiebert, et al., 2005; Stigler & Hiebert, 2004; OERI, 1997; Stigler, Fernandez, & Yoshida, 1996). In fact, teachers can best be described as using the same strategies for teaching mathematics that they experienced as students. The NRC (2001) cites the report of National Advisory Committee on Mathematical Education (NACOME) when describing the lack of change in instructional practices during the 10-15 years prior to the report,

> The mathematics period is 43 minutes long, and about half of this time is written work. A single text is used in whole-class instruction. The text is followed fairly closely…Teachers are essentially teaching the same way they were taught in school (p. 49).

Goldin (1990) provided a rationale for teachers' use of traditional practices in mathematics instruction,

> Some teachers, often (but not always) those with the least mathematical preparation, see mathematics only as such a set of rules and procedures. Some are insecure with their own mathematical ability, and find reassurance in procedures and algorithms that can be implemented in a fairly mechanical but at least reliable way (p. 46).

These results can be interpreted in one of two ways; teachers are unclear about how to implement reform practices in mathematics classrooms or teachers do not believe reform practices will best meet the needs of their students. In either scenario, teachers are in need of professional development that problematizes their current instructional practices and that provides them with the tools to implement reform practices in mathematics

instruction (Loucks-Horsely, Hewson, Love, Mundry, & Stiles, 2003; Cobb, Wood, & Yackel, 1990).

The overwhelming consensus from researchers in mathematics education is that professional development experiences need to be ongoing and content focused (Kelleher, 2003; Smith, 2001; NRC, 2001; Carpenter, Fennema, Franke, Levi, & Empson, 1999). Current practices in professional development center on one-day workshops or inservice experiences (Mouza, 2006; Usiskin & Dossey, 2004; Smith, 2001). The majority of elementary school teachers in the United States do not receive a significant amount of professional development geared towards mathematics; in 2000, only 12% of fourth grade teachers received 16-35 hours of professional development in mathematics, while 7% received 36 or more hours during a single school year (Usiskin & Dossey, 2004; NRC, 2001). Boyle and Lamprianou's (2006) findings from a three-year longitudinal study of models of professional development indicate that only 10% of mathematics teachers in their sample participated in professional development lasting two days or longer.

Teachers are typically exposed to additive professional development sessions where new materials or techniques are added to an already existing set of instructional practices (NCES, 2006; Kelleher, 2003; Smith, 2001). These types of experiences have led teachers to become frustrated with the concept of professional development, seeing it as unnecessary and unrelated to everyday practice. Pellicer and Anderson (1995) recognize this frustration when discussing inservice education as something that is being done to teachers, not something that is done for teachers, "Because educators have long

been accustomed to operating staff development programs from a deficiency model, teachers quite naturally have associated negative feelings with inservice education" (p. 40). Sparks and Hirsch (1997) reiterate this concern about additive professional development when stating, "At its worst, staff development asks teachers to implement poorly understood innovations with little support and assistance; and before they are able to approach mastery, the school has moved on to another area" (p. 13).

Researchers (Desimone, Smith, & Ueno, 2006; Jacob & Lefgren, 2004; Kelleher, 2003; Smith, 2001) have voiced the need for professional development in mathematics to shift from an additive perspective to a transformative perspective. Transformative professional development attempts to change beliefs and alter instructional practices of educators. This type of professional development experience requires a large amount of commitment from all stakeholders. It requires the time and motivation of participants, the dependence on a knowledgeable and influential facilitator or group of facilitators, and support from organizational structures.

> Teachers' professional development should be high quality, sustained, and systematically designed and deployed to help all students develop mathematical proficiency. Schools should support, as a central part of teachers' work, engagement in sustained efforts to improve their mathematics instruction. This support requires the provision of time and resources (NRC, 2001, p. 12).

The current literature in mathematics education identifies the characteristics that are necessary for high-quality mathematics professional development to occur. An effective professional development model is ongoing and situated in practice (Desimone,

Smith, & Ueno, 2006; Loucks-Horsley, et al., 2003; Guskey, 2003), focused on

mathematical content (Weiss & Pasley, 2006; Smith, 2001; Ball & Cohen, 1996), has

student learning as the ultimate goal (Loucks-Horsley, et al., 2003; Smith, 2001), and

leads toward the development of a community of learners (Loucks-Horsley, et al., 2003;

NRC, 2001). While the literature relating to effective practices in mathematics

professional development is extensive, there is little focus on the role of the facilitator

during professional development experiences. Some characteristics of influential

facilitators are implied in the research on mathematics professional development. These

characteristics include the need for the facilitator to have an adequate level of

mathematical content knowledge to support teacher learning and the ability to

problematize the instructional practices of participants (Simon, 2000). However, the

specific characteristics that make an influential facilitator of professional development,

while examined in other areas (Fullan, 2006; Mouza, 2006; Jones, West, & Stevens,

2006; Sparks & Hirsch, 1997; Pellicer & Anderson, 1995; Garmston & Wellman, 1992),

has not been examined in the literature relating to elementary mathematics. This

dissertation attempts to add to the literature base by examining teacher perceptions of

influential facilitators of elementary mathematics professional development.

<center>Significance</center>

The impetus for this research is based on my own experience as a facilitator of

professional development in elementary mathematics. For the past three years I have

worked with teachers in South Carolina and New Jersey to improve instructional

practices through the use of a reform-based elementary mathematics curriculum. While

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being a facilitator, I have encountered many different reactions from participants during professional development sessions. There have been times when I felt confident in my role and times where I knew that I was ineffective in helping teachers transform their practice. Unfortunately, those times when I was ineffective, I was unaware of why teachers were not motivated to be engaged during professional development. The model of professional development was the same and I believe my approach was identical, but teachers in these settings were not influenced to change. More recently, another facilitator was sent to work with teachers that I had worked with in the past. These teachers asked the facilitator why I was not there, stating that they enjoyed watching the way I moved around the room. They told the facilitator that I was graceful in my approach to professional development. There was no mention of the content of the presentation or the activities they were asked to do. When determining whether a facilitator is influential, in essence, we are examining the characteristics of the facilitator that motivate teachers and enable them to learn from the professional development experience. If teachers are unmotivated during professional development, they are unlikely to gain anything from the experience. These teachers were engaged in professional development in part because of the way I moved around the room, something that I had not previously considered to be important. If we are to change instructional practices of elementary school teachers in order to improve student achievement in mathematics, it is necessary to acquire a full understanding of what teachers perceive are the characteristics of an influential facilitator of elementary mathematics professional development.

This research study adds to the literature base on professional development in elementary mathematics by providing insight for facilitators of professional development, such as myself, as to what we can do to influence teachers and support their learning during professional development experiences. In addition to providing insight for facilitators of professional development to improve practices, this research also provides information for developers of professional development models. Many times, developers will seek out and work with people in education who will become future facilitators of professional development. This process is typically labeled the "train the trainer" model. In my work as a facilitator of mathematics professional development, I have had the opportunity to work with potential facilitators. These potential facilitators were chosen based on their background in mathematics and in education, meaning that they had a relatively high level of mathematical content knowledge and had experience as an elementary school teacher. However, I quickly came to realize that some of these potential facilitators could not engage teachers during professional development sessions. By identifying what teachers perceive are the characteristics of influential facilitators of professional development, developers will be better equipped to find educators that will be influential facilitators. Finally, this research study provides information for administrators who are seeking to identify teacher leaders within the confines of a school or a district. Many times these teacher leaders will work with teachers through ongoing professional development to improve instructional practices. By helping administrators to develop a better understanding of the qualities teachers are seeking in facilitators of

professional development, they will be more likely to choose teacher leaders that will be influential in engaging teachers during professional development experiences.

Research Questions

The central research question guiding the focus of this study was: How do United States elementary school teachers perceive an influential facilitator of elementary mathematics professional development (EMPD)? This question was examined using a mixed method methodology with an exploratory sequential design. This type of research design begins with a qualitative methods phase and is followed by a quantitative methods phase. The exploratory nature of this design indicates the need to explore a topic or a phenomenon, such as teacher perceptions of influential facilitators of EMPD, in depth through qualitative methods and then attempt to strengthen or test the results from the qualitative phase with a larger or a different sample through a quantitative design.

The first phase of this design addressed the question: What do South Carolina teachers experiencing two separate models of EMPD identify as influential characteristics of the facilitators of professional development? A secondary question addressed in phase one is: How are teachers' perceptions of what makes a facilitator influential similar and different dependent upon two different models of EMPD? These questions were examined qualitatively through a transcendental phenomenological design (Schram, 2006; Moustakas, 1994) where data was gathered through semi-structured interviews. In this first phase, two subgroups of teachers were interviewed to determine their perceptions of influential facilitators of professional development. The first subgroup of teachers was those who had experienced a model of EMPD that was aligned with the

literature on best practices in professional development, including the need for ongoing, content-focused experiences. The second subgroup of teachers was made up of those who had experienced a model of professional development that was aligned with some of the research recommendations in that it was content-focused and had student learning as an objective, but it was considered a traditional model because it was not ongoing.

While ongoing models of professional development examined in the literature have proven to be effective in improving teacher quality (Steinberg, Empson, & Carpenter, 2004; Franke & Kazemi, 2001; Carpenter, et al., 1999) most teachers in the United States do not have access to this type of mathematics professional development. Ball (2002) acknowledged the continuing use of the isolated workshop experience as the traditional model of professional development,

> One reason to disparage such formats is that most of us, whether teachers or teacher educators, have seen or participated in shoddy one-shot teacher "inservice" sessions. We have had strong reactions to the waste of time, to the lack of engagement or useful knowledge, to the often-poor pedagogy or dramatic style of such sessions…many of us may have also had important insights in the context of a single session- a lecture, a workshop, a meeting- that turned out to be significantly generative for our learning…If in fact, districts are likely to continue sponsoring such sessions, there are good reasons to investigate the sorts of experiences, content, and ways of working that *can* be productively packaged into single sessions (p. 10).

Ball recognized the need to examine isolated professional development experiences that are devoted to improving teacher quality in addition to the model recommended by researchers in professional development. For the purposes of this study, it was necessary to complete a dual phenomenology examining teacher experiences of professional development models that were ongoing in addition to those that were isolated to determine what teachers perceive as common characteristics of influential facilitators.

While the results of phase one provided extensive data on how teachers in certain areas of South Carolina perceive influential facilitators of EMPD, it was unclear if these results would generalize to a larger sample of teachers in South Carolina or across the United States. It was necessary to use the results from the first phase of this study to inform the second phase of this study, which examined teacher perceptions of influential facilitators of EMPD across the United States. The second phase of this study addressed four research questions. These questions were examined quantitatively through a survey research design. The first question examined was: To what extent do the results of the first phase generalize to a larger sample of teachers across the United States? In this first examination, two secondary questions were also addressed: (1) What items, based on the themes emerging from South Carolina teachers, best represent the results from phase one and (2) What items, based on the themes emerging from South Carolina teachers, least represent the results from phase one? The second question examined was: To what extent do the results of the first phase generalize to samples of teachers across the United States with differing demographics? The demographics examined for this question were: (1) state where employed, (2) district where employed, (3) grade level, (4) gender, (5) years

of full-time teaching experience, (6) level of education, (7) National Board Certification status, (8) ethnicity, (9) hours of professional development received, (10) type of professional development received, and (11) perceived change from professional development. The third question examined was: What rankings of importance do a sample of teachers across the United States place on characteristics of influential facilitators of EMPD? The fourth question examined was: What rankings of importance do samples of teachers across the United States with differing demographics place on characteristics of influential facilitators of EMPD? This examination focused on the eleven demographic areas outlined above.

In this second phase, the results from phase one were used to develop a survey instrument that was administered to a larger sample of teachers to determine if their perceptions of influential facilitators were similar to those identified in phase one. Further elaboration of these questions and their corresponding analyses can be found in the description of research methods in Chapter Three. Both qualitative and quantitative approaches were utilized to answer the central mixed methods research question: How do United States elementary school teachers perceive an influential facilitator of EMPD?

<div align="center">Definition of Terms</div>

This section serves as a reference for readers to clarify the terms used throughout this study. In order to proceed, it is necessary to provide definitions for four key terms used in the overall question guiding this research: professional development, influential, facilitator, and elementary mathematics.

Professional Development

Professional development has been defined in a variety of ways. Some researchers have defined it as any teacher learning that occurs within the context of a wider school or district need (Jones, West, & Stevens, 2006; Clement & Vandenberghe, 2000; Huberman, 1993). Loucks-Horsely and colleagues dismissed the notion of district needs and defined professional development as teacher learning as a means to improve instruction, "We use the term *professional development* to mean the opportunities offered to educators to develop new knowledge, skills, approaches, and dispositions to improve their effectiveness in their classrooms and organizations" (Loucks-Horsley, Hewson, Love, & Stiles, 1998, p. XIV). Eleven years earlier, Loucks-Horsely and colleagues emphasized the need for professional development to indicate learning opportunities for teachers as separate from district mandated experiences, "Schools need to transform what has heretofore been called 'inservice' and interpreted by many as something done *to* teachers into opportunities for teachers to engage in a wide range of growth experiences that have real meaning to them" (Loucks-Horsley, Harding, Arbuckle, Murray, Dubea, & Williams, 1987, p. 1). Simon (2000) refined the term professional development to relate specifically to current needs in mathematics. He stated that teacher development refers to, "Changes in knowledge, beliefs, dispositions, and skills that support teachers' increased ability to implement successfully the principles of the current mathematics education reform" (p. 335). This type of professional development was described in the perspectives section of this chapter as transformative rather than additive.

For the purposes of this study, professional development was defined as any teacher learning, district mandated or not, that is dedicated to improving teacher quality. Because this study focused on elementary mathematics teachers, Simon's (2000) call for a change in knowledge and beliefs to be aligned with reform efforts was used as criteria for determining improvement in teacher quality. This definition of professional development excluded experiences that are additive in nature. While Loucks-Horsley and her colleagues recommend the movement away from district mandated professional development, in reality, these experiences are the only ones available to most teachers in the United States (NCES, 2006). Therefore, district-mandated experiences that are dedicated to improving teacher quality were included in this definition. Because district-mandated experiences were included, the terms inservice and staff development were used interchangeably with professional development as long as these experiences were dedicated to improving teacher quality. This teacher learning could take place in a variety of venues such as after-school workshops, graduate-level courses, district-wide initiatives, collaborative planning or reflection sessions, or in some cases, within the confines of one's own classroom.

Influential

To have influence over a person can indicate the ability to exert power over their behavior (Merriam-Webster, 2008). This influence can be exerted through perceived authority, prestige, competence, or similarity depending on the role of the influential party (Watt & Richardson, 2007; Arthur, Marland, Pill & Rea, 2006). Influence can take the form of environmental factors such as time or money (Weasmer, Woods, & Coburn,

2008; Arthur, et al., 2006). However, this study focus on the role a person can play in influencing elementary school teachers, therefore influence takes a more intrinsic form (Watt & Richardson, 2007).

Influential in terms of the facilitator of professional development was defined in two parts for the purposes of this study. First, influential was defined as having the ability to engage or motivate teachers to participate in learning experiences. Second, influential indicated the ability to increase teacher learning during professional development. This study focused on what teachers perceive are the characteristics that are necessary for facilitators to both motivate and support the learning of participants during professional development experiences.

Facilitator

A facilitator of professional development represents a movement away from the traditional, or additive, approach to professional development where trainers transmit or tell information and teachers are passive recipients. A facilitator of professional development acts as a guide for teachers as they develop new knowledge through a variety of experiences. Lambert (2003) draws a parallel between the role of a teacher in constructivist teaching to the role of a facilitator in constructivist leading. According to Lambert (2003), constructivist teachers seek and value students' points of view, structure lessons to challenge students' suppositions, recognize that tasks must be meaningful, structure lessons around big ideas, and utilize formative assessment in making instructional decisions. In comparison, a constructivist leader or a facilitator seeks out and values teachers' point of view, structure leadership to challenge teacher beliefs,

constructs meaning through reflection and dialogue, and assesses teacher learning in context. Schools or districts will typically hire a facilitator of professional development from outside organizations. However, a facilitator of professional development can also be a teacher leader from within the school confines, an administrator dedicated to improving teacher quality, or it can be the teachers themselves. For the purposes of this study, a facilitator was defined as someone who supports the learning of teachers.

Elementary Mathematics

The term elementary mathematics referred to the knowledge of content and instructional practices necessary for instruction of mathematics for students in grades kindergarten through fifth grade. This distinction was necessary because the teachers participating in phase one of this study were all employed in the state of South Carolina. Elementary teacher certification in South Carolina begins at grade two. In order for teachers to work in kindergarten or first grade, they must possess an early childhood teaching certificate. However, many states use the term elementary when referring to certification in education for grades kindergarten through fifth grade, therefore the term elementary was used in this study to indicate kindergarten through fifth grade teachers even if they were employed in the state of South Carolina.

Theoretical Framework

The theoretical framework guiding this study was grounded in motivation theory. In order for a facilitator of professional development to be influential, they must engage teachers or motivate them to learn from professional development experiences. Woolfolk (1998) describes motivation theory as focusing, "On how and why people initiate actions

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directed toward specific goals, how intensively they are involved in the activity, and how persistent they are in their attempts to reach these goals" (p. 399). This study primarily centers on Bandura's social cognitive theory (1986). In this theory, Bandura identified three constructs: (1) environment, (2) self, and (3) behaviors; which act in a symbiotic manner to influence motivation. Embedded in this theory is the notion of self-regulation, or peoples' ability to control learning through the necessary combination of academic learning skills and self-control, or what is commonly known as the skill and the will to complete a task. There are three factors that influence self-regulated learning. People must have knowledge, including content knowledge or what can be considered prior knowledge as well as knowledge about one's self or metacognitive knowledge. Metacognitive skills allow people to understand how they think by analyzing practices that best induce learning (Crain, 2005). Motivation is the second component necessary for self-regulated learning. People must possess the intrinsic motivation to learn, a feature that is commonly associated with mastery learning. Self-efficacy is important in this component of self-regulated learning. A person is more motivated to learn a subject in which they feel confident. The third aspect of self-regulated learning is violition or self-discipline. If a person possesses knowledge, motivation, and violition they are then able to self-regulate learning (Muis, 2008).

Self-regulation focuses on the need for a person to recognize their own ability to learn, however, this recognition is heavily dependent upon perceptions of the world around them. Vogt, Hoecevar, and Hagedoren reinforced this idea when stating, "From a social cognitive perspective, a learner's successes or failures can be described as a

mutually reinforcing interplay between self and behaviors based upon his or her

perceptions of teacher and peer receptivity" (2007, p. 339). Vogt and colleagues describe

the role a male dominated environment had in negatively influencing achievement of

females in an engineering program (Vogt, Hoecevar, & Hagedoren, 2007). In this study,

they also identify the potential of faculty members in influencing academic self

regulation in female students.

The rationale for examining teacher perceptions in this study is two-fold. First is

the underlying principle first set forth by Husserl and then refined into method by

Moustakas (1994) that truths can be derived from the examination of perceived truths to

identify common themes. The "truth" of focus in this examination was to identify the

characteristics of an influential facilitator of EMPD. This truth was determined by

examining how teachers perceived these characteristics and identifying those

characteristics that were common among perceptions. Second, according to Bandura's

social cognitive theory (1986), perceptions play a key role in influencing motivation. A

number of studies have shown how perceptions influence motivation (Watt &

Richardson, 2007; Groth & Bergner, 2007; Könings, Brand-Gruwel, & van Merriënboer,

2007; Arthur, et al., 2006; Somers & Piliawsky, 2004). If the goal is to motivate teachers

to be engaged, then an examination of their perceptions as they relate to the role of the

facilitator can provide new insight as to controllable factors that influence teacher

engagement.

It is imperative that teachers are motivated during professional development in

order to learn from the experience. The facilitator can play a key role in developing this

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motivation. Pellicer and Anderson (1995) focus on the need for facilitators of professional development to build experiences around the tenets of andragogy as a means of motivating teachers to be engaged. Malcolm Knowles first introduced the theory of andragogy, or the study of how adults learn, as compared to pedagogy, the study of how children learn (Knowles, Holton, & Swanson, 1998; Knowles, 1994). In this theory, Knowles stipulates that certain conditions are necessary for adults to thrive in a learning environment. These conditions include the need for adults to be actively involved in learning tasks; the need for learning to be relevant to past experiences; and the need for self-direction (Brown, 2006; Merriam, 2001; Pellicer & Anderson, 1995). According to this theory, adults prefer professional development experiences where they are able to give and receive feedback and can actively test ideas rather than passively receiving information. Adults are also self-directive in that they are present, rather than future orientated. This point is crucial for professional development experiences because teachers have to believe that what they are learning is useful to their current practices (Merriam, 2001). Pellicer and Anderson (1995) elaborate on this point when stating, "Mature learners choose to learn what they are convinced they need to learn, rather than to learn what someone else thinks they need to learn" (p. 145). Table 1.1 in Appendix A shows the behaviors described by Pellicer and Anderson that facilitate or inhibit adult learning based on the theory of andragogy.

Facilitators who utilize motivation theory and andragogy when implementing professional development experiences are more likely to have teachers learn from the experience (Pellicer & Anderson, 1995). However, it is unclear which of these

characteristics teachers perceive as influential. It is also necessary to examine whether these characteristics differ based on the content area of study. While the theoretical framework for this study provides insight as to what may make an influential facilitator of EMPD, it does not provide empirical evidence. This study attempted to build on these theories by examining teacher perceptions of influential facilitators of professional development specifically related to elementary mathematics.

Conclusion

In Chapter One, the rationale for examining the role of the facilitator in elementary mathematics professional development was discussed and an overview of the methods for conducting this research study was introduced. Chapter Two contains a review of the literature relating to professional development. Because the literature relating to professional development is extensive, this review has been divided into three distinct areas: (1) effective practices in elementary mathematics professional development, (2) models that have utilized effective practices, and (3) the role of the facilitator during professional development. While the focus of this literature review is on EMPD, literature relating to general practices in professional development and professional development in other content areas is also included. Chapter Three contains a rationale for the use of mixed methods methodology along with a description of the methods used to complete this study. A description of the sampling techniques used to identify participants and the types of professional development that participants have experienced is also provided. Chapters Four and Five present the results from each phase of data collection with Chapter Four focusing on phase one and Chapter Five focusing on

phase two. Finally in Chapter Six, the implications for the findings identified in Chapter

Four and Chapter Five are discussed and potential paths of future study are identified.

CHAPTER TWO

*"Effective teaching requires continuing efforts to learn and improve. These efforts include learning about mathematics and pedagogy, benefiting from interactions with students and colleagues, and engaging in ongoing professional development and self-reflection" (*NCTM, 2000, p. 19).

Chapter One provided an overview of the current state in mathematics education and the rationale for studying professional development as a means of improving teacher quality. This chapter builds on that overview by synthesizing the literature relating to professional development for elementary mathematics in addition to other content areas. While the research question guiding this dissertation focused specifically on the role of the facilitator in professional development, it was necessary to examine professional development as a whole entity before focusing on one part to better understand the context in which the research topic occurs. A review of the literature was conducted by examining 133 sources relating to professional development. These sources included book chapters, peer reviewed journal articles, and dissertations. Three areas of focus emerged from this literature review, forming the basis for this chapter: (1) the literature relating to effective practices in elementary mathematics professional development, (2) the models that have utilized these effective practices in elementary mathematics and in other content areas, and (3) the role of the facilitator in professional development.

Effective Practices

The publication of the 1983 report, "A Nation at Risk" by the National

Commission on Excellence in Education described the rising level of mediocrity in

students' ability in mathematics (NRC, 2001). In response to this report, a call for a

reform movement in mathematics instruction to increasingly develop conceptual

knowledge in students resulted in the need for professional development to shift from

additive experiences to those that are transformative in nature (NRC, 2001; NCTM,

2000). Beginning in the late 1980's, researchers in mathematics were calling for school

districts to abandon the traditional one-shot inservice model of professional development

to experiences that were ongoing and grounded in practice (Lappan, 1997; Ball, 1995b;

Darling-Hammond & McLaughlin, 1995; Corcoran, 1995; Loucks-Horsley, 1995; Steffe,

1990; Maher & Alston, 1990; Loucks-Horsley, et al., 1987).

The new model of professional development recommended in the literature

centered on constructivist theory, which coincided with the call for the use of a

constructivist approach when educating students (Ball, 2000; Simon, 1995). This use of

constructivist theory in professional development was also supported by the theory of

andragogy, which called for active rather than passive learning experiences (Sparks &

Hirsch, 1997; Lappan, 1997; Pellicer & Anderson, 1995). Ball (1995) emphasized the

need for a constructivist approach as a means for teachers to understand how their

students learn, "Teacher educators and staff developers should model the approaches

which they are promoting" (p. 21). This push for a reform movement in professional

development increased following the publication of "Principles and Standards for School

Mathematics" in 2000 by the National Council of Teachers of Mathematics, which emphasized the need for high-quality professional development experiences (Loucks-Horsely, et al., 2003; NRC, 2001; Smith, 2001; NCTM, 2000).

The first theme emerging from the literature review related to the practices that are identified as effective when conducting mathematics professional development. Of the 133 sources examined, approximately 36% focused on this topic. The following section synthesizes the recommendations set forth by researchers that represent best practices in professional development.

Ongoing and Grounded in Practice

Teachers require extensive experiences geared towards developing both mathematical content knowledge and pedagogical content knowledge (Hill, Rowan, & Ball, 2005; Capraro, et al., 2005; Hill & Ball, 2004; Hill, Schilling, & Ball, 2004). These experiences must connect to the everyday practice of teaching (Garcia, Sanchez, & Escudero, 2006; Margolinas, Coulange, & Bessot, 2005; Loucks-Horsely, et al., 2003; Simon, 2000; Darling-Hammond & McLaughlin, 1995). Teachers should not be exposed to a variety of theories about learning; rather, they should construct these theories through ongoing professional development experiences, just as their students construct knowledge about mathematics in the classroom (Margolinas, Coulange, & Bessot, 2005; Loucks-Horsley, et al., 2003; Sparks & Hirsch, 1997). In order to ground these experiences in everyday practice, facilitators of professional development should make use of classroom artifacts, case studies, or professional learning tasks that connect teachers to classroom life (Garcia, Sanchez, & Escudero, 2006; Koehler, 2002; Smith, 2001; Simon, 2000).

Focus on Mathematical Content

Research indicates that teachers are inadequately prepared to deal with the types of discussions that could occur in a reform-minded mathematical classroom (Osana, et al., 2006; Davis & Simmit, 2006; Hill, Rowan, & Ball, 2005; Capraro, et al., 2005; Sherin, 2002). Many teachers at the elementary level do not have the mathematical content knowledge to best support their students. This lack of knowledge indicates the necessity for all professional development to include the underlying expansion of mathematical content knowledge through the use of mathematical tasks and through a focus on student thinking (Silver, Clark, Ghousseini, Charalambous, & Sealy, 2007; Yackel, Underwood, & Elias, 2007; Smith, 2001). Some researchers have found that ongoing professional development focused on expanding content knowledge can be achieved through the use of curricular materials (Newton & Newton, 2006; Remillard, 2005; Callopy, 2003; Remillard & Geist, 2002; Remillard, 2000; Ball, 2000; Ball & Cohen, 1996), others recommend the use of "snapshots of practice" (Garcia, Sanchez, & Escudero, 2006; Koehler, 2002; NRC, 2001; Smith, 2001; Putnam & Borko, 2000) where teachers focus on episodes of teaching or student work.

Student Learning as the Ultimate Goal

Guskey (2000) emphasized the need to determine the effectiveness of professional development by the impact it has on student learning. Many studies conducted on models of professional development measure effectiveness by the reactions of the teacher or the approval from the district (NRC, 2000). However, very few studies examine how the professional development experience impacted student achievement (Loucks- Horsley, et

al., 2003). Kennedy (1999) analyzed 93 studies examining the impact of professional development. Of those studies, only 10 demonstrated evidence of benefits to students. Smith (2001) elaborated on this concern when stating, "The effectiveness of professional development should ultimately be measured by the impact that it has on student learning" (p. 51) and then going on to state, "Considerable time, energy, and financial resources are currently being expended on professional development efforts that are not effective" (Smith, 2001, p. 57). Professional development experiences must have student learning as the ultimate goal, meaning that the needs of students should override district or teacher needs (Gamoran, Anderson, Quiroz, Secada, Williams, & Ashmann, 2003; Loucks-Horsely, et al., 1998).

Creating Disequilibrium for Teachers

The lack of change evident in mathematics instruction indicates the possibility that teachers have certain assumptions about the best ways of teaching mathematics. In order for change to occur, these assumptions must be challenged (Seaman, Szydlik, & Szydlik, 2005; Hiebert, et al., 2005; Kelleher, 2003). Fennema, et al. (1993) described five levels of teachers that were encountered in professional development, representing a continuum of beliefs from traditional to reform-minded. This study supported the findings of Carpenter et al. (1989), which indicated a correlation between teacher beliefs and students' problem solving ability. Hiebert and Stigler (2004) describe results from the TIMSS video study where teachers perceive a change in beliefs; however, these changes were only considered marginal. When teachers' beliefs about the nature of learning and teaching mathematics shifted to be more reform-minded, their students

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demonstrated better problem solving abilities (Franke & Kazemi, 2001). Cobb (2000) and Simon (2000) emphasized the need to problematize teachers' instructional practices to facilitate the development of this disequilibrium.

Creating Communities of Teachers

Cobb, Stephan, McClain, and Gravemeijer (2001) describe the need for professional development to enable teachers to collaborate and communicate with each other. Teaching is typically an isolated profession where teachers have little opportunity to work together to meet the needs of all students (NRC, 2001). Ongoing professional development that is sustainable requires that teachers begin to take ownership of their development through these communities of practice (Gellert, 2008; Ticha & Hospesova, 2006; Smith, 2001). The NRC (2001) reiterates this recommendation when stating, "When teachers have opportunities to continue to participate in communities of practice that support their inquiry, instructional practices that foster the development of mathematical proficiency can more easily be sustained" (p. 397).

Acknowledge Teachers' Expertise

Pellicer and Anderson (1995) describe the need for teacher input in professional development experiences when stating, "Mature learners choose to learn what they are convinced they need to learn, rather than to learn what someone else thinks they need to learn" (p. 145). Professional development experiences should allow teachers to be actively involved in designing and implementing tasks rather than passively receiving information. Loucks-Horsely et al. (1998) describes the importance of having teachers feel respected as a source of information, "How many professional development efforts

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have fallen flat, insulting and alienating teachers because they failed to honor their knowledge, skill, cultures, and experience?" (p. 176). Along with this need to acknowledge teacher expertise is the need to consider the context in which these teachers work. Mundry and Loucks-Horsley (1999) comment on the need to consider context after examining four case studies of professional development occurring at different stages of implementation. These findings have been substantiated in more recent studies of professional development (McClain & Cobb, 2004; Gamoran et al., 2003).

Support from Administration

Teachers require extensive support to implement and reflect on the changes that occur as a result of professional development. Without district support, these changes will not be sustainable (Gamoran, et al., 2003; Corcoran, Fuhrman, & Belcher, 2001; Mundry & Loucks-Horsley, 1999; Corcoran, 1995b). This support includes extended time inside and outside of the classroom, resources such as funding or materials, and policies that encourage the use of reform-minded instruction.

The preceding section provided an overview of the recommended practices for effective mathematics professional development. These recommended practices were identified through a systematic review of the literature relating to professional development in mathematics. Table 2.1, located in Appendix A, provides a comparison of these recommendations to traditional professional development experiences.

Connection to Research Question

Although these recommendations have existed for more than twenty years, their implementation on a wide scale has not yet occurred. Findings from the National Center

for Education Statistics (NCES, 2006) indicate that teachers are receiving the same types of professional development that they did a decade ago. However, this study did shed light on isolated professional development sessions that were transformative in nature,

> In terms of content, about one-half to two-thirds of all teachers participated in professional development activities related to reforms, including programs covering content and performance standards in their main teaching field, student assessment, using computers for instruction, and in-depth study of content in their main teaching field. Many of these activities lasted a day or less (NCES, 2006, p. 78).

These findings indicate a shift in the traditional one-day professional development model to be more aligned with recommendations in the research literature. Loucks-Horsely et al. (1998) voiced opposition to the dismissal of the traditional model of professional development a decade ago when stating, "Often disparaged as the 'traditional form of professional development,' workshops, courses, institutes, and seminars, like other professional development strategies, can range in quality, depending on the extent to which they reflect the principles of effective professional development" (p. 88). Studies have shown the ineffectiveness of one-day inservices when they are additive in nature (Jacob & Lefgren, 2004; Kennedy, 1999; Cocoran, 1995). Although the use of ongoing transformative professional development is considered the ideal approach (Desimone, Smith, & Ueno, 2006), it is clear that many teachers are not experiencing an ongoing model (NCES, 2006). Therefore, current research must focus on transformative models that are both ongoing and isolated to provide a more comprehensive examination of professional development. This call for research focusing on ongoing and isolated

transformative professional development is met in this study by examining teacher

perceptions of influential facilitators in both types of settings.

Effective Models

The second theme identified through a review of the literature focuses on

determining effective models of mathematics professional development. Of the 133

sources reviewed, approximately 44% concentrate on this topic. When examining models

of professional development, the term effective indicates the production of an intended

change. This change can be related to instructional practices or student achievement.

Guskey (2000) cautions against the use of anything but measures of student achievement

when demonstrating the effectiveness of a professional development model, however,

most studies of professional development do not focus on student achievement as a

predictor of effectiveness (Mouza, 2006). This section provides an overview of some of

the models in mathematics education and in other content areas that have proven to be

effective.

Professional Development Model: Cognitively Guided Instruction

The work of Carpenter and his colleagues with Cognitively Guided Instruction

(CGI) marked the beginning of a shift in mathematics professional development

(Carpenter, et al., 1988). CGI allows teachers to focus on student thinking as a means of

improving instructional practice. In this program, teachers act as facilitators during

instruction and allow students to construct knowledge through problem solving

experiences. Teachers then spend time analyzing mathematical content and student

methods for solving problems to plan for instruction (Carpenter, et al., 2000; Carpenter,

et al., 1999; Carpenter, Fennema, & Franke, 1996; Hiebert, et al., 1997). Carpenter,

Fennema, Peterson, and Carey (1988) examined the effectiveness of CGI on student

achievement. Results from this study indicated that participants' knowledge about student

thinking was extensive, but fragmented, so it did not play a large role in instructional

decision-making prior to CGI. However, those teachers who utilized CGI were found to

increase their knowledge about student thinking and were able to use this information to

inform instructional decisions. Results also indicated that students whose teachers knew

more about their thinking had higher levels of achievement on problem solving

experiences (Carpenter, et al., 1988). A study analyzing the effects of CGI on student

achievement conducted the following year yielded similar results (Peterson, et al., 1989).

Based on these results, Carpenter and colleagues conducted an experimental study

examining how teachers might use student thinking in making instructional decisions.

Results from this study indicated that learning to understand children's thinking could

lead to changes in teacher beliefs about teaching and learning mathematics. These

changes were determined by examining instructional practices and student learning

(Carpenter, et al., 1989). This study acted as a pilot for a larger longitudinal study of

instructional practices with CGI occurring over the course of three years. The

longitudinal study substantiated previous findings in that changes in teacher beliefs led to

increased problem solving ability in students (Fennema, et al., 1993). Since that time,

many researchers have utilized CGI as a model of professional development. Franke and

Kazemi (2001) conducted a four-year longitudinal study to examine the effects of CGI

after initial teacher implementation. In this study, Franke and Kazemi found that

teachers' work was generative in that they continued to add to their understanding over the course of four years, "We learned that generative growth is not about a set of characteristics the teacher possesses; it is about teachers' developing knowledge and skills and the identities that evolve in relation to the knowledge and skill" (Franke & Kazemi, 2001, p. 108). Franke and Kazemi acted as consultants during the implementation of CGI. They came in classrooms, not as an evaluator, but as part of the community created through the professional development experience (Franke & Kazemi, 2001). In 2004, Steinberg, Empson, and Carpenter analyzed the instructional changes in one teacher who used CGI in her classroom. In this study, the use of discussion between the teacher and her students emerged as a contributing factor to this change in practice. This process allowed the teacher to better understand her students' thinking and then use this understanding as a vehicle for change (Steinberg, Empson, & Carpenter, 2004). Li (2004) adapted the CGI model to investigate gender differences in teachers of mathematics. More specifically, this model sought to uncover differences in beliefs about teaching mathematics between male and female teachers (Li, 2004). Results from this study indicate that student beliefs were heavily influenced by teacher beliefs and that there were significant differences in beliefs between genders of teachers and students (Li, 2004). These findings corroborate results in studies related to student retention or achievement which show that connections between teachers or other role models and students such as gender or ethnicity can increase the amount of influence teachers can possess (Karunanayake & Nauta, 2004; Zirkel, 2002).

Professional Development Model: Lesson study

Stigler and Hiebert have identified many differences between instructional practices of American teachers and those from other countries in their analysis of the Third International Mathematics and Science Study (TIMSS). Since that time, they have emphasized the use of lesson study as a means of professional development for teachers in the United States (Stigler & Hiebert, 2004; Hiebert & Stigler, 2000; Stigler & Hiebert, 1997; Stigler, 1988). Lesson study is a Japanese model of professional development where teachers, "Examine and try to improve their teaching by first planning lessons together and then evaluating these lessons through teaching and observing them in real classrooms" (Fernandez & Cannon, 2005, p. 269). Japanese teachers reflect on their lessons based on extensive observations of the same lesson conducted by different teachers and then revise and reteach these lessons continuously until the lessons are perfected. Most teachers in Japan participate in about ten lesson studies per year, as the process is lengthy and time consuming (Lewis, Perry, & Hurd, 2004). Lesson study as a model of professional development meets the guidelines set forth in the previous section on best practices in professional development. Many researchers have used this model in an effort to increase teacher content knowledge and to increase student achievement (Devlin-Scherer, Mitchel, & Mueller, 2007; Lewis, Perry, & Murata, 2006; Puchner & Taylor, 2006; Rock & Wilson, 2005; Trent, Blum, McLaughlin, & Yocom, 2005). Fernandez (2005) examined the use of lesson study as a form of professional development with over 30 elementary mathematics teachers. Results from this longitudinal study indicated that lesson study provided teachers with a vehicle for

examining their own content knowledge and beliefs about mathematics and, as a result, implemented sustainable changes in instructional practice.

Professional Development Model: Teaching Experiments

Paul Cobb's work with constructivist teaching experiments represents another effective model of professional development. Occurring concurrently with the beginnings of the reform movement in professional development, Cobb (1990) emphasized the need to coordinate constructivist views on teaching and learning mathematics. His use of the classroom as a learning environment led to changes in teacher beliefs and instructional practices,

> In the process of undertaking these analyses we became aware that the classroom had simultaneously and unintentionally become a learning environment for the teacher. As the teacher used the instructional activities in her classroom and interacted with her students, her beliefs about her own role, the students' roles, and the nature of mathematical activity changed dramatically (Cobb, 1990, p. 127).

This observation of teacher learning led to an approach to professional development that was grounded in practice, a recommendation that has been reiterated continuously in the research literature (Loucks-Horsely, et al., 2003; Knapp & Peterson, 1995; Simon & Schifter, 1991; Cobb, Wood & Yackel, 1990). Cobb (2000) went on to recommend the use of classrooms as action research sites and including the teacher as part of the development team in constructivist teaching experiments in an effort to examine math activity in a social context. These experiments focused on the connection between research and practice by representing a movement away from teachers being taught

theories and then attempting to implement in classroom and toward generating theories as

a result of studying classroom practice (Cobb, 2000). In these experiments, it is critical

that researchers be present in the classrooms acting as a facilitator,

> The role of a researcher who collaborates with a teacher is that of a leader in a local
>
> pedagogical community comprising the research and development team. One of his or
>
> her primary responsibilities is to guide the development of this community as it seeks
>
> to arrive at taken-as-shared decisions and judgments (Cobb, 2000, p. 330).

Cobb (2000) cautions against choosing teachers for these experiments that do not share

common ground with the researchers. For that reason alone, the constructivist teaching

experiment represents an ideal model of professional development, however, it is one that

would be very difficult to implement on a larger scale. Simon (2000) built on Cobb's

work with the implementation of teacher development experiments, which focused

primarily on the development of teachers rather than mathematical development as did

Cobb's constructivist teaching experiment. In the teacher development experiment,

teachers are immersed in, "A process of inquiry in which the teacher is engaged in an

ongoing cycle of interaction and reflection has great potential" (Simon, 2000, p. 359). In

this model, the researcher also acts as a facilitator by guiding teachers through this cycle

with discussions centering on reflections of practice (Simon, 2000). Lamb, Cooper, and

Warren (2007) utilized teaching experiments in a longitudinal study of ten teachers'

knowledge of algebraic concepts. They found that lack of time and levels of teacher

content knowledge resulted in conflicting goals between researchers and participants.

These two factors led participants in this experiment to rely heavily on researchers when

implementing instructional changes (Lamb, Cooper, & Warren, 2007). Norton and

McCloskey (2008) implemented a teacher experiment model outside the context of the

classroom where two teachers presented tasks to individual students and analyzed student

thinking to inform instructional practice. Findings from this study indicate an increase in

mathematical content knowledge for each participant, attributed to extensive analysis of

student reasoning during sessions. Participants also valued the support provided in this

model through extended duration and through communication during sessions. However,

each participant voiced concern when attempting to implement the model in the context

of a classroom, citing lack of time and inability to focus on one student during instruction

(Norton & McCloskey, 2008).

Alternative Models of Effective Professional Development

The use of CGI, lesson study, or teaching experiments represent the majority of

research literature on effective models of professional development in mathematics,

however, many other efforts to implement effective models have occurred over the past

few years (Heck, Banilower, Weiss, & Rosenberg, 2008; Peng, 2007; Bobis, Clarke,

Clarke, Thomas, Wright, Young-Loveridge, & Gould, 2005; Jasper & Taube, 2004).

Weiss and Pasley (2006) describe an initiative called Local Systemic Change through

Teacher Enhancement (LSC) where professional development in science and

mathematics was offered over the course of ten years to a total of over 70,000 elementary

and secondary teachers. In this initiative, teachers were required to participate in a

minimum of 130 hours of professional development over the course of five years, all of

which were, "Aimed to prepare teachers to implement high-quality mathematics and

science materials in their classes and to use inquiry-based practices that the materials

supported" (Weiss & Pasley, 2006, p. 2). Results from this study indicated that systemic

implementation of transformative professional development had positive impacts on

instruction. Teachers had more positive attitudes about reform efforts in science and math

and noted a higher self-efficacy in their ability to teach these subjects. There was also

evidence of positive impact on student achievement in those schools that provided reports

(Weiss & Pasley, 2006). Ticha and Hospesova (2006) emphasize the importance of

reflection in professional development as a means of improving mathematics instruction.

In an examination of elementary teachers' reflections on instructional practices, Ticha

and Hospesova (2006) found that these reflections became more content-focused over

time. Gellert (2008) discussed the need to consider social contexts when examining

professional development experiences. In this study, Gellert used a phenomenological

approach when examining the potential conflict that could arise as a result of these

communities of practice. Findings from this study emphasize the need for teachers to be

self-reflective while participating in these professional development experiences (Gellert,

2008).

Professional Development Models: Examining other Content Areas

Models of professional development in other content areas have also utilized the

recommendations made by researchers in mathematics education (Mroz, 2006; Jones,

West, & Stevens, 2006; Steyn, 2005; Kelleher, 2003). Suggested professional

development models for science educators closely resemble the best practices in

mathematics professional development (Gray & Bryce, 2006; Young & Lee, 2005;

Hartshorne, 2005; Freeman, Marx, & Cimellaro, 2004; Miller, Wallace, DiBiase, & Nesbit, 1999). Dori and Hercovitz (2005) explored the use of long term, constructivist-based professional development that was content-focused and situated in practice with the intent of educating teachers on the use of case-based methods in science. The researchers found that the use of this model of professional development supported teachers in implementing case-based methods in their classroom. This implementation was deemed sustainable based on the continuation of the practice over a three-year period (Dori & Hercovitz, 2005). Informal learning environments have long been recommended in science literature when developing meaningful experiences for students (Dresner & Worley, 2006). Melber and Cox-Peterson (2005) explored the use of informal learning contexts in professional development to examine their impact on elementary science teachers. The three models explored in this study were each created based on best practices in professional development as described previously in this chapter. The researchers found that each model succeeded in increasing science content knowledge and changing instructional practices based on self-reported data from participants (Melber & Cox-Peterson, 2005).

While professional development is closely related in science and mathematics, there are models of professional development in other content areas that utilize effective practices. Hall and Scott (2007) comment on the need to not only increase teacher content knowledge in history, but also to enable teachers to develop the use of historical thinking in their students. They attempted to achieve this goal through the implementation of a content-focused professional development model that was situated in practice. Through

this process, the researchers voiced the need to listen to teachers' concerns when developing tasks (Hall & Scott, 2007). Meichtry and Smith (2007) also voice the need for content-focused professional development that is situated in practice in the context of environmental education. In this study, the researchers use a survey design to measure changes in self-efficacy and in instructional practices related to environmental education based on participation in a place-based professional development model (Meichtry & Smith, 2007). In special education, Jones, West, and Stevens (2006) examined teacher perceptions of effective professional development sessions. Their findings indicate the importance of connecting theory to practice and using collaboration and reflection in professional development experiences (Jones, West, & Steven, 2006). Kinnucun-Welsch, Rosemary, and Grogan (2006) emphasize the need for professional development in literacy education that: (1) focuses on student needs, (2) involves active learning for teachers, (3) is ongoing and situated in practice, (4) is content focused, and (5) is coherent. In a study of a statewide initiative focusing on increasing knowledge of literacy pedagogy, these components were utilized to create a professional development model for elementary school teachers. Results from this study indicate that teachers who participated in this professional development experience report differences in beliefs and practices related to literacy instruction. Landry and colleagues (2006) report on a quasi-experimental study of 750 early childhood teachers who participated in a professional development program designed to improve literacy instruction. This program was ongoing, content-focused, and situated in practice. Findings indicate the effectiveness of this model in changing teacher beliefs as determined by student achievement (Landry,

Swank, Smith, Assel, & Gunnewig, 2006). Mouza (2006) compared two separate professional development models, which were focused on increasing technology use in instructional practices. These models were created based on best practices in professional development in that they both were ongoing and content-focused, encouraged group collaboration and active learning, and were situated in practice. However, one model used a prescribed curriculum to guide experiences while the other was customized to meet teacher needs (Mouza, 2006). Results from this study indicate that both models were effective in transforming teacher beliefs and increasing content knowledge relating to instructional technology (Mouza, 2006).

Connection to Research Question

The common theme in these models of professional development is the inclusion of a facilitator that guides learning experiences. Weiss and Pasley (2006) describe the quality of professional development sessions as varying due to the inability of the facilitator to support teacher learning when examining a wide-scale implementation of mathematics professional development, "While many sessions were excellent, evaluators also noted many missed opportunities for deepening teacher understanding of content and pedagogical strategies; in general, professional development quality suffered to some degree from ineffective delivery by teacher leaders" (p. 5). While there are few studies relating to mathematics professional development that focus solely on the facilitator, there are recommendations embedded in the literature relating to effective models of professional development that describe the qualities necessary for facilitators to be influential. Carpenter and his colleagues stressed the need for the facilitator to have a

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high level of content knowledge in mathematics to support the learning of participants

when examining the effects of CGI (Carpenter, et al., 1999; Carpenter, et al. 2000). This

need is reiterated in many studies relating to mathematics professional development

(Norton & McCloskey, 2008; Lamb, Cooper, & Warren, 2007; Weiss & Pasley, 2006;

Rhoton & Bowers, 2001). Cobb (2000) and Simon's (2000) work with teaching

experiments identifies the need for a facilitator to problematize participants' current

instructional practices to induce critical reflection. The call for facilitators to modify

professional development experiences to fit the context of participants can be seen in

Lesson Study (Fernandez & Cannon, 2005; Hiebert & Stigler, 2000) and in teaching

experiments (Norton & McCloskey, 2008; Gellert, 2008). These essential characteristics

of facilitators are identified in the literature relating to effective models of professional

development; however the role of the facilitator in professional development was not

considered the focus of these studies. The following section concentrates on studies

relating primarily to the role of the facilitator in professional development.

<div align="center">The Role of the Facilitator</div>

The last theme emerging from the literature review related to the role of the

facilitator in professional development. The results from this review indicate that the role

of the facilitator is a relatively unexplored topic in the literature relating to mathematics

professional development. Of the 133 sources included in this review, only 20% focused

primarily on the facilitator in professional development and less than 4% of these sources

focused on the facilitator in mathematics professional development. The following

sections synthesize the information from these sources. The first section focuses on the

role of the facilitator in mathematics professional development while the second examines facilitators in other areas of professional development.

The Role of the Facilitator in Mathematics Professional Development

A report from the National Research Council outlined behaviors that are necessary for a teacher leader to be effective (Druckman, Singer, & Van Cott, 1997). The behaviors identified in this report include the ability to: (1) clarify roles and objectives, (2) demonstrate supportive leadership, (3) plan and problem solve, (4) monitor operations and the environment, (4) promote participative leadership, (5) demonstrate inspirational leadership, (6) provide positive reinforcement, and (7) network with future colleagues. These findings are summarized in Table 2.2 located in Appendix A.

Loucks-Horsley, et al. (1998) reiterate some of these findings when describing facilitators of professional development as having the ability to broaden experiences beyond the classroom, "They are open to change, are credible with teachers, are effective communicators, and have experiences and knowledge that are relevant to the staff with whom they will work" (p. 154). Rhoton and Bowers (2001) also cite the findings summarized above when describing the four skills that are needed to be an effective leader or facilitator: (1) technical skills which include, "Knowledge of product and services, work operations, procedures, and equipment" (p. 4), (2) conceptual skills or, "The ability to analyze complex events and perceive trends, recognize changes, and identify problems and opportunities" (p. 5), (3) interpersonal skills including, "The ability to understand the motives, feeling, and attitudes of people from what they say and do" (p. 5), and (4) self-learning skills or the ability to "Analyze their own learning process and

adjust their actions and decisions both to improve their own knowledge and skills and to make decisions that they have never made before" (p. 5).

In 2007, Sztajn and colleagues examined the role of the facilitator in a school-based mathematics education community by investigating the development of trust between teachers and facilitators. Teachers in this study identified three components of the professional development experience that were vital to the development of reciprocal trust among colleagues; "The professionalism of the mathematics educators, the organization of the project, and the establishment of school-university relations" (Sztajn, Hackenberg, White, & Allexsaht-Snider, 2007, p. 983). This study provides empirical evidence regarding the importance of considering the role of the facilitator in professional development. In 2008, Nipper and Sztajn emphasized the necessity to focus on the role of the facilitator when presenting a theoretical framework for mathematics professional development. This framework represents professional development in an instructional triangle with the "teacher developer" or facilitator acting as a vertex, signifying the importance of the facilitator in engaging teachers during professional development experiences (Nipper & Sztajn, 2008). In this article, Nipper and Sztajn (2008) indicate the need for future study on the collaboration and education of facilitators of professional development.

The Role of the Facilitator in Other Areas of Professional Development

The role of the facilitator has been a topic of inquiry in areas outside of mathematics education (Fullan, 2007; Hargreaves, 2007; Levac, 2004; Buysse & Wesley, 2004; Garmston, 2004; Garmston, 2004b; Fullan, Cuttress, & Kilcher, 2005; Stein,

Smith, & Silver, 1999; Garmston, 1997). Garmston and Wellman (1992) cite Bedrosian (1987) when describing the five roles a presenter can play during professional development experiences: (1) the "boss" who represents authority, (2) the "expert" who represents knowledge, (3) the "colleague" who creates a bond with participants, (4) the "sister or brother" who communicates with concern for participants' current predicaments, and (5) the "novice" who is enthusiastic but is clearly not an expert. Based on these descriptions, Garmston and Wellman (1992) recommend that facilitators of professional development always speak to four audiences during presentations,

Because of learning style preferences and variations in the ways people intake and process information, presenters attend to at least four different types of audience members in each presentation: those seeking facts, data, and references; those wishing to relate topics to themselves through interaction with colleagues; those who wish to reason and explore; and finally, those interested in adapting, modifying, and creating new ideas and procedures as a result of attending the presentation (p. 6).

In this book, they also emphasize the importance of language in professional development experiences. They describe some language choices as being inhibitive for teacher learning, "If you are not careful, you can inadvertently set up barriers between yourself and your audience. For example, using jargon or technical terms unknown to audience members can sometimes make the audience feel dumb, creating resistance or hostility" (Garmston & Wellman, 1992, p. 49). While Garmston and Wellman (1992) provide insight into the types of roles facilitators can play in professional development experiences, they do not include empirical evidence to support these findings. Jones,

West, and Stevens (2006) found that teachers aligned themselves with facilitators who represented the role of what Garmston and Wellman would call an "expert" in a study examining professional development relating to special education. However, it is unclear which role, if any, teachers experiencing transformative professional development in elementary mathematics would want facilitators to represent.

The use of school-based coaching has become an increasingly prevalent method of ongoing professional development in the fields of mathematics and literacy (Knight, 2009, Costa & Garmston, 2002). In this model, coaches are hired within schools or districts to work with teachers as they implement lessons. Gibson (2005) analyzed the role of a literacy coach as perceived by two school-based literacy coaches at the elementary level. Participants in this study describe a level of resistance existing between coaches and teachers and a lack of engagement or motivation from teachers during professional development experiences. These participants also describe the need for coaches to listen and take teachers' needs into consideration when developing sessions. In the discussion of this study, Gibson (2005) indicates the necessity for coaches to not be chosen based solely on experience or knowledge, but also based on the coaches' ability to critically examine their own practice. McGatha (2008) also studied the role of a facilitator in professional development through coaching by examining the interactions of two coaches with teachers. Results from this study indicate the importance of defining the role of the coach and the coaching experience by providing a clear focus for teachers (McGatha, 2008). While both of these studies provide insight about the role of the

facilitator in professional development, they each utilize a small sample size of only two participants to determine results.

In the field of vocational education, Santoro (2005) argues for the need to investigate the facilitators' role in professional development, in particular, how their role changes in response to sociocultural differences. Results from a qualitative case study investigating how the social and cultural backgrounds of four trainers intersect with discourse occurring in vocational education and training indicate the need for reflective practice and the examination of facilitator beliefs regarding the implementation of professional development experiences (Santoro, 2005). An emphasis on transformational leadership has developed in the learning and skills sector (Muijs, Harris, Lumby, Morrison, & Sood, 2006; Bush & Glover, 2004; Sandler, 2002). Transformational leadership is defined as, "Leadership that transforms individuals and organizations through an appeal to values and long-term goals" (Muijs, et al., 2006, p. 88). This type of leadership is similar to the recommendations for an effective facilitator in the research related to mathematics professional development. Muijs, et al. (2006) found that this type of leadership was most effective in terms of changing practices. In early childhood education, Riley and Roach (2006) describe the need for facilitators to use a constructivist approach when working with day care providers in ongoing professional development, however it was necessary for these facilitators to be flexible when dealing with certain situations, "In particular instances, Training Specialists adopted a directive role by pointing out unhealthy conditions or unsafe practices" (Riley & Roach, 2006, p. 369). In this study, researchers found that facilitators who were trusted by participants

proved to be more effective in terms of creating change (Riley & Roach, 2006).

However, it is unclear what qualities these facilitators possessed to develop reciprocal

trust with participants.

<p style="text-align: center;">*Connection to Research Question*</p>

The studies reviewed in this chapter provide a potential framework for

characteristics of influential facilitators of professional development. The following list

describes the characteristics that are included in this framework.

A facilitator should:

1. have a high level of content knowledge.

2. problematize instructional practices to induce reflection.

3. alter experiences to meet participants' contexts.

4. build trust with participants.

5. reflect on their own practice.

6. provide a clear focus for participants.

7. play the role of a boss, expert, colleague, novice, or sister/brother.

8. use a constructivist approach.

9. be open to change.

10. be an effective communicator.

While this framework is informative, it is based largely on theoretical literature

that is unrelated to elementary mathematics professional development (EMPD). It is

necessary to conduct empirical research to determine if this framework is consistent with

how teachers across the Unites States perceive an influential facilitator of EMPD.

Conclusion

These recommendations of necessary qualities of influential facilitators are based on the needs of participants as determined by researchers of professional development. It is unclear if characteristics of influential facilitators as perceived by participants are aligned with the recommendations found in the research literature. While it is necessary for a facilitator to possess the qualities described above, they could still be insufficient in motivating teachers to be engaged in professional development experiences. Therefore, it is imperative that facilitators meet the needs of teachers as determined by researchers of professional development in addition to the wants of teachers as determined by teacher perceptions.

This study adds to the literature on professional development in elementary mathematics by exploring teacher perceptions of influential facilitators. Chapter Three provides an in-depth description of the specific methods that were used to explore this topic. This description includes an outline of the sampling techniques used to determine participants in addition to the data collection and data analysis procedures conducted in both phase one and phase two of the research design. Chapter Four presents the results of the first phase of data analysis through a discussion of the common themes emerging among participants. Chapter Five presents the results of the second phase of data analysis with an emphasis on how the results from the first sample of participants generalized to the second sample of participants. Chapter Six concludes this dissertation with a discussion of the significance of this study and implications for future research.

CHAPTER THREE

"Instead of searching for metaphysical truths, pragmatists consider truth to be 'what works'" (Tashakkori & Teddlie, 1998, p. 12)

Chapter One provided an overview of the research questions and methods guiding this study. This chapter expands on that overview with a discussion of the rationale for the use of mixed methods research and an analysis of the research design that was utilized to answer the overall research question: How do United States elementary school teachers perceive an influential facilitator of EMPD? To examine these methods, it is necessary to divide the chapter into four separate sections. The first section examines the rationale for using mixed methods research as a methodology. The second section outlines the sampling techniques used to determine participants for this study and provides a description of the types of professional development experienced by each participant. The third section describes the methods involved in phase one including a discussion of the data collection and analysis procedures utilized in the study. The fourth and final section describes the methods involved in phase two and includes a logic model that shows the framework for the entire mixed methods study.

Rationale for Using Mixed Methods Research

The primary rationale for using a mixed methods design is that by combining both qualitative and quantitative methodology, the researcher is able to build on the strengths and offset the weaknesses that are inherent when each method stands alone. The

philosophical foundation for this study is based on the worldviews outlined by Creswell and Plano Clark (2007). Mixed methods research as a methodology follows a pragmatic paradigm or worldview, which "Guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases of the research process" (Creswell & Plano Clark, 2007, p. 5). A pragmatic worldview can be defined as following both deductive and inductive designs in research. By taking a pragmatic stance, the researcher abandons notions commonly associated with either qualitative or quantitative research and focuses instead on how both styles can be utilized to answer a central research question (Plano Clark & Creswell, 2008; Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 1998).

As a method, mixed methods research, "Focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or a series of studies" (Creswell & Plano Clark, 2007, p. 5). The mixed methods design used for this study was an exploratory sequential design. Creswell and Plano Clark (2007) describe a sequential design as beginning with either a quantitative or qualitative methods phase and then using the resulting data to inform the second phase. The exploratory nature of this design indicates the need to explore a topic or a phenomenon in depth through qualitative methods and then attempt to generalize or test the results from the qualitative phase to a larger or a different sample through a quantitative design. In this study, an exploratory design was necessary due to a lack of empirical work identifying qualities of influential facilitators of professional development in elementary mathematics. This study utilized a variant associated with the exploratory sequential design called the instrument

development model. Through this model, phase one of the study investigated teacher perceptions of influential facilitators through a phenomenological design and phase two was dedicated to creating and implementing a survey instrument based on the results of phase one to determine if these results generalized to a larger sample. In this study, the quantitative results built on the qualitative results; they were not considered separate entities (Tashakkori & Teddlie, 1998). Although both methodologies were utilized, the qualitative phase of this study was considered to be of higher priority. That is, the question examined in the quantitative phase was a direct result of the question examined in the qualitative phase, therefore the weighting of this study is heavier for the first data collection. In all subsequent representations of this model, the notation QUAL→quan will be used to show the sequential design of this study and the weighting of the qualitative findings as a priority (Plano Clark & Creswell, 2008; Creswell & Plano Clark, 2007). While the use of mixed methods methodology in educational research is a relatively new paradigm, there are examples of studies using an exploratory sequential design with an instrument development variant in the research literature (Plano Clark & Creswell, 2008; Milton, Watkins, Studdard, & Burch, 2003; Myers & Oetzel, 2003).

The strengths associated with using a mixed methods exploratory sequential design include the straightforward manner in which data can be collected and analyzed. Because each phase is separated, the researcher can effectively manage a large amount of data and can implement the mixing procedures necessary for a mixed methods design in an efficient manner. The use of both qualitative and quantitative approaches also appeals to a wider audience in educational research (Creswell & Plano Clark, 2007). This study

not only considered the perceptions of two small sub-groups of teachers through qualitative methods, it also attempted to strengthen these results through the implementation of a quantitative design. The two phase approach used in a sequential design can also be a weakness when considering the amount of time that could be necessary to complete a study. An attempt was made to control for this inherent weakness by using qualitative and quantitative designs in this study that have a manageable completion time.

<center>Sampling Techniques and Description of Participants</center>

The participants in this study were elementary school teachers who have had experience with transformative mathematics professional development as defined in Chapter One. These participants included kindergarten through fifth grade teachers who teach all content areas, those who only teach specialized areas such as math and science, and special education teachers who work in either inclusive or self-contained settings. In this mixed methods study, criterion or purposive sampling techniques were used in addition to convenience, and maximal variation sampling techniques (Creswell & Plano Clark, 2007, Fraenkel & Wallen, 2006; Flick, 2005). These sampling techniques were necessary due to the lack of teachers who have experienced this type of professional development. The use of randomized sampling techniques would not have been effective in this study because the teachers selected may not have provided the insight needed to determine the characteristics of facilitators that are influential in transformative mathematics professional development. The following sections outline the specific sampling techniques used to identify participants for phase one and phase two of this

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dissertation. A discussion of the limitations associated with these techniques is also included.

Sampling Techniques for Phase One

Phase one contained two subgroups of teachers, one group who had experienced transformative professional development that is ongoing (labeled Group I) and the other group who had experienced transformative professional development that is isolated into a one or two day session (labeled Group 2). Each subgroup was comprised of 10 participants. Criterion or purposive sampling techniques were used to create these subgroups, in that participants had to be elementary school teachers who had participated in one of these two types of experiences. Convenience sampling was also used during this phase due to the lack of teachers who met the set criteria. While more teachers have experienced isolated professional development that is transformative in nature, very few have experienced a model that is ongoing (NCES, 2006).

Some Group I participants were elementary school teachers from three different schools in the northwest region of South Carolina who were participating in a grant dedicated to improving teacher quality through the use of professional development. These teachers met weekly with facilitators of EMPD from the School of Mathematics at a public university in South Carolina. The teachers and facilitators worked together to design a professional development model that was grounded in the research literature described in Chapter Two. The data collection procedures for these participants took place following three months of this ongoing professional development. These participants were selected through convenience sampling techniques due to the

researcher's involvement with this grant as one of five people facilitating the professional

development of these teachers. While the researcher did not have contact with every

teacher, she worked closely with the teachers at one of the four schools. Therefore, the

participants selected from this group were comprised of teachers who had worked with

the researcher in addition to those who had not in an attempt to control for any bias that

may have been present. Overall, the sample for phase one of this study included eight

participants who have worked with the researcher in a professional development

experience and 12 participants who had no previous contact with the researcher.

Because the definition of facilitator used for this study includes mathematics

specialists and teacher leaders, participants were also included in Group I that have

experienced ongoing transformative professional development in the context of their own

schools with a state-hired math coach. These coaches, or facilitators, work with teachers

at the elementary level to improve instruction through reflection and collaboration

(Dempsey, 2007; Harwell-Lee, 1999). It is important to note that teachers were only

selected from schools where a math coach had been hired through the Mathematics and

Science Unit (Dempsey, 2007), not from schools where math coaches were hired through

a district initiative. This distinction is necessary due to the extensive training state-hired

math coaches were required to complete prior to working with teachers. These Group I

participants were identified through convenience sampling techniques by working with

mathematics supervisors and coaches in a variety of school districts who acted as

gatekeepers by providing contact with potential teachers. After finding a pool of teachers

who fit the criteria for Group I, maximal variation sampling techniques were used to

identify participants in this pool who vary in terms of age, years of experience, level of schooling, and type of position (Creswell & Plano Clark, 2007). By varying the participants in this way, the researcher was better able to examine different points of view regarding perceptions of influential facilitators.

The participants in Group II for phase one were selected based on the previously stated criteria of being an elementary school teacher who has experienced isolated transformative professional development. In addition to criterion sampling, convenience sampling techniques were used to determine the sample for Group II. Some participants were selected based on their involvement with an isolated transformative professional development experience prior to implementing a reform-based elementary mathematics curriculum. Participants were also selected for Group II by working with the same gatekeepers from Group I to identify teachers who met the necessary criteria. Once a pool of potential participants for Group II was created, maximal variation sampling techniques were again used to ensure the representation of a variety of viewpoints when examining their perceptions of influential facilitators. Table 3.1, located in Appendix A, provides an overview of the demographics representing the final participant selection for phase one. Figure 3.1 in Appendix B highlights the areas in which these participants are currently employed to show the spread of this sample across South Carolina.

Sampling Techniques for Phase Two

The participants selected for phase two of this study were identified through convenience and snowball sampling techniques. The sampling objective in phase two was to identify a large number of participants who fit the aforementioned criteria. However,

this sample was comprised of elementary school teachers from across the United States rather than isolated to teachers in South Carolina. These potential participants were contacted through gatekeepers from a variety of areas in education. These areas include state agencies, district personnel, curriculum publishing companies, university professors, and state and national educational organizations, all of which were identified through snowball sampling. A total of 49 gatekeepers participated in this phase of the study. The researcher provided each gatekeeper with access to the survey instrument, who then distributed it to participants. Prior to this distribution, a pilot study was conducted to assess the reliability and validity of the survey instrument used in phase two. Participants for this pilot study were also identified through gatekeepers who provided access to the survey. Tables 3.2 and 3.3, located in Appendix A, provide an overview of the demographics representing the pilot study sample and final participant selection for phase two. Figure 3.2 in Appendix B highlights the areas in which the participants in phase two are currently employed to show the spread of this sample across the United States.

A response rate for the survey implementation could not be calculated. Participants had the ability to forward the survey to other potential participants. As a result, it is unclear how many people were asked to complete the survey. A total of 652 participants responded to the electronic survey. However, this sample was narrowed down to 565 participants after a cursory examination of the responses. Due to the nature of electronic surveys, many potential participants began the survey and did not complete it for various reasons, including not meeting the criteria necessary to be a participant or clicking on the electronic link without intending to complete the survey. These potential

participants were omitted from the sample used during data analysis. Examples of sampling issues relating to electronic surveys are not uncommon and have been documented in the literature relating to survey research (Franklin, 2008; Davidson, 2008; Nulty, 2008; Wu & Newfield, 2007; Dillman, Smyth, & Christian, 2008). Elementary school teachers from South Carolina accounted for approximately 77% of the phase two sample. The remaining percentage of participants from ten states spread across the United States. Therefore, while the results for phase two pertain to a sample of United States elementary school teachers, they do not generalize to all United States elementary school teachers.

Limitations of Sampling Procedures

Although an attempt was made to control for extraneous variables in the design of this study, limitations existed relating to sampling techniques. The samples used in phases one and two of this study were not randomized. The researcher primarily relied on convenience and snowball techniques to determine each sample. The researcher attempted to control for this limitation in phase one by using maximal variation sampling techniques to strategically select participants who provided multiple lenses in regards to the research question. In phase two, the researcher again attempted to control for this limitation by accessing a robust number of participants to reduce variability. Although a randomized sample could potentially strengthen the results of this study, the use of convenience sampling ensured that participants were those who had the aforementioned criteria of experiencing transformative professional development.

The fact that some of the participants involved in this study had worked with the researcher on a previous occasion could be considered a second limitation. This relationship between the participant and the researcher could cause the participant to be less than honest during semi-structured interviews in phase one or it could cause the participant to feel obligated to respond to survey items in a certain way during phase two (Flick, 2005). An attempt was made to control for this limitation by including participants in phase one that have not worked previously with the researcher in an effort to triangulate the data. The researcher also utilized a large number of participants in phase two to control for any testing issues arising from working previously with participants.

An additional limitation associated with the sampling procedures in this study was the decision of the researcher to only interview teachers. This decision was made based on the viewpoint expressed in Loucks-Horsley et al. (1998) that teachers are the "Primary client of professional development" (p. 176). Because the intent of professional development is to improve teacher quality, teachers' perceptions of influential facilitators become a higher priority than others who may be involved in professional development, such as principals or administrators. This study examines an area of mathematics professional development that has not been explored in the research literature. Therefore, it was necessary to examine the primary stakeholders of professional development prior to investigating others. Future investigations are necessary to determine if the perceptions of other stakeholders in professional development are similar to the participants in this study.

Procedures for Phase One

The purpose of phase one was to explore teacher perceptions of influential facilitators, a topic that had not been examined in the research literature relating to elementary mathematics professional development. The research question guiding phase one was: What do South Carolina teachers experiencing two separate models of EMPD identify as influential characteristics of the facilitators of professional development? A secondary question addressed in phase one was: How are teachers' perceptions of what makes a facilitator influential similar and different dependent upon two different models of EMPD? In this phase, an inductive approach was necessary to discover teacher perceptions. Because these perceptions relate to the experience of professional development, a phenomenological design was appropriate. According to Schram (2006), a phenomenology investigates, "The meaning of a lived experience of a small group of people from the standpoint of a concept or phenomenon" (p. 98). The phenomenon investigated in this study was elementary mathematics professional development with an influential facilitator. In attempting to identify the qualities of an influential facilitator it was necessary to ascertain the meaning of the experience from teachers.

An assumption of this type of research is that perceptions provide evidence of a lived reality (Schram, 2006, Moustakas, 1994). This assumption is grounded in the work of Husserl who first proposed the notion that perceived truth can be discovered through analysis of objects or events as experienced through the self or through one's consciousness (Moustakas, 1994). Schram (2006) identifies language as the primary medium for meaning to be discovered. Therefore, this approach called for the use of in-

depth interview techniques and descriptive analysis to provide insight to the essence of the experience of having an influential facilitator. Because two different types of experiences had been identified, it was necessary to complete a dual phenomenology for phase one of this study. Polkinghorne (1989) recommends the inclusion of approximately 10 participants to complete a phenomenological study. The samples previously identified as Group I and Group II were each comprised of 10 participants. The interviews conducted for each of these groups occurred concurrently during the fall of 2008.

Data Collection Procedures

Semi-structured interviews were conducted to provide each participant with the ability to speak more openly than they could if the researcher used a formal interview protocol (Silverman, 2006; Moustakas, 1994). The use of semi-structured questions also enabled the researcher to guide the interview and keep participants focused to ascertain the data needed to understand this phenomenon, unlike an open interview where participants are free to speak to a broad range of topics (Silverman, 2006; Flick, 2005). Subjects in this phase were each interviewed separately and the interviews occurred at a time and place chosen by participants. This process of allowing participants to have control over the time and place of an interview increased the researcher's rapport with each participant (Creswell, 2003). Prior to conducting any interviews, participants were provided with an informational letter describing their role in the study. A copy of this letter is located in Appendix C. Each interview lasted for approximately 45 minutes to one hour. The protocol that was used during these semi-structured interviews is located in Appendix D. This protocol includes questions developed by the researcher with the

assistance of two experts in the field of qualitative research. Each interview was digitally recorded and transcribed by the researcher in an effort to better understand the data. Member checks were utilized during this process to increase trustworthiness by providing each participant with an electronic copy of the transcript and asking them to confirm their responses (Silverman, 2006). This member check took place approximately two weeks after each interview and resulted in a response rate of 50%.

Data Analysis Procedures

The data analysis for phase one followed the steps outlined by Moustakas (1994) for a transcendental phenomenological design. The researcher began with repetitive readings of each interview transcription to ascertain an overall impression of the data. Methodologists cite this preliminary review as necessary for the researcher to identify overarching patterns in data (Silverman, 2006; Creswell, 2003; Moustakas, 1994). During this process, it was necessary for the researcher to distance or bracket herself from the data to avoid preconceptions about the experience. This process, which Schram (2006) identifies as "Epochè", enables researchers to suspend their own beliefs in an effort to immerse themselves in the meaning of the experience as described by the participants. The results of this bracketing process are described in Appendix E.

Each subgroup in phase one was examined separately in a primary analysis of the data by isolating and extracting significant statements from interview transcripts. These statements were then used to create meaning units, which were clustered into common themes (Schram, 2006; Moustakas, 1994). This clustering process was completed twice before final themes were developed. One doctoral student acted as an independent rater

during this process to establish inter-rater agreement. This student was presented with the common themes and asked to code an excerpt of twenty statements from the data that were identified as significant. This analysis resulted in 85% agreement between the researcher and additional coder. The three statements that were coded differently were examined and discussed, which resulted in 100% agreement between coders. Following this analysis, a secondary review occurred where the researcher identified common themes between groups. Once themes were established, a data reduction phase occurred where all repetitive meaning units were eliminated in an effort to create a manageable set of data to use when developing thematic descriptions (Moustakas, 1994). A Table of Themes and thematic descriptions outlining the results of this data analysis are described in Chapter Four.

The Table of Themes was sent electronically to phase one participants for a second member check. Participants were asked to answer three questions relating to the data to ensure that they had analyzed the table: (1) Do you agree with the findings as displayed in the table, (2) If not, what parts of the table do you disagree with, and (3) What category, if any, do you find is most important when considering the qualities of an influential facilitator of mathematics professional development? Nine out of 20 participants, or 45%, responded to this member check and agreed with the findings in the table. A reminder email was sent out one week after the initial member check, which resulted in an additional response from one participant for a total response rate of 50%. All participants who responded agreed with the findings as displayed in the table. These member checks marked the end of the data analysis for phase one.

Limitations for Phase One

The data collection for this study consisted of semi-structured interviews and survey responses, both of which are considered self-reported data (Flick, 2005). Researchers (Cobb, 2000; Simon, 2000) have been critical of the use of self-reported data as a primary data source in studies due to the view of this data as a representation of an experience through the participants' eyes, which can lead to issues of subjectivity and bias. In the context of this study, there was no observational data collected to confirm or disprove these self-reported data. An attempt to control for this limitation was made by collecting self-reported data from a large number of participants who viewed the research topic through a variety of lenses. The researcher also used semi-structured interviews rather than a formal interview protocol to allow participants more freedom to speak openly about the research topic. It is also important to note that the research question specifically called for the need to understand teacher perceptions of influential facilitators, therefore, the use of interview and survey data were the most appropriate choices for this study.

Mixing Data: Developing the Survey Instrument

Following the data analysis for phase one, it was necessary to complete a separate step before continuing on to phase two. This step, known as mixing the data in mixed methods research (Creswell & Plano Clark, 2007), is a process of relating the two separate data sets. In order for a study to qualify as mixed methods, the data from both qualitative and quantitative methods must be mixed at some point during the study.

Creswell and Plano Clark (2007) identify three ways to mix the data to provide the researcher with a clearer understanding of the problem,

Merging or converging the two datasets by actually bringing them together, connecting the two datasets by having one build on the other, or embedding one dataset within the other so that one type of data provides a supportive role for the other dataset (p. 7).

The data for this study were mixed at two separate points, the first of which followed phase one. This mixing connected the data from phase one and phase two by using the results from phase one to create the survey instrument that was used in phase two. To complete this process, the researcher used the analyzed data from phase one as a guide to write each survey item. Qualitative data that had been organized by theme prior to data reduction were quantitized to determine how often each idea occurred. The results of this process are described in Chapter Five prior to a discussion of the results for phase two. The first set of research questions for the quantitative phase of this study centered on whether or not the results from phase one can be generalized to larger samples of teachers. To examine these questions, items were developed for the survey instrument based on the quantitized data from phase one of the study. To be included in this set of questions, items had to occur between at least 30% of participants in phase one. These questions utilized a Likert response with a scale of eight: (1) Completely Agree, (2) Strongly Agree, (3) Agree, (4) Somewhat Agree, (5) Somewhat Disagree, (6) Disagree, (7) Strongly Disagree, (8) Completely Disagree. Thorndike (2005) advocated the use of a scale with a higher number of points to increase reliability in the instrument. This scale

contained no neutral point to strengthen the probability that participants would take an appropriate amount of time to respond to each question (Fraenkel & Wallen, 2006). The second set of research questions in phase two examined if participants rank qualities of influential facilitators in order of importance. To determine if a rank order exists, items were developed from ideas that occurred most frequently in the qualitative data. To be included in this set of questions, items had to occur between at least 50% of participants in phase one. The items used to determine a rank of qualities were written in a multiple choice fashion with participants choosing items that they felt were most important. Without including demographic questions, a total of 116 items were developed based on the themes that emerged in the qualitative phase of the study. These items were reviewed and reduced by two experts in the field of instrument development. Once the instrument was refined, it was administered to three former elementary school teachers who were then interviewed to determine if revisions were necessary. Based on their recommendations, the items were reduced to a total of 65. These items were divided as follows: 11 demographic items, one open-ended item, 43 Likert items, and 10 multiple choice items. The resulting survey, which is included in Appendix F, was piloted to 35 elementary school teachers in South Carolina. The procedures for administering this pilot study are described below in the data collection procedures for phase two. Figure 3.3, which is located in Appendix B, represents the procedures used in phase one beginning with data collection and ending with the mixing of data to inform phase two.

Procedures for Phase Two

In the second phase of this study, a survey research design was used to determine if the results from phase one generalized to a national sample of elementary school teachers. The following research questions were analyzed during this phase of research:

1. To what extent do the results of the first phase generalize to a larger sample of teachers across the United States?

   a. What items, based on the themes emerging from South Carolina teachers, best represent the results from phase one?

   b. What items, based on the themes emerging from South Carolina teachers, least represent the results from phase one?

2. To what extent do the results of the first phase generalize to samples of teachers across the Unites States with differing demographics?

3. What rankings of importance do a sample of teachers across the Unites States place on characteristics of influential facilitators of EMPD?

4. What rankings of importance do samples of teachers across the United States with differing demographics place on characteristics of influential facilitators of EMPD?

Creswell (2003) describes the purpose of survey research as, "To generalize from a sample to a population so that inferences can be made about some characteristic,

attitude, or behavior of this population" (p. 154). The survey designed for phase two

measured elementary teachers perceptions about influential facilitators of mathematics

professional development. This survey was administered in a cross-sectional fashion,

meaning that the data was collected from individual participants at one point in time

(Fraenkel & Wallen, 2006; Creswell, 2003). The sampling procedures used to identify

this sample were described in the previous section.

Data Collection Procedures

Prior to administering this survey to the sample identified for phase two, the

researcher conducted a pilot study with a smaller sample of teachers (n = 35) to examine

the validity and reliability of the survey instrument. The specific statistical measures used

to determine validity and reliability are described below. This pilot survey was

administered through a mass email. The email contained a letter to each participant

describing the research study and the risks involved with participation along with a link

to the survey, which was created through www.surveymonkey.com. A copy of this letter

was contained in an exempt application to the university Institutional Review Board for

permission to conduct this study and is also included in Appendix C. This email was sent

to three gatekeepers who then acted as distributers. Following this pilot study, items were

evaluated and reviewed for clarity and appropriateness by the researcher with guidance

from a measurement expert to increase content validity (Thorndike, 2005). Once the pilot

study was complete, the researcher administered the survey using the same procedures as

the pilot study to the sample for phase two (n = 565). The main strength associated with

using an electronic survey in this study as opposed to a survey administered in person is the freedom that participants had to complete the survey in their own time, giving them the ability to answer in a meaningful manner. However, a large sample size was required in this phase due to the low response rate usually associated with email surveys (Frankel & Wallen, 2006). The researcher attempted to control for issues of nonresponse by sending out reminder emails in the weeks following initial contact. Two reminder emails were sent to gatekeepers for distribution to potential participants. Because the survey could be forwarded without the knowledge of the researcher, a response rate could not be calculated from this study. However, the researcher controlled for this limitation by asking gatekeepers who worked in administrative roles to dissuade participants from forwarding the survey to other parties. Once surveys were submitted through www.surveymonkey.com, the researcher coded each participant's responses using SPSS, a statistical software package used to facilitate the organization and examination of quantitative data.

Data Analysis Procedures

The data analysis for phase two consisted of three main objectives: (1) to examine the validity and reliability of the survey instrument, (2) to analyze items to confirm overall constructs for the survey, and (3) to examine data to answer the quantitative research questions. Before these objectives were addressed, the researcher conducted a descriptive examination of the data by analyzing measurements of central tendency. This step was necessary for the researcher to have an overall understanding of participants'

responses (Thorndike, 2005). From there, the researcher computed the reliability coefficient to establish the internal consistency of the survey instrument. Following this examination, construct validity and the dimensionality of items were analyzed using principle components factor analysis (PCA) (Thorndike, 2005; Ott & Longnecker, 2001). Once factors were identified and labeled, the researcher conducted a series of t tests to determine if participants in phase two agreed with the findings from phase one. A cutoff of 4.5 was established based on the eight point Likert scale used in the survey. Following this examination, an analysis of variance (ANOVA) was used to investigate the relationships between the factors identified through PCA and eleven demographic items: (1) state where employed, (2) district where employed, (3) grade level, (4) gender, (5) years of full-time teaching experience, (6) level of education, (7) national board certification status, (8) ethnicity, (9) hours of professional development received, (10) perceived change in instructional practice and (11) type of professional development received (Ott & Longnecker, 2001). The dependent variable in this scenario was the participant score on each factor determined through PCA. The independent variable was each individual demographic category. The multiple-choice items included in the survey were designed to determine if participants ranked qualities of influential facilitators in any particular order of importance. These questions were categorical in nature, therefore chi-square tests and frequency counts were used to determine if a rank order exists among participants. Figure 3.4, located in Appendix B represents the data collection and analysis procedures for phase two.

The second mixing of data sets occurred following the procedures for phase two. This mixing involved the merging of both the qualitative and quantitative interpretations of findings to discover a new set of interpretations that were used to answer the central research question (Creswell & Plano Clark, 2007). Following a report of the findings for phase one in Chapter Four and phase two in Chapter Five, a discussion is provided in Chapter Six of findings that are apparent in both data sets. A logic model representing the overall design for this study is displayed in Figure 3.5 in Appendix B. This logic model provides the process and products that resulted from each phase of the design.

Limitations for Phase Two

The use of a mixed methods exploratory sequential design required the acceptance of uncertainty for the design in the second phase in the study (Creswell & Plano Clark, 2007). While it was clear that a survey instrument would be developed to administer during the second phase of this study, it was unclear what each item would look like on the survey. The number of questions needed to ascertain the necessary information was also ambiguous. An attempt was made to control for this uncertainty by piloting the survey instrument to a smaller number of participants (n = 35) prior to administering it to the large number of participants required for phase two.

Conclusion

This chapter addressed the specific methodology and methods that were utilized to answer the central research question and all subsequent research questions. A rationale for using mixed methods methodology and the specific sampling, data collection, and data analysis procedures used in this study were discussed. Embedded in this discussion

were the limitations associated with each phase of the research design. Although limitations did occur, the rigorous nature of the research design and the specific attempts to control for these limitations ensured the strength of this study. The following two chapters discuss the results from each phase of the research design. Chapter Four presents the results for phase one. Chapter Five presents the results of the pilot study and phase two. These results form the basis for Chapter Six, which concludes this dissertation with an analysis of the significance and implications of this study. Included in this analysis is a list of recommendations for future investigations relating to the research topic.

CHAPTER FOUR

An influential facilitator is "Someone who, you get excited about the lesson, but it isn't

just the lesson anymore, it's more about what you're going to do. You leave and you

really are excited about whatever it is and you really can't wait to try it, you can't wait to

apply it in your class" (Participant 12).

Chapter Three summarized the methods used to examine the central research

question of this study: How do United States elementary school teachers perceive an

influential facilitator of EMPD? Chapter Four and Chapter Five provide a discussion of

the qualitative and quantitative results that emerged as a product of the data analyses

outlined in Chapter Three. The linearity of these sections follows a pattern that emerges

when utilizing a mixed methods exploratory sequential design. The results must first be

presented separately to answer the research questions for each phase and then mixed to

address the central research question (Creswell & Plano Clark, 2007). This mixing is

presented in an analysis of the significance and implications of the results for both

research and practice. This discussion is provided in the sixth and final chapter of this

dissertation.

Phase One Results

In phase one, a dual phenomenological approach was utilized to answer two

qualitative questions: (1) What do South Carolina teachers experiencing two separate

models of EMPD identify as influential characteristics of the facilitators of professional

development and (2) How are teachers' perceptions of what makes a facilitator influential

similar and different dependent upon two different models of EMPD? Two samples of elementary school teachers, each experiencing either ongoing or isolated transformative professional development, were interviewed to determine the essence of how teachers perceive influential facilitators of EMPD (Moustakas, 1994). Data from each sample of teachers were analyzed separately and then compared to determine overall themes. The specific procedures used to analyze this data were provided in Chapter Three. Five themes emerged from the data analysis: (1) Credibility, (2) Support, (3) Motivation, (4) Management, and (5) Personality. Table 4.1, located in Appendix A, outlines these results with examples extracted from the data.

Participants across samples identified a barrier or wall that exists between the facilitator and participants, mostly due to the nature of professional development as being something that teachers are required to attend. If a facilitator wants to influence participants to alter instructional practices, this barrier must first be addressed. The five themes emerging from the data provide a framework for facilitators to understand why this barrier exists. In order for the barrier between teachers and facilitators to deteriorate, it is necessary for the facilitator to possess the qualities inherent in each of these themes. Based on the data, it is insufficient for a facilitator to display evidence of only one or two themes; all must be present for that facilitator to be influential in transforming instructional practice. The following section presents descriptions of each theme. These descriptions provide the reader with an understanding of how each theme was defined.

Composite Textural Descriptions

This section presents the findings from phase one of this mixed methods study in the form of composite textural descriptions as described by Moustakas (1994). These composite textural descriptions provide the meaning or essence for participants as a whole when experiencing an influential facilitator of EMPD. Prior to the development of these composite textural descriptions, individual textural descriptions were developed for each participant in phase one. Moustakas (1994) describes the process of developing of individual textural descriptions:

> In the Transcendental-Phenomenological Reduction, each experience is considered in its singularity, in and for itself. The phenomenon is perceived and described in its totality, in a fresh and open way. A complete description is given of its essential constituents, variations of perceptions, thoughts, feelings, sounds, colors, and shapes (p. 34).

The individual textural descriptions for participants are located in Appendix G. A composite textural description is presented below for each of the five themes emerging from the data. These descriptions include excerpts from the data to provide the reader with examples of how participants perceived and described each theme.

Credibility

Credibility, as determined by the data, encompasses any quality or characteristic a facilitator possesses which allows participants to feel confident that the facilitator is qualified and capable to conduct professional development for elementary mathematics. These characteristics identified by participants extend to a variety of areas, but they all

allow participants to feel secure that the information presented or discussed during professional development is coming from a reputable source. This confidence enables participants to connect with facilitators and can be vital to influencing practice. If participants are not confident that a facilitator is credible, they are less likely to buy into what the facilitator is recommending during professional development. Participants identified this lack of confidence as common in their professional development experiences. Four central characteristics emerged as meaning units for the theme of credibility: (1) Knowledge, (2) Experience, (3) Proof, and (4) Professionalism. If any of these characteristics were not present, teachers categorized facilitators as not being credible.

Knowledge

Participants identified knowledge in three different ways, (1) Knowledge of content, (2) Knowledge of pedagogy, and (3) Knowledge of new practices in education. An influential facilitator of EMPD must have a thorough understanding of mathematical content and both the elementary level and beyond. They must be able to answer questions related to mathematical content or provide a way for participants to find answers. It is also necessary for a facilitator to understand the best ways to teach the content at the elementary level. This understanding of pedagogy should encompass the continuum between early childhood and upper elementary grade levels. In addition to knowledge of content and pedagogy, an influential facilitator will demonstrate knowledge of new practices related to education. Participants often cited a lack of new information as a non-

influential characteristic of a facilitator of EMPD. The following excerpts from data transcripts provide examples of how participants perceive knowledge as a necessity:

Knowledge of content.

- o I just feel like she is so knowledgeable on the content of each grade level, because there are so many grade levels sometimes in that professional development and she makes it to where it is meaningful to a Kindergarten teacher, just as meaningful to me as a fifth grade teacher (Participant 9).

- o Their knowledge of the material. You can memorize something and regurgitate, but do you really understand? Because if they don't understand it and you don't believe them, then you are not going to buy into what they are saying (Participant 7).

- o They don't know the content or what they are talking about and it is very obvious that they don't so you are listening to someone that probably you feel like you know more than they do (Participant 14).

Knowledge of pedagogy.

- o In how children develop. You know knowledge is this would pertain to early childhood whereas it wouldn't necessarily pertain to upper elementary, so knowledge about kids and their development (Participant 15).

- o They would be knowledgeable about current strategies for instruction. Because if you are facilitating, that may be the missing piece that a group is having. So it may not be that math instruction is where they are falling

down, it may be that they don't understand learning styles. They may have

a group of all tactile, kinesthetic learners, which if you're talking about

children of poverty that is typically what you've got, and they are doing

everything orally, well a good facilitator would know, 'all right, we need

to talk about modalities' (Participant 17).

Knowledge of new practices.

- o She constantly is learning new information that makes me want to learn

    new information. When you watch somebody just soak up knowledge you

    say, 'I want that too' (Participant 9).

- o One who does research and finds new ideas and brings new ideas back

    (Participant 11).

Experience

Participants across both samples stressed the need for facilitators of EMPD to

have two main types of experience in order to be influential. They need current classroom

experience at the elementary level and experience with the topic in which they are

facilitating. Participants identified facilitators with elementary classroom experience as

understanding of the issues that teachers currently face and realistic of the expectations

that are demanded of teachers. Participants valued empathy over sympathy when a

facilitator exudes this understanding. If a facilitator had classroom experience, but it was

at a level above elementary school, teachers were less likely to categorize that experience

as influential. Many participants felt it was necessary for facilitators to have experience at

the specific grade level they were working with in professional development. If a

facilitator was working with teachers from kindergarten through fifth grade, that

facilitator should have experience at kindergarten, first, second, third, fourth, and fifth

grade in order to exude a high level of credibility. Experience in one grade at the early

childhood level (kindergarten through second grade) and one grade at the upper

elementary level (third through fifth grade) was also considered highly credible. The

facilitator must also demonstrate experience with their topic, in this case, with elementary

mathematics. Facilitators should be able to describe specific instances where they have

used the recommended methods in their own instructional practices. Teachers cited this

type of experience as valuable because facilitators then have the ability to provide hints

or answer questions teachers may have about implementing these practices in their own

instruction. The following excerpts from the data indicate the need for facilitators to have

experience.

Classroom experience.

- o Someone who has been where I am and knows what it's like to have 24

   children and you're one person and trying to manage everything and they

   understand and have ways to help a lot of times, been there, done that, you

   know, that helps (Participant 1).

- o Someone who sits behind a desk all day. Yes, they have the education,

   they've got the background knowledge, but it has been how many years

   since they have been in a classroom? They think they know what they

   should be saying or they know what they want to see, but a lot of times

what you want to see and what you think you should see isn't what works

for the kids (Participant 5).

o I think that if you are the facilitator, you should be well-rounded, both in

the classroom and you are expected to, because sometimes I know our

facilitators, they have to come in and evaluate, I don't think a facilitator

should only have experience in like Kindergarten. I think they should have

taught both upper and lower grades as well (Participant 10).

o I think they ought to have the overall spectrum because it is definitely a

continuum, but you know when you are talking about early childhood, you

really need to have some experience with early childhood children. I think

some suggestions maybe in my Masters class were not necessarily

appropriate for the age group (Participant 13).

o Not because they don't know the information, but for the participants, they

need that validity that it is OK, this person has taught, they have been in

my shoes before. Sometimes teachers come in with the mindset that you

don't know what it is like; you've never been there (Participant 15).

o Well, I would think someone who was going to do elementary

mathematics, they should have taught math at the elementary level. Maybe

two or three different grades (Participant 20).

Experience with their topic.

o If a facilitator is going to come teach on how to utilize, for example, XYZ

math program, how can they truly teach me how to use it if they never had

classroom experience because they are not going to be prepared for the

what ifs. So I think they definitely need classroom experience (Participant

7). (The name of the curriculum was changed to protect confidentiality.)

- o One who whatever you're dealing with or whatever you are trying to teach

  have actually experienced it or actually have seen other schools who were

  actually involved (Participant 11).

- o Instead of just telling me to do it, I want them to say, 'Well I do it and it

  really…', I guess the benefits of it, you know how their children have

  learned so much or they really found, well you know this part was hard,

  they could give me the heads up (Participant 12).

Proof

Teachers stressed the need for facilitators to provide proof or evidence that their

topic was beneficial to classroom instruction. It was not enough for a facilitator to

possess the belief that their topic would improve student achievement in mathematics;

evidence of this increase in student achievement should be presented through

standardized test scores or student work in order for a facilitator to increase their level of

credibility. The following excerpts indicate the need for facilitators to provide proof to

teachers of the benefit of their topic.

Proof of the benefits.

- o When you see statistics, however accurate the testing is, when you see that

  compared to either in district, in state, nationally or internationally you see

  sort of where you're falling in that. I think that is incentive enough to

make you want to know how to do something more effectively (Participant 13).

- o I think if they believe in something that there should be some sort of example to go with it. I think there should be evidence to back it up rather than just the belief. It is two separate things, but I think they should both be evident (Participant 15).

Professionalism

The last piece categorized under the theme of credibility was the need for facilitators to act, speak, and dress in a professional manner. Teachers described experiences where facilitators used curse words, dressed inappropriately, or behaved in a disrespectful manner. When these experiences occurred, teachers identified these facilitators as being non-influential. The following excerpts provide evidence of the need for facilitators to exude professionalism to ensure credibility.

Professionalism in dress and behavior.

- o I just think if a professional development is a professional thing, you should dress and act the part (Participant 8).
- o I would say dialect is pretty important too. Most people I can understand. There are some people that I have trouble understanding (Participant 15).
- o I have been at one before where the person has used curse words before and I don't think that is appropriate for any activity and still be considered professional (Participant 18).

Support

The second theme emerging from the data was the need for facilitators to support participants before, during, and after professional development. In order for facilitators to break through the existing barrier, they must demonstrate to participants the ability and desire to provide support in two ways: (1) By providing assistance to participants and (2) By reacting to participants in an appropriate manner. This support enables participants to develop trust in the facilitator. This feeling of trust is imperative in transformative professional development. If a teacher does not trust the facilitator, they will be less likely to be engaged in a professional development experience.

Providing Assistance

The need for participants to provide assistance to teachers is the only area emerging in the data that differed between samples of participants. This need was evident in both samples; however it was described differently depending on the model of professional development that was experienced by participants. Teachers experiencing a model of isolated transformative professional development often described the feeling that they were exposed to professional development and then were expected to immediately implement changes in classroom practice regardless of how confident or capable they felt. They identified the need for facilitators of professional development to be available following a professional development experience and realized that this need was not currently being fulfilled. Many described the feeling that facilitators could not fully meet teacher needs because they were not present long enough to develop an understanding of the context for teachers. In contrast, those who had experienced a model

of ongoing professional development categorized the support received from facilitators as an influential or positive characteristic. These teachers recognized the importance of this type of support and often cited experiences where changes in instructional practices were evident because they felt confidence and trusted that their facilitator would provide support or assistance if necessary.

While the need for ongoing assistance was described differently between samples, both samples also described providing assistance during a professional development session as essential in building trust. A facilitator should provide assistance during a session by affording enough time for participants to complete and discuss activities, by offering a variety of resources for teachers to use during or following sessions, and by providing incentives such as food or prizes during professional development. If a facilitator supplied these types of support during a session, participants were more likely to be engaged in the experience. The following excerpts from the data show the importance of providing assistance before, during, and after professional development experiences.

Providing assistance.

o She is so open minded and helpful in any way that if we go to her with any concern, whether it be as a small group, whole group, or an individual student in our class and maybe take samples to her or whatever the case may be. She will sit down with us, she will even come in and monitor and watch the student to help facilitate the learning for that child, whether we

need to be taught something to teach that child or a suggestion (Participant 7).

- o Knowing that the facilitator is there to guide you and help you at any time, whether it be on a Wednesday afternoon and that you have a lesson that you are preparing for Thursday that you have a question about, that you can go to them and ask, it makes you want to do it more (Participant 9).

- o You don't see our facilitators unless you are struggling with something (Participant 10).

- o And I think one of the other things with this is the one shot deal. It just, if you are here for one day and that is supposed to solve all of my ills and you are never going to touch base with me again, there is no follow up (Participant 17).

- o We emailed her one day and said 'When you get a chance can you come and talk to us' well, she rearranged her schedule so that she could meet with us that next morning because that was important. If it was important to us, then it was important to her (Participant 18).

Reacting to participants

The way a facilitator reacts to participants during sessions can either build or deteriorate the amount of trust teachers feel. Many teachers describe the feeling that facilitators don't view them as equals and that their reactions toward questions or comments made by teachers often are condescending or dismissive. Facilitators must instill the feeling that they are on the same level as teachers and that any comments or

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questions are valid and will be treated as such. Teachers value facilitators who listen to what they have to say and who are open to criticism or differing opinions during professional development. An influential facilitator is someone who establishes personal connections with teachers and makes an effort to get to know more about the lives of teachers in the session. This facilitator will establish a community of learners within a session where teachers learn from each other and the facilitator participates in the learning process. This facilitator will also present material in a way that "makes sense" to participants and will not introduce mathematical content that is "too far over the participants' heads". They will exhibit a sense of caring or understanding towards participants and will continuously encourage them during sessions. Finally, an influential facilitator will alter a professional development session to meet the needs of the teachers they are serving. They will react to these needs by tailoring a professional development session for the context of participants. The following excerpts demonstrate the need for facilitators to react to participants in a certain manner in order to instill the trust that is necessary to influence practice.

Reactions.

- o Making you feel like your questions are important. 'That's a good question, I'm glad you asked that' because you know other people might have that question too and you're hoping it is not a stupid question (Participant 2).
- o It was as if we were learning together, so they knew that we were all in the same boat learning together and that attitude always helps too because it

makes you feel like, 'Well, I can give input and it's important and they are giving me input' and it builds the relationship or the rapport (Participant 3).

o She was just always encouraging, always encouraging, no matter what. And we have had some rough, where we didn't see eye to eye, simply because she knows a lot more than I do, but sometimes I think I know more. But she just, I have seen the light and I am glad that she put me through what she put me through last year (Participant 5).

o You have to be comfortable around them, I think that is the only way to learn new things, if you are comfortable enough to ask questions and know that your questions won't be beat down, comfortable enough to disagree and not worry that you will be angry with me (Participant 10).

o If you have a disagreement about what you are talking about, the facilitator needs to listen to what you are saying and then if they can see that they can agree with part of that, you know if they can say, 'Well, I can see that, you know, still, why don't you try this? Instead of just having a closed mind, you know, why don't you try these new ideas?' (Participant 11).

o Someone who I guess that critiques, I don't necessarily, I like critiques, I want to know what I am doing wrong, but it is in a certain way, in a bad way, I don't know how to say that, I don't mind being told I'm doing something wrong, but say it in a nice way (Participant 12).

o I think the comfort level overall in a session like that, to where you come in and they make you feel like they are glad you are there, they are interested in you as a person, so personally, they try to get to know people in the group (Participant 14).

o You can be knowledgeable about something, you can be very smart and know your material, but you could also come across if somebody were to say something, you could, a question that you think like, 'Oh that is just the easiest thing' and just treating them like, 'You should know that' then they, to me that is sort of the know it all, when they are like, 'Are you kidding me?' I want you to be knowledgeable, but I don't want you to be a know it all (Participant 15).

o If they can't read their group to know how to adjust, if they just keep going and are not aware of the participants and if they are grasping or not grasping, if they are tuned in or not tuned it, bored or not (Participant 16).

o They are capable of listening, which that seems like a silly thing to say, but a lot of times that is the difference between a facilitator and an instructor. A facilitator is going to listen and then start planning. An instructor just has a set of curriculum they are going to march down. We are going to do A then B then C then D (Participant 17).

Motivation

The third theme emerging from the data is Motivation. This theme does not indicate the need for a facilitator to motivate participants, but rather pertains to teacher

perceptions regarding the motivation of a facilitator to approach the job in a meaningful or effective manner. In this theme, participants discuss two areas in which motivation can be seen: (1) The rationale for being a facilitator and (2) Demonstrating belief or excitement about the topic. A motivated facilitator is not conducting professional development for a "paycheck". They are there to influence change in instructional practice. They are there to help teachers and to support students. Their main goal for being a facilitator of EMPD is to improve student achievement. Teachers describe instances in which facilitators tell participants that they don't want to be there in an effort to make a personal connection; however, this effort backfires on the facilitator because teachers view the facilitator as having a lack of proper motivation for their position. Motivated facilitators of EMPD have a love or a passion for mathematics and for seeing people achieve in mathematics. These facilitators demonstrate this passion by showing enthusiasm or excitement during professional development. They believe that their topic is important and that if teachers adopt recommended practices, their students will be more likely to increase achievement in mathematics. The following excerpts from the data show the need for a facilitator to be motivated when conducting professional development. These statements are divided into the two areas described by participants: (1) The rationale for being a facilitator and (2) Demonstrating belief or excitement about the topic.

Rationale for being a facilitator.

- o Her love for, not just math, but truly wanted to see the kids succeed. That is her one goal. All the kids. Not just the high group or not just bringing

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the low kids from the bottom up, she really and truly wants to see all the kids succeed (Participant 5).

o You kind of quickly see whether or not they feel strongly about what they are doing, based on their tone, based on how it is presented or delivered (Participant 7).

o One who is there for the staff and not there just for a paycheck. Like teachers, you know, you can't be in teaching just for a paycheck you've got to have a love for it and this is someone who has a love for training because they want to see growth in the students in that school (Participant 10).

o 'I know you don't want to be here, I don't want to be here either. It is time for everybody to go home so I will make it as short and sweet as I can, this is what we have to do'. They come in, they don't elaborate very much, they don't give many examples, they act like it is a job to be there, not that they necessarily enjoy it (Participant 18).

o You can tell they are sad to be there, because you know as well as I do, you're sitting out there and you are thinking, 'You are getting paid to do this, you need to act like you want your paycheck', just negative, it makes the whole atmosphere kind of have an Eeyore syndrome, you kind of have a little cloud following you everywhere, boring (Participant 20).

Belief and excitement about their topic.

o She was wholeheartedly, she wasn't only talking it, she was walking it

too. She was telling us what she truly believed (Participant 2).

o Convincing for lack of a better word, if you don't believe in it, why do

you expect me to. You have got to sell your product, if you believe in it,

you have got to make me believe that it is worthwhile (Participant 16).

o When you get her going, there is no stopping her, I mean she gets really

excited about something and it kind of rubs off, sometimes, and

sometimes you are like, oh man. But, I mean just being excited, you're

kind of like, 'Okay this is kind of cool' and you start coming over to it

(Participant 12).

o She knew what she had to say was important for everyone in the room

(Participant 20).

Management

The fourth theme emerging from the data is Management. Management includes

the types of activities or discussions occurring during a session, but more importantly, it

includes the way the facilitator presents these activities. There are three meaning units

that are clustered under this theme: (1) Session management, (2) Making the material

meaningful, and (3) Organization. Session management includes any physical action that

the facilitator does to present the experience to teachers. Influential facilitators will

manage a session by moving around rather than standing in one place at the front of the

room. They will use group activities rather than lecture to present the content and they

will engage participants with reflective discussions. Influential facilitators will present information in a way that is meaningful to participants by anticipating their needs and wants prior to a professional development session. These facilitators will identify what teachers perceive their needs to be and construct the session to meet these needs. Teachers described facilitators who have met their needs during sessions by connecting the information to current practices or by making it useful to them by making the information immediately applicable to their current situations. They also identified facilitators who presented challenging experiences as influential. Some teachers describe facilitators who have participants do activities that their students will do during a session as influential while others describe this practice as unnecessary. It is unclear whether or not facilitators should use these types of activities, but it is clear that whatever activities are done during a professional development session should connect explicitly to classroom practice. A facilitator conducting an experience devoted primarily to improve teacher content knowledge in mathematics must show how improving content knowledge connects to classroom practice in order to influence or motivate teachers to be engaged. In addition to making the information meaningful, an influential facilitator will have the professional development experience organized in an effective manner. They will have all materials prepared prior to the session and have these materials easily accessible by participants during the session. They will not waste time by "getting off track" and they will dismiss participants on time. The following excerpts from the data demonstrate the need for facilitators to manage a session in an influential manner.

Session management.

- o She always starts out her presentations with little cartoons, just something entertaining to kind of break the ice, or some little activity where people can get to know each other, or tell some funny story about you or you know, just a little ice breaker, kind of like a preacher does before he starts his sermon (Participant 2).

- o Putting you in situations where you have to come up with a solution, where it is not just, 'I'm going to show you how to do this' but they force you to be in a circumstance where you have to come up with the solution. That's how the Army was all of the time, you know, 'You don't know what you're going to face in the field, what would you do?' And rather than tell you, they would let you work it out (Participant 3).

- o I love the interaction, the not so much lecture, but here is a task, go work on that for a little while and let's come back, group work, I enjoy that as an adult. I learn from my peers and when I have the opportunity to sit with a group of other teachers in a professional development situation and the facilitator lets us work together, that is so powerful for me (Participant 9).

- o I kind of like the facilitators that are actually moving around and talking to the entire group and not so much focusing on maybe just one side you know, because then that tends to make me think, you know, 'Oh, well they are saying all of the right things and this group over here, well they are not

as important as this group over here. We are less important'

(Participant10).

- o I think the most beneficial thing that helps me is listening to each group
  share out because there is always something coming from each group, that
  accountability, and then hearing that it is not just this way, it can be this
  way or it can be this way and that has probably been the most beneficial
  thing (Participant 15).

Making it meaningful.

- o When we left, we were like, 'Wow, what a new idea', you know seeing
  something new that you know would be beneficial for you and your
  students. More so for the students (Participant 2).

- o Because when she teaches to us or to other groups, she makes it very, one,
  hands on, but she also brings it about in a way that is practical, you
  understand the use of it based upon how you would apply it to your
  everyday life, which is what we have to do in our classrooms (Participant
  7).

- o When you can walk away with something and make it your own, it is so
  powerful. Sometimes you think, 'Yeah, that doesn't really apply to me". I
  feel like everything applies to me, it makes me want to do better
  constantly (Participant 9).

- o A facilitator to me is a person who is bringing information to another
  group of people that is to be used. It is not information for the sake of

information. It is information that is going to be used for a purpose (Participant 17).

Organization.

o If they are not organized in their speech and the way they present the material, they may be all over the place and you are lost, you are still trying to figure out what exactly are they trying to tie together. So their ability to organize the material and present it (Participant 7).

o They have to be able to keep things moving along, but at the same time, you've got to allow for discussion and questions (Participant 16).

o Someone that strays off topic, they start talking about personal things that have nothing to do with the topic that it is on (Participant 19).

Personality

The fifth and final theme emerging from the data is Personality. Personality signifies the way facilitators act or their demeanor, not the way they react to participants which was categorized under Support. Personality includes all of the characteristics or behaviors that are encompassing of the self or how facilitators present themselves to the audience. These characteristics are described by participants as positive or negative and as setting the tone for an entire professional development experience. If a facilitator conducts a session in a "monotone voice" or is considered boring or unanimated, participants become disengaged. If the facilitator exudes a sense of humor or a friendly disposition, teachers are more likely to be engaged. Influential facilitators are friendly and outgoing; they have a sense of humor and have the ability to laugh at themselves.

They are energetic yet relaxed. They display a sense of confidence and calm. They are

entertaining and include jokes or tell stories when presenting. Non-influential facilitators

are boring and monotone. They are opinionated, arrogant, and can be rude toward

participants. When they speak, they are not animated and seem sad. They are standoffish

or unapproachable. In the following excerpts from the data, teachers describe both

positive and negative qualities they have witnessed in facilitators of EMPD.

Positive and negative qualities.

o   You want somebody that's easy to listen to and that you can relate to and

that's a little entertaining and keeps you interested. Not just somebody

who stands up there and just talks and talks and talks (Participant 2).

o   They need to be upbeat, kind of energetic, because at first, they go into a

presentation, even if they act like they are upbeat, it is either going to last

throughout the presentation, or you are going to quickly see right through

them that it is just kind of a farce to get you to focus and pay attention

initially (Participant 7).

o   When I get there, I am really surprised because he is so animated that he

makes everything fun and so I get surprised and I forget that I have to go

all the way up until March, until I have to go the next week (Participant

10).

o   I guess I am putting energetic and enthusiastic in with the category of

friendly, you know like when you come into a session, they might start up

a conversation with you (Participant 15).

- It is almost like you have to entertain teachers just like we are expected to entertain students in the classroom. They say there is a little bit of drama and acting in what you do to keep them motivated (Participant 18).
- It was interesting, the presenter was a little, how do you say, opinionated, so he ruffled quite a few feathers (Participant 12).
- They can't be negative, they can't be condescending. You can't let that show, you can think it, but you can't let it show (Participant 16).
- Arrogant, very arrogant. 'I am not in the classroom anymore, you are, aw poor baby'. I have heard that before. I'm like, 'There's the door, don't let it hit you on the way out' (Participant 17).

Conclusion

This chapter presented the findings for phase one data collection and analysis. The dual phenomenology conducted in phase one resulted in the emergence of five themes that outlined the essence of how teachers perceive an influential facilitator of EMPD: (1) Credibility, (2) Support, (3) Motivation, (4) Management, and (5) Personality. These themes were identical across the two samples of teachers; however a difference was identified in the way that teachers experienced one of the themes. The textural descriptions indicate that teachers who experienced both ongoing and isolated transformative experiences in EMPD identify support through ongoing assistance from the facilitator as an influential characteristic. However, those who have experienced ongoing professional development recognized that they were receiving this type of support from facilitators while those who had isolated professional development

recognized the need for this type of support, which was absent from their experiences. It is imperative to note that all five of these themes must be present for a facilitator of EMPD to be influential and to motivate teachers to be engaged in professional development. If a facilitator lacks the characteristics present in one of the themes described in this chapter, then the wall that exists between teachers and facilitators cannot be broken. A facilitator of EMPD must be credible, instilling confidence in teachers of their ability; they must provide support, allowing for teachers to build a sense of trust; they must be motivated, showing the same passion for facilitating that their participants do for teaching; they must demonstrate management ability, providing teachers with purposeful experiences; and they must have a positive personality, enabling teachers to enjoy the experience as a whole.

Phase one examined perceptions of influential facilitators of EMPD as determined by two samples of elementary school teachers in South Carolina. While the results emerging from this analysis are illuminating and will provide a wealth of information for future facilitators of EMPD, it is unclear if the perceptions of these teachers are similar to those of other elementary school teachers. The five themes emerging from the data analysis for phase one informed the development of the survey instrument that was piloted and then administered to a larger sample of elementary school teachers across the United States in phase two. This national survey was used to determine the extent to which the results from phase one generalized to a larger sample of elementary school teachers. The results of the pilot study and phase two are presented in Chapter Five. The results from phase one and phase two of this study form the basis for Chapter Six, which

concludes this dissertation with a discussion of the implications of this study for

practitioners and researchers.

CHAPTER FIVE

"Keeping your audience motivated. Lots of times people are there because they are told to, lots of times people are there because they think they want to when they would rather be across the street shopping. I think a good presenter or facilitator has to be prepared to keep them motivated, to keep them wanting to be there" (Participant 8).

This dissertation investigates how teachers perceive influential facilitators of elementary mathematics professional development (EMPD). A mixed methods exploratory sequential design was utilized to answer the central research question: How do United States elementary school teachers perceive an influential facilitator of (EMPD)? Chapter Four presented the qualitative results emerging from the first phase of this sequential design. These results indicated that elementary school teachers in South Carolina perceive influential facilitators along five themes: (1) Credibility, (2) Support, (3) Motivation, (4) Management, and (5) Personality. The second phase of this study utilized a survey design to determine if the results from phase one generalized to a larger sample of elementary school teachers across the United States. This chapter provides an overview of the results from this second phase of the research study. This overview is divided into three separate sections: (1) The results from the mixing process completed prior to phase two, (2) The results from the pilot study conducted to assess the quality of the survey instrument developed for use in phase two, and (3) The results of the national survey implemented during phase two of this study.

Results from Mixing the Data

Five themes emerged from the data analysis conducted for phase one of this study. These themes were: (1) Credibility, (2) Support, (3) Motivation, (4) Management, and (5) Personality. These themes formed the basis for the constructs used to develop the survey implemented in phase two of this study. Once these themes were ascertained, the meaning units that were identified and extracted from the interview transcripts and clustered under each theme were quantitized (Johnson & Onwuegbuzie, 2004) to determine the frequency that these meaning units occurred among participants. The results from this process are displayed in Table 5.1, located in Appendix A.

The survey developed for use in phase two of this study contained four sections: (1) Demographic items to determine differences among groups, (2) An open-ended item to give participants an opportunity to list important characteristics of influential facilitators, (3) Likert-type items to determine if participants in phase two agree with the findings from phase one, and (4) Multiple-choice items to determine how participants rank characteristics of facilitators in terms of importance. The data quantitized from phase one were used to develop the items used in sections three and four of this survey. Due to the large amount of data analyzed in phase one, it was necessary to determine a benchmark for the quantitized data that would be included as items on the survey for phase two. A review of the literature relating to instrument development models in mixed method research yielded no guidelines for determining benchmarks. Therefore, a benchmark of 25% was chosen, indicating that the meaning unit had to occur among at

least 25% of participants in order to be included in a potential item pool for the third section of the survey. This benchmark was later revised to 30% to narrow down potential items. The items written for this third section of the survey were Likert style in which participants could choose a response from an eight point scale ranging from Completely Agree (1) to Completely Disagree (8). The results from quantitizing the data in phase one indicated that meaning units clustered under the themes of Management and Support occurred more frequently than meaning units clustered under Credibility, Motivation or Personality. In addition, items clustered under the theme of Support occurred across participants more frequently than any other theme. Of the 94 meaning units that were quantitized, 52% met the benchmark cutoff of 30%. Of this percentage of units, 27% related to Management, 24% related to Support, 18% related to Credibility, 18% related to Personality, and 13% related to Motivation. Therefore, the proportionality of the items written for the survey reflected these results. Of the 43 Likert items created for this survey, 21% were related to Management, 31% were related to Support, 16% were related to Credibility, 16% were related to Motivation, and 16% related to Personality. Because meaning units relating to Support occurred more frequently among participants than those related to Management, more survey items were written relating to the theme of Support than any other theme. The items that were written to represent each construct are displayed in Table 5.2, located in Appendix A.

The fourth section of the survey developed for phase two is comprised of multiple choice questions. These questions are designed to determine if participants in phase two categorize characteristics of influential facilitators in order of importance. Participants

were asked to choose the quality that was most important among groups of four statements about influential facilitators. Because this section examined levels of importance, the benchmark used to develop items from the quantitized phase one data was increased to 50%. Therefore, items written for this section were based on meaning units occurring among at least 50% of participants in phase one. Of the 10 questions developed for this section, six items examined if a rank order exists between themes and four items examined if a rank order exists within themes. Table 5.3, located in Appendix A, lists the items categorized by theme that were developed for this section of the survey. The resulting survey, which is located in Appendix G, was piloted prior to administering it to the national sample identified for phase two. The results from the pilot study are described in the section below.

Pilot Study Results

Once the mixing of the data between phase one and phase two was complete, the survey was piloted to a small sample of elementary school teachers in South Carolina. Of the 41 surveys that were returned following an electronic distribution, 35 were usable after removing surveys that were incomplete or reflected one response throughout. Disregarded surveys were not used in the analysis. The purpose of this pilot study was to analyze the validity and reliability of the instrument to ensure an efficient implementation in phase two. Two questions were addressed during this pilot: (1) Do the items in the survey instrument yield valid and reliable results, and (2) Should any items be removed from the survey instrument? To answer these questions, the survey was analyzed by the type of scale in order to better understand the items. Therefore, separate analyses

occurred for the Likert items in section three of the survey and for the multiple-choice items in section four of the survey. The results for each section are described below.

Section Three: Likert Scale

Internal consistency for the 43 item Likert scale was determined through an analysis of the Cronbach's alpha. Prior to this analysis, reverse scaling was used for item 19 (A facilitator should lecture during PD) to ensure a common metric among items. The reliability for the scale was .959. The use of the results from phase one of the study to write items increased the content validity of the Likert scale. Items for this scale were written along five theoretical constructs identified through a phenomenological analysis of teacher perceptions of influential facilitators of elementary mathematics professional development.

One-sample *t* tests were conducted for each of the 43 items developed for this scale to determine whether each test variable was statistically significant from a test value or cutoff point. For this pilot study, the midpoint on the survey scale (4.5) was used as the test value and those items that had means significantly different from the test value were kept in the final version of the scale. The alpha for this analysis was set at .05. Each of the 43 *t* tests yielded significant results (p < .01) indicating that participants in this sample agreed with the findings from phase one of this study. The effect size for each *t* test indicated a high effect. The results for each of the 43 *t* tests are displayed in Table 5.4 located in Appendix A. Because each item was significantly different than the test value and there was a high level of internal consistency within the scale, all of the items in section three were retained for the final survey implemented during phase two.

Section Four: Multiple-Choice Items

Six of the 10 items written for section four of this survey were coded by theme as follows: Credibility = 1, Support = 2, Motivation = 3, Management = 4, and Personality = 5. The last four items measured levels of importance within themes; therefore they were coded separately on a one to four nominal scale. Because these items were nominal in nature, no analyses of the scale were required. One-sample chi-square tests were conducted for each item to assess whether the proportions associated with each category are equal among participants. The results of each of the 10 chi-square tests were significant ($p < .05$) indicating that participants in the pilot study identified one overall item as more important than the others in each multiple-choice question. These results are displayed in Table 5.5, located in Appendix A. Due to the low sample size collected for the pilot study, follow-up tests were not conducted for each item. All items were retained from this section to determine if a larger sample size would produce similar results.

The results from an analysis of the validity and reliability of section three and section four indicated that no revisions were necessary for the survey instrument. Although the survey contained 65 items, it was decided that the high reliability in section three and the significance of the chi-square tests in section four outweighed the overall length. The survey was kept intact and implemented to a national sample in phase two of the study. The methods for this survey implementation were described in Chapter Three. The results of the phase two are described below.

Phase Two Results

The final survey was distributed electronically to 49 gatekeepers in areas across the United States who, in turn, distributed it to elementary school teachers. Of the 660 surveys that were returned following an electronic distribution, 565 were usable after removing surveys that were incomplete or reflected one response throughout. Following the criteria established during the pilot survey, disregarded surveys were not used in the analysis. Therefore, the rate of returned surveys meeting inclusion requirements was 85.6%. Data was disaggregated along eleven demographic items for analysis: (1) state where employed, (2) district where employed, (3) grade level, (4) gender, (5) years of full-time teaching experience, (6) level of education, (7) National Board Certification status, (8) ethnicity, (9) hours of professional development received, (10) perceived change in instructional practice and (11) type of professional development received. Demographics of participants in phase two were displayed in Table 3.3 located in Appendix A, as stated in Chapter Three. A cursory examination of items for central tendency yielded no extreme outliers, indicating that items were coded properly in SPSS. Procedures for reverse-coding of Item 19 on the Likert scale were identical to those conducted in the pilot study. Internal consistency of the Likert scale was determined through an analysis of the Cronbach's alpha. The reliability of the scale was .941, indicating a high level of reliability. Further, an examination of "Cronbach's Alpha if Item Deleted" suggested that the Cronbach's Alpha increases to .947 upon deletion of Item 19. The need to reverse code this item and the significant increase in internal consistency was enough to warrant the removal of this item from the scale.

Principle components factor analysis (PCA) was conducted for data reduction and to examine the dimensionality of the 43 items from the Likert scale. A factor extraction yielded six factors with eigenvalues greater than one. The Kaiser-Meyer-Oiken measure of sampling adequacy yielded a high level of compactness (.945), further, Bartlett's test yielded significant results (p< .001) therefore, factor analysis was appropriate for these data. Factor rotation was determined through a comparison of the scree plot and the amount of variance explained by each factor. Based on these results, five factors were rotated using a Varimax rotation procedure. Each of the five factors yielded an interpretable factor solution as displayed in Table 5.6 in Appendix A. Six items loaded on more than one factor. Factor 1, accounting for 36.42% of item variance, was defined by 16 of the scale items. Because these items were related to how a facilitator supports or reacts towards participants, this factor was labeled as Support. Items written for the survey based on the themes of Support and Motivation in phase one were clustered under this factor. Factor 2, accounting for an additional 6.89% of item variance, was defined by six of the scale items and was labeled Personality. The items clustered under this theme were almost identical to the theoretical construct developed from phase one. Factor 3 was defined by seven of the scale items and accounted for 5.15% of item variance. This factor was labeled Management because all of the items related to the way a facilitator presents material during professional development. Factor 4 accounted for 4.05% of the variance and was defined by six items. This factor was labeled Knowledge. Factor 5 was defined by five items and accounted for an additional 3.6% of the variance. This factor was labeled Connections. Factors 4 and 5 were comprised of items that related to the

theoretical construct of Credibility. However, items clustered under Connections all related to how a facilitator can relate to participants either through personal or professional experiences. Therefore, knowledge and experience, while combined in the phase one analysis, was separated into two separate factors in the phase two analysis. For the most part, each factor was similar to the themes identified in phase one of this dissertation. The five rotated factors accounted for a total of 56.10% of the variance.

Four questions framed the data analysis for phase two: (1) To what extent do the results of the first phase generalize to a larger sample of teachers across the United States, (2) To what extent do the results of the first phase generalize to samples of teachers across the Unites States with differing demographics, (3) What rankings of importance do a sample of teachers across the Unites States place on characteristics of influential facilitators of EMPD, and (4) What rankings of importance do samples of teachers across the United States with differing demographics place on characteristics of influential facilitators of EMPD? The following sections present the results pertaining to each of these questions.

Question 1 Results

The first question addressed in the data analysis for phase two was: To what extent do the results of the first phase generalize to a larger sample of teachers across the United States? In order to answer this question, analyses were conducted at the unit level by examining each Likert item and at the cluster level by examining each factor identified through factor analysis. One-sample *t* tests were conducted for each of the 42 items developed for this scale to determine whether each test variable was statistically

significant from the test value of 4.5. Item 19 was removed from this analysis based on the results from the internal consistency examination. Each item had a scale of 1 (Completely Agree) to 8 (Completely Disagree). The alpha for this analysis was set at .05. Each of the 42 *t* tests yielded significant results (p < .001) indicating that participants in the national sample agreed with the findings from phase one of this study. The effect size for each *t* test indicated a high effect. The results for each of the 42 *t* tests are displayed in Table 5.7 located in Appendix A.

Following the analysis of the 42 individual items, five one-sample *t* tests were conducted on the survey responses to determine the extent to which participants agreed or disagreed that the items were characteristics of influential facilitators. The five factors identified through PCA were used in this analysis. Each had a scale of 1 (Completely Agree) to 8 (Completely Disagree). The test value was the midpoint of a summative score calculated for the items clustered under each factor. The alpha was set at .05. Following are the results for each *t* test.

Factor 1 (Support):

The one sample *t* test was significant, $t(564) = -90.327$, *p*<.001. The *t* test indicates agreement that teachers in this sample include those items clustered under support as influential characteristics of facilitators of EMPD. The effect size *d* of -3.80 indicates a large effect.

Factor 2 (Personality):

The one sample *t* test was significant, *t* (564) =-54.555, *p*<.001. The *t* test indicates agreement that the personality of a facilitator can impact teacher perceptions of the facilitator during EMPD. The effect size *d* of -2.30 indicates a large effect.

Factor 3 (Management):

The one sample *t* test was significant, *t* (564) = -38.807, *p*<.001. The *t* test indicates agreement teachers in this sample include the way a professional development session is managed and organized as influential characteristics of facilitators of EMPD. The effect size *d* of -1.633 indicates a large effect.

Factor 4 (Knowledge):

The one sample *t* test was significant, *t* (564) = -114.488, *p*<.001. The *t* test indicates agreement that teachers in this sample include knowledge of content and pedagogy relating to mathematics and knowledge of new practices as influential characteristics of a facilitator of EMPD. The effect size *d* of -4.825 indicates a large effect.

Factor 5 (Connections):

The one sample *t* test was significant, *t* (564) = -57.465, *p*<.001. The *t* test indicates agreement that teachers in this sample include the ability to make personal or professional connections with participants as an influential characteristic of a facilitator of EMPD. The effect size *d* of -2.418 indicates a large effect.

The first question addressed in phase two examined the extent that the results of the first phase generalize to a larger sample of teachers across the United States. Based on

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the results of the *t* tests conducted on individual Likert items and on the five factors

identified through PCA, it is evident that participants in phase two agree with the findings

in phase one to a significant extent. The open-ended question included in the survey was

also used to determine if the results from phase one can be generalized to a sample of

teachers across the United States. In this open-ended question, participants listed the most

important characteristics they would want a facilitator of EMPD to possess. These

characteristics were coded by the themes emerging in phase one. Codes for these items

were as follows: 1 = Credibility, 2 = Support, 3 = Management, 4 = Motivation, 5 =

Personality, 6 = Other. A doctoral student acted as an independent rater to establish inter

rater agreement by coding a subsection of the surveys (n= 20). Agreement between raters

occurred among 95% of items. While the original survey item requested that participants

list the top five characteristics of influential facilitators, many participants in the sample

only listed one characteristic that was most important. Because of this phenomenon, only

the top two items were considered in the analysis. In an examination of characteristics of

influential facilitators as perceived by teachers in this sample, no items were coded as

"other". Therefore, no new themes emerged from an analysis of this data meaning that

the participants in this sample identified the same characteristics as participants in the

sample for phase one. Frequency counts of each theme are displayed in Table 5.8, located

in Appendix A.

Question 2 Results

The second question addressed in this data analysis focused on the extent that the

results of the first phase generalized to samples of teachers across the Unites States with

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differing demographics. To answer this research question, a series of one-way

multivariate analysis of variances (MANOVAs) were conducted to evaluate the

relationship between the eleven demographic items and each of the following factors

identified through PCA: (1) Support, (2) Personality, (3) Management, (4) Knowledge,

and (5) Connections. The independent variable for each MANOVA was the demographic

item of focus and the dependent variables were the five factors identified through PCA.

The researcher first conducted MANOVAs to control for the Type I error inflation that

could occur from conducting individual analysis of variances (ANOVAs). The alpha for

each test was set at .05. Significant differences were found between the five factors and

the following demographics: State (Wilks's $\Lambda = .87$, $F(50, 2512) = 1.56$, $p<.01$), District

(Wilks's $\Lambda = .51$, $F(285, 2512) = 1.27$, $p<.005$), Grade Level (Wilks's $\Lambda = .89$, $F(30,$

$2210) = 2.11$, $p<.001$), Level of Education (Wilks's $\Lambda = .94$, $F(20, 1842) = 1.62$, $p<.05$),

Experience (Wilks's $\Lambda = .93$, $F(25, 2045) = 1.53$, $p<.05$), Hours of PD (Wilks's $\Lambda = .92$,

$F(25, 2060) = 1.91$, $p<.005$), Isolated versus Ongoing Professional Development (Wilks's

$\Lambda = .95$, $F(5, 528) = 5.08$, $p<.001$), and Perceived Change from PD (Wilks's $\Lambda = .94$,

$F(15, 1502) = 2.35$, $p<.005$). The multivariate η^2 ranged from .01 to .1 indicating a small

effect for each test.

Analyses of variances (ANOVAs) on individual dependent variables were

conducted as follow-up tests to the MANOVAs. Bonferroni's post hoc comparisons were

conducted when ANOVAs produced significant results and variances were equal.

Dunnett's C post hoc comparisons were used when ANOVAs produced significant

results and variances were unequal. The alpha for each test was .05. Statistically significant findings are described below.

State and Management

The ANOVA for the state where participants are currently employed and the way a facilitator manages a professional development session was significant, $F(8, 554)=3.19$, $p<.05$. The η^2 of .04 indicates a small effect size. Bonferroni's post hoc was selected to evaluate pairwise differences among the means, since variances were equal. A significant difference was identified in the means between participants working in South Carolina and those working in New Jersey ($p<.05$). While both groups agreed that the items listed under Management were influential characteristics, participants from South Carolina displayed a higher level of agreement than participants from New Jersey. No other significant differences among states existed.

Grade Level and Connections

The ANOVA for the grade level that participants teach and connections with facilitators was significant, $F(6, 556)=4.17$, $p<.001$. The η^2 of .04 indicates a small effect size. Follow-up tests were conducted to evaluate pairwise differences among the means. Levene's Statistic revealed equal variances, resulting in the use of Bonferroni's post hoc comparison. Significant differences occurred between those participants teaching at the first grade level and those at both the fourth grade level ($p<.05$) and those teaching in other settings such as a multi-age or a self-contained classroom ($p<.005$). While all groups agreed that the items listed under Connections were influential characteristics, participants working with first grade students displayed a higher level of agreement than

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those working with fourth grade students or with students in other settings. Significant differences also occurred between participants teaching at the kindergarten level and those teaching in other settings ($p<.05$). Participants working with kindergarten students displayed a higher level of agreement than those working with students in other settings. These findings are consistent with findings from phase one of the study where participants teaching at the early childhood level stressed the importance of facilitators having experience with early childhood students.

Level of Education and Connections

The ANOVA for participants' level of education and connections with facilitators was significant, $F(3, 559)=6.09$, $p<.001$. The η^2 of .03 indicates a small effect size. Bonferroni's post hoc was selected to evaluate pairwise differences among the means, since variances were equal. A significant difference was identified in the means between participants with a Bachelors degree and those with a Bachelors degree and 30 additional credits ($p<.005$), those with a Masters degree ($p<.05$), and those with a Masters degree and 30 additional credits ($p<.01$). While all groups agreed that the items listed under Connections were influential characteristics, participants with Bachelor's degrees displayed a higher level of agreement than any other group.

Perceived Change in Practice and Management

The ANOVA for participants' perceived change in practice and the way facilitators manage professional development sessions was significant, $F(3, 548)=6.74$, $p<.001$. The η^2 of .04 indicates a small effect size. Bonferroni's post hoc was selected to evaluate pairwise differences among the means, since variances were equal. A significant

difference was identified in the means between participants who perceived a significant change in practice based on their experience with professional development and those who perceived some change (p<.01), those who perceived little change (p<.001), and those who perceived no change(p<.01). While all groups agreed that the items listed under Management were influential characteristics, participants who perceived a significant change displayed a higher level of agreement than any other group. These findings indicate that teachers who claim to use reform practices in mathematics instruction also want reform practices to be used in professional development.

Type of Professional Development and Support

The ANOVA for the type of professional development that teachers receive (isolated or ongoing experiences) and the need for support from facilitators was significant, $F(1, 532)=4.51$, p<.05. The η^2 of .008 indicates a small effect size. A post hoc was not conducted for this analysis because there were only two groups among participants. While both groups agreed that the items listed under Support were influential characteristics, participants with ongoing experiences displayed a higher level of agreement than those with isolated experiences.

Type of Professional Development and Management

The ANOVA for the type of professional development that teachers receive (isolated or ongoing experiences) and the way a facilitator manages a professional development experience was significant, $F(1, 532)=7.22$, p<.01. The η^2 of .01 indicates a small effect size. A post hoc was not conducted for this analysis because there were only two groups among participants. While both groups agreed that the items listed under

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Management were influential characteristics, participants with ongoing experiences displayed a higher level of agreement than those with isolated experiences.

The second question addressed in this data analysis examined if differences existed among demographic groups regarding the extent that the results of the first phase generalized to a sample of teachers in the phase two. While agreement occurred among all participants, these findings indicate that differences existed among groups as to the level of agreement. Follow-up investigations are necessary to determine why these differences exist.

Question 3 Results

The third question asked during this analysis focused on whether a sample of United States teachers place rankings of importance on characteristics of influential facilitators of EMPD. The results from the open-ended item included on the survey indicated that participants in this sample rank items across all themes identified in phase one as important. However, items relating to the themes of Credibility, Support, and Management were listed more frequently than items relating to the themes of Motivation and Personality. These results indicate that characteristics relating to Credibility, Support, and Management are more important for facilitators to possess than characteristics relating to Motivation and Personality. Figures 5.1, located in Appendix B, displays the results from the open ended item.

Section four of the survey asked participants to choose the most important item among statements relating to each theoretical construct (Credibility, Support, Management, Motivation, and Personality). One-sample chi-square tests were conducted

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for each item to assess whether the proportions associated with each category are equal among participants. The results of each of the six chi-square tests were significant (p < .001) indicating that participants in the pilot study identified one overall item as more important than the others in each multiple-choice question. Follow up tests were conducted to determine if a significant difference exists between the two items on each multiple choice question that were identified as important most often. Each follow up test yielded significant results indicating that one item in each of the six multiple choice questions was identified as most important by a significant number of participants. These results are displayed in Table 5.9 and Table 5.10 in Appendix A.

Of the six multiple choice questions included in this analysis, four items indicate that participants value Credibility over any other construct. Two items indicate that Management is most important. When combining the frequency counts among all questions, items related to Credibility are chosen more often than any other construct. These results indicate that phase two participants rank characteristics related to Credibility, including level of knowledge and amount of experience, as most important when identifying an influential facilitator of EMPD. Figure 5.2, located in Appendix B displays these results.

Question 4 Results

The last question considered in this analysis asked whether rankings of importance for characteristics of influential facilitators of EMPD differed among demographics. A two-way contingency table analysis was conducted to evaluate if a relationship existed between demographic groups and characteristics listed as "Most

Important" in the open-ended survey item. The variables used in this analysis were as follows: (1) Each of the eleven demographic items and (2) The characteristic that participants rated as most important in the open-ended question, which were coded on a nominal scale of one through five. Of the 11 two-way contingency tables conducted in this analysis, one yielded significant results. Level of education and the characteristic labeled "Most Important" were found to be significantly related, Pearson χ^2 (16, N = 483) = 37.08, ($p < .001$). Follow-up pairwise comparisons were conducted to evaluate the difference among these proportions. Holm's sequential Bonferroni method was used at the .05 level to control for Type I error. The only significant pairwise difference was between participants who have obtained a Bachelors degree and those possessing a Masters degree ($p = .05$). The proportion of listing a quality of influential facilitators relating to Management was almost twice as high for participants with a Bachelors degree (.19) than those with a Masters degree (.10). However, the overwhelming majority of participants in both groups listed items related to Credibility as most important. These findings indicate that while slight differences occurred among one subgroup of participants, overall participants agreed that all of the themes emerging from the phase one analysis were important and that if they were forced to choose, those items related to Credibility were most important.

Conclusion

This study attempts to identify the characteristics of facilitators of EMPD that elementary school teachers across the United States perceive as influential. Chapter Four

presented the results from phase one of this mixed methods study where influential

characteristics of facilitators were identified through a phenomenological analysis of

teacher perceptions from two samples of elementary school teachers in South Carolina.

These results were mixed to develop a survey instrument used in phase two of this study

to determine if the results from phase one generalized to a larger sample of elementary

school teachers across the United States. Chapter Five presented the results of phase two.

Participants in phase two agreed that the themes developed in phase one are

representative of essential characteristics of influential facilitators of EMPD. No new

themes emerged from the data when phase two participants were asked to list the

characteristics they perceive as most important. While participants in phase two identified

all five themes from phase one as important, overall, Credibility emerged as the most

important theme.

When analyzing the dimensionality of the Likert items written for the survey

instrument, five factors were identified: (1) Support, (2) Personality, (3) Management, (4)

Knowledge, and (5) Connections. Two of the five factors were identical to the themes

identified in phase one. The factor labeled Support combined items that were written for

the survey based on the themes of Support and Motivation emerging in phase one. This

combination is not surprising when considering the underlying principle of the

Motivation theme; facilitators should want to be there to help teachers and students.

Motivation was kept as a separate theme in the phase one analysis because of the

frequency that participants identified characteristics related to the facilitator's motivation

for working with teachers as important. The factors labeled Knowledge and Connections

identified in phase two were combined under the theme of Credibility in the phase one analysis. In the phase two analysis, the need for facilitators to be experts in content, pedagogy, and current practices in education were isolated under the factor of Knowledge. The need for facilitators to identify with participants by having teaching experience or by showing an understanding of the realities that teachers face on a daily basis were isolated under Connections. This separation promotes the possibility that the theme of Credibility emerging in phase one should be separated into two separate themes. The overwhelming majority of teachers identified Credibility as most important in phase two. The combination of these two factors under the theme of Credibility could provide a rationale for why a significant difference in rankings of importance between themes occurred.

Overall, participants in phase two agreed with the findings from phase one, as discussed in the results for each phase two research question. Demographic groups within the phase two sample were also examined to determine if significant differences of perceptions occurred between groups. In this analysis, a difference was identified among groups along the following factors: (1) State where employed and Management, (2) Grade Level and Connections, (2) Level of Education and Connections, (3) Perceived Change from Professional Development and Management, (4) Type of Professional Development and Support, and (5) Type of Professional Development and Management. While all groups agreed that items clustered under each factor could be classified as influential characteristics, differences emerged as to the extent of agreement. Future investigations are necessary to determine why these differences exist. It can be stated,

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based on these results, that the findings from phase one of the study were generalizable to a larger sample of teachers in phase two of the study. The results from phase one and phase two were mixed a second time to answer the overall research question guiding this study. Chapter Six presents the results of this second mixing of the data along with a discussion of the implications for practice and research. This dissertation is concluded with a presentation of recommended paths for future research related to the role of the facilitator in elementary mathematics professional development.

CHAPTER SIX

"An influential facilitator is one who is able to come in to an inservice situation, and

when the inservice is over, time is finished, you will see positive changes in instructional

practices and student achievement" (Participant 17).

This dissertation began by asking the question: How do United States elementary

school teachers perceive an influential facilitator of elementary mathematics professional

development (EMPD)? This question was examined through a mixed methods

exploratory sequential design. The researcher began the exploration of how teachers

perceive influential facilitators by conducting a dual-phenomenological data collection

and analysis of two samples of elementary school teachers in South Carolina. The

characteristics of influential facilitators identified in the first phase of this study were

then mixed to create a survey instrument measuring the extent of which elementary

school teachers across the United States agreed with the qualitative findings. Chapter One

of this dissertation provided an overview of the rationale for pursing research related to

professional development in elementary mathematics. Chapter Two built on this rationale

by presenting a review of the literature relating to professional development and, more

specifically, the role of the facilitator in EMPD. Chapter Three outlined the mixed

methods design used to answer the central research question. This outline included a

discussion of the sampling methods and methods for data collection and analysis for each

phase of the research design. Chapter Four presented the results from the qualitative

phase of the research design, which analyzed how South Carolina teachers perceive

influential facilitators of EMPD. Chapter Five presented the results from the quantitative phase of the research design, which attempted to generalize the findings from phase one to a larger sample of elementary school teachers across the United States. Chapter Six concludes this dissertation with a discussion of how the results from phase one and phase two answer the central research question guiding this study. This discussion is separated into five sections: (1) Answering the central research question, (2) Implications for practice, (3) Theoretical implications, (4) Methodological implications, and (5) Recommendations for further research.

Answering the Central Research Question

The central research question asked how elementary school teachers across the United States perceive influential facilitators of EMPD. Five themes emerged from the phenomenological analysis of the phase one sample: (1) Credibility, (2) Support, (3) Motivation, (4) Management, and (5) Personality. The theme of credibility was further divided during the phase two analysis into two separate themes, (1) Knowledge and (2) Connections. The characteristics clustered under each of these themes were identified as influential by teachers across all samples. It is necessary for a facilitator to possess characteristics from all themes in order to be considered influential. If a facilitator displayed a high level of content knowledge but did not show an understanding of teachers' professional contexts, they were not considered influential. The same holds true for a facilitator that was friendly and had a high level of experience, but presented ideas that could not be immediately implemented in practice. The following list presents the

essential characteristics of influential facilitators of EMPD emerging from both phases of data analysis.

A facilitator should:

1. display a high level of knowledge related to content and pedagogy for teaching mathematics at the elementary level.

2. have current experience at the early childhood and elementary level. It would be preferable if this experience was at the exact grade level of the participants with whom the facilitator is working.

3. demonstrate the ability to answer all questions relating to elementary mathematics.

4. provide evidence from data or research that the information presented during professional development is beneficial for students.

5. have an understanding of how to implement innovative practices in a realistic manner.

6. act, dress, and speak in a professional manner.

7. provide ongoing assistance following professional development experiences.

8. listen to participants during professional development.

9. be accepting of different opinions or points of view.

10. display the ability to read the audience and respond to their needs.

11. learn along with participants.

12. view participants as equals.

13. explain information in a way that makes sense to participants.

14. encourage participants during professional development.

15. be patient with participants and demonstrate the ability to understand or care about participants' professional contexts.

16. want to be there to help teachers and students.

17. show excitement or enthusiasm about their topic.

18. act like they enjoy what they do.

19. use group work and discussion during activities.

20. make information useful by connecting it to current practice.

21. have materials prepared in advance and organized during a professional development experience.

22. hold teachers accountable by moving around and asking each participant questions.

23. have a sense of humor and demonstrate the ability to laugh at themselves.

24. be friendly and outgoing.

25. show a sense of confidence.

These characteristics are representative of how elementary teachers across the United States perceive influential facilitators of EMPD. While characteristics clustered under all themes were considered important, those characteristics related to levels of knowledge and experience were identified as most important. Ideally, an influential facilitator should possess all of the characteristics listed above. The following sections describe the implications these results hold for research and practice.

Implications for Practice

The findings from this study provide insight for facilitators of professional development and for those people who hire or evaluate facilitators of professional development. Current facilitators of EMPD should be cognizant of how teachers perceive their actions and demeanor. Every participant in phase one of this study described a professional development experience where the facilitator was arrogant or egotistical. While this attitude is apparent to teachers who are consumers of professional development, it may not be apparent to those who facilitate professional development. Facilitators should also attempt to connect to teachers by showing an understanding of their professional context and by demonstrating a genuine interest in the opinions of participants. Findings from this study indicate that facilitators should use group work and discussion during professional development sessions to support teacher learning. The

characteristics identified by teachers in this study provide a framework for facilitators to assess their own practice. Facilitators should use reflection after professional development experiences to determine if the characteristics identified through this study are apparent in their own professional practice.

The influential facilitator as perceived by teachers may be a difficult role to achieve. Those people who hire or train facilitators of professional development should consider the possibility of using more than one person during professional development experiences. Perhaps a facilitator possesses the knowledge and personality necessary to be influential, but does not have any classroom experience. The addition of a second facilitator who has classroom experience can potentially increase participants' motivation during a professional development session. Future research is necessary to assess whether co-facilitation can increase teacher motivation during professional development. This study provides a framework for assessing characteristics of facilitators of EMPD. An observation instrument developed based on the results from the study is included in Appendix H. This instrument can potentially be used to evaluate the performance of facilitators during professional development. If a facilitator displays evidence of the characteristics included on the observation instrument, the motivation of participants should be high. More research is needed to determine if this correlation is evident in practice.

Participants across all samples in this study recognize the importance of ongoing support during professional development. Those participants who had experienced

isolated professional development identified a lack of support from facilitators while those who had ongoing experiences identified the benefits of receiving support from facilitators during professional development. These findings were consistent in both phases of the study. The use of ongoing experiences has been a consistent theme in the literature related to elementary mathematics professional development (Smith, 2001; NRC, 2001). Recommendations for mathematics professional development primarily stem from researchers in mathematics education or from providers of professional development. The findings from this study indicate that teachers of elementary mathematics, whose point of view had not previously been considered, agree with the recommendations in the research literature and can recognize the importance of ongoing professional development.

<div align="center">Theoretical Implications</div>

For the past three decades, a reform movement has existed for the teaching and learning of elementary mathematics (NRC, 2001; NCTM, 2000). A call for research examining the effects of professional development on teacher quality and student achievement has occurred concurrently with this reform movement (Hezel Associates, 2007; Darling-Hammond, & Hammerness, 2005; Borko, 2004). Although extensive research has been conducted on professional development in mathematics, a review of the literature revealed a lack of research related to the role of the facilitator in elementary mathematics professional development. This dissertation was conducted in response to the gap identified in the research to examine how teachers perceive influential facilitators of EMPD. While this dissertation lays a foundation for understanding the role of the

facilitator, it also represents a call for action for future research on how facilitators can influence teachers to be motivated during professional development.

The results from this dissertation build on recent findings from Sztajn and colleagues (2007), which identify the importance of trust between teachers and facilitators of ongoing professional development. The importance of ongoing support was reiterated among participants in both phases of this research study. Embedded into the theme of Support was the necessity for facilitators to understand the needs of participants and to build a community through the reciprocity of trust. This study also presents an alternative to Garmston and Wellman's (1992) roles that facilitators can play in professional development. Garmston and Wellman recommend that facilitators should play certain roles based on the reactions of participants. These roles include the boss, the expert, the colleague, the novice, and the sister or brother. Results from this study indicate the development of a new role that facilitators should play in order to maximize motivation in participants during professional development. Participants listed characteristics of influential facilitators that are representative of three roles identified by Garmston and Wellman; (1) the expert, (2) the colleague, and (3) the sister or brother. By combining these characteristics, a new role emerges: The mentor. In this new role, the mentor must display both the knowledge of the expert and the experience of the colleague. The mentor displays a sense of respect and understanding towards participants and is able to present a realistic method for improving classroom instruction based on their expertise in mathematics content and pedagogy. The mentor is also able to support participants in the development of their own expertise through the management of each

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session and the personality they bring to each presentation. The mentor has a thorough understanding of how to improve teacher quality in a way that is enjoyable for participants. The essential difference between this new role and those identified by Garmston and Wellman is the need for the facilitator to possess all of the characteristics identified in this study. For a facilitator to be playing the role of the mentor, characteristics cannot be present in isolation.

This need to possess characteristics across all themes in order to be influential also holds implications for research relating to motivation theory. As stated in Chapter One of this dissertation, the theoretical framework guiding this study was grounded in motivation theory. For a facilitator of EMPD to be influential, that facilitator must motivate participants to be engaged in the experience. Participants must first be engaged in the experience before they can learn from the experience. A wealth of research has been conducted on the roles people can play in influencing motivation (Vogt, Hoecevar, & Hagedoren, 2007; Watt & Richardson, 2007; Groth & Bergner, 2007). Role models have been shown to increase motivation through such qualities as perceived competence, perceived prestige, or perceived connections (Bandura, 1986). In this study, an additive effect that can be termed "perceived influence" has been found to potentially increase motivation. An influential facilitator of EMPD must possess perceived competence, prestige, and connections in order to motivate participants. Future investigations of this additive effect are necessary to determine if facilitators who are perceived as influential increase teacher motivation during professional development and to determine the implications that increased motivation holds for instructional practice.

Methodological Implications

This study utilized both qualitative and quantitative measures to identify how United States teachers perceive influential facilitators of elementary mathematics professional development. While the data emerging from the qualitative analysis was extensive, it was limited to a small sample in one area of the United States. The use of a survey design in the second phase of this study strengthened the results from phase one by determining that the results were generalizable to other samples of teachers. The instrument development model in mixed methods research is a relatively new paradigm in research methodology. The use of this type of design can be effective in determining rich textural meaning among a large sample. By demonstrating the ability to generalize results within the parameters of a single study, this model has the potential to decrease the need for replication within qualitative research.

The use of a dual-phenomenology in phase one of this study provides a framework for qualitative researchers needing to explore a phenomenon that differs slightly among groups. The straightforward nature of data collection and analysis in phenomenology makes it an ideal research design. However, the main limitation associated with phenomenological research is the inability for researchers to generalize results. The use of a dual-phenomenology enables researchers to determine perceived truths by identifying commonalities among groups. This ability to look at more than one group provides more flexibility within the phenomenological design.

Methodological considerations for mixed methods research are continuously emerging. No guidelines existed in the literature relating to the instrument development

model in mixed methods research for how to use qualitative data to write survey items when developing an instrument. In many studies, items were written based on the themes emerging from qualitative data analysis, however no framework was used to determine which items should be included in the survey (Plano Clark & Creswell, 2008). The mixing of the data occurring between phase one and phase two of this research study represents the emergence of a potential framework for researchers using this method of research. In this study, the data from phase one was quantitized to determine how often each meaning unit occurred among participants. A 30% benchmark for Likert items and a 50% benchmark for multiple choice items provided a more systematic method for item development within the confines of this study. The high reliability and validity of the phase two survey created through this framework reinforce the necessity to consider its' use in mixed methods research. The use of 30% and 50% benchmarks are somewhat arbitrary and relate more to the results of this study than an overall standard for future item development. However the use of benchmarks in this study provides a starting point for future discussions regarding specific data collection procedures for the instrument development model in mixed methods research. This use of benchmarks provides a more rigorous method than what was previously utilized in mixed methods research.

<div align="center">Recommendations for Further Research</div>

This study lays a foundation for future research in an area that has been previously unexplored in the literature relating professional development in elementary mathematics. While this study provides empirical evidence as to how teachers perceive influential facilitators of EMPD, it does not examine the role that influential facilitators

play in changing instructional practice. Future research is necessary to identify influential facilitators and examine their effect on the motivation and practice of elementary mathematics teachers. The observation protocol developed based on the results of this study is a potential tool for identifying influential facilitators. Research is needed to investigate this instrument to ensure validity and reliability.

This study focused on how teachers, or what Loucks-Horsely et al. (1998) describe as the primary clients of professional development, perceive influential facilitators. It is necessary to examine if differences exist among other clients of professional development such those people in administrative or parental roles. It is also necessary to examine what characteristics current facilitators of professional development identify as influential in their own practice. These types of investigations can be used to determine if discrepancies exist between perceptions among groups.

Finally, the use of a mixed methods approach in this study provided more insight about how United States teachers perceive influential facilitators than if a qualitative approach was used in isolation. The survey implemented in phase two of this study ensured that the results from the dual-phenomenological analysis generalized to a larger sample of teachers. However, differences regarding the extent of agreement with phase one findings occurred among groups within phase two. More research is required to explore why these differences exist. Research is also required to determine if the results from this study generalize to geographic areas not investigated in phase one or phase two samples. The development and validation of this survey through this study allows for its

use in future examinations of teacher perceptions of influential facilitators of elementary

mathematics professional development.

APPENDICES

Table 1.1:
Adult learning behaviors

Adult Learning Behaviors Described by Pellicer and Anderson (1995)	
Behaviors that facilitate adult learning	**Behaviors that inhibit adult learning**
Having an informal tone	Having a formal tone
Demonstrating open body language	Demonstrating closed body language
Having an easy manner	Having an intimidating manner
Demonstrating sensitivity to others	Demonstrating insensitivity to others
Respecting experience	Discounting experience
Demonstrating reciprocal trust	Demonstrating suspicion
Providing thought-provoking questions	Providing narrow-factual questions
Providing choices	Never providing choices
Demonstrating good listening skills	Demonstrating poor listening skills
Encouraging interaction	Discouraging interaction

Table 2.1:

Professional development recommendations

Professional Development Recommendations from Literature Review	
Movement Towards	**Movement Away From**
Facilitation of constructed knowledge	Transmission of knowledge and skills
Focus on the use of tasks	Focus on lectures
Job-embedded learning	Pull out training
Content specific teaching skills	Generic teaching skills
Ongoing and cohesive experiences	Fragmented one-shot experiences
School and teacher directed	District directed
Focus on student needs	Focus on teacher needs
Building a community	Isolated learning
Teachers as active participants	Teachers as passive learners
Problematizing current practices	Adding new practices
Developing teacher leaders	Administrative leaders
Promoting experimentation and risk-taking	Following prescribed procedures
Being context specific	One-size fits all model
Professional development as essential	Professional development as a frill

Table 2.2:
Qualities of effective leaders

Qualities of Effective Leaders* (Druckman, Singer, & Van Cott, 1997)	
Quality	**Description**
Ability to clarify roles and objectives	Teachers need to know what they are expected to do and the results that are expected during professional development experiences.
Demonstrates supportive leadership	Shows acceptance and concern for participants needs and feelings
Ability to plan and problem solve	Need to develop flexible strategies to meet objectives
Ability to monitor operations and environment	Uses feedback to monitor progress of participants
Promotes participative leadership	Allows other members of the group to cooperate to find ways to achieve shared goals
Demonstrates inspirational leadership	Questions beliefs and stimulates participants to think about situations in new ways
Ability to positively reward behavior	Provides tangible components (stipends, prizes) or intangible rewards (positive praise).
Ability to network	Develops and maintains networks of people to draw resources or information from.

*As described by Druckman, Singer, and Van Cott, 1997 in a synthesis of literature relating to the leader's role in professional development.

Table 3.1:
Demographics of final sample for phase one data collection

Demographics of Phase One Participants			
Demographic Criteria	**Sample Demographics**	**Number of Participants**	**Percentage of Participants**
State Employed	SC	20	100%
District Employed	Greenville	4	20%
	Florence	4	20%
	Greenwood	4	20%
	Anderson	2	10%
	Pickens	3	15%
	Rock Hill	1	5%
	Oconee	1	5%
	Lexington	1	5%
Grade Level	Kindergarten	1	5%
	1st Grade	1	5%
	2nd Grade	3	15%
	3rd Grade	4	20%
	4th Grade	4	20%
	5th Grade	5	25%
	Special Education	1	5%
Ethnicity	Caucasian	18	90%
	African American	2	10%
Gender	Male	1	5%
	Female	19	95%
Years of Experience	1-3	1	5%
	4-10	9	45%
	11-15	3	15%
	16-20	3	15%
	Above 20	4	20%

Table 3.2:
Demographics of sample for pilot study

Demographics of Phase Two Pilot Participants				
Demographic Criteria	**Sample Demographics**	**Code in SPSS**	**Number of Participants**	**Percentage of Participants**
State Employed	SC	1	35	100%
District Employed	Greenville	1	15	42.9%
	Lexington 2	2	13	37.1%
	Pickens	3	4	11.4%
	Other	4	3	8.6%
	(Florence, Anderson, Rock Hill, Oconee)			
Grade Level	1st Grade	1	7	20%
	2nd Grade	2	6	17.1%
	3rd Grade	3	3	8.6%
	4th Grade	4	2	5.7%
	5th Grade	5	3	8.6%
	Kindergarten	6	5	14.3%
	Other	7	9	25.7%
Ethnicity	Caucasian	1	33	94.3%
	Other	2	2	5.7%
Gender	Male	1	0	0%
	Female	2	35	100%
Years of Experience	1-3	1	3	8.6%
	4-10	2	12	34.3%
	11-15	3	4	11.4%
	16-20	4	3	8.6%
	Above 20	5	13	37.1%
Highest Level of Education	Bachelors	1	6	17.1%
	Bachelors + 30	2	4	11.4%
	Masters	3	12	34.3%
	Masters + 30	4	13	37.1%
National Board Certification	No	1	31	88.6%
	Yes	2	4	11.4%
Isolated/Ongoing PD	Isolated	1	21	60%
	Ongoing	2	14	40%
Hours of PD Annually	0	1	4	11.4%
	1-5	2	14	40%
	6-10	3	6	17.1%
	11-15	4	3	8.6%
	16-20	5	2	5.7%
	Above 20	6	6	17.1%
Perceived Change from PD	No Change	1	4	11.4%
	Little Change	2	10	28.6%
	Some Change	3	12	34.3%
	Significant Change	4	9	25.7%

Table 3.3:

Demographics of final sample for phase two data collection

Demographics of Phase Two Participants				
Demographic Criteria	**Sample Demographics**	**Code in SPSS**	**Number of Participants**	**Percentage of Participants**
State Employed	South Carolina	1	436	77.2%
	New Jersey	2	79	14%
	Michigan	3	13	2.3%
	Idaho	4	6	1.1%
	Pennsylvania	5	1	.2%
	California	6	7	1.2%
	North Carolina	7	9	1.6%
	Washington	8	2	.4%
	Missouri	9	1	.2%
	Oregon	10	3	.5%
	Tennessee	11	8	1.4%
District Employed	South Carolina:			
	Edgefield	1	9	1.6%
	Anderson 5	2	62	11%
	Anderson 2	3	10	1.8%
	Anderson 4	4	4	.7%
	Greenville	5	118	20.9%
	Spartanburg 1	6	4	.7%
	Spartanburg 2	7	6	1.1%
	Spartanburg 3	8	9	1.6%
	Spartanburg 7	9	4	.7%
	Lancaster	10	11	1.9%
	Florence	11	62	11%
	Aiken	12	22	3.9%
	Lexington 2	13	20	3.5%
	Beaufort	14	7	1.2%
	Lexington 4	15	4	.7%
	Greenwood	16	11	1.9%
	Berkeley	17	40	7.1%
	Oconee	18	8	1.4%
	Sumter 2	19	3	.5%
	Darlington	20	3	.5%
	Chesterfield	21	6	1.1%
	Laurens 55	22	3	.5%
	Charleston	23	1	.2%
	Ware Shoals	24	1	.2%
	Pickens	25	5	.9%
	Clarendon 1	26	1	.2%
	Colleton	27	3	.5%
	New Jersey:			
	Westfield	29	10	1.8%
	Jackson	30	11	1.9%
	Lawrence	31	3	.5%

	Edison	32	1	.2%
	Elizabeth	33	1	.2%
	Dennis	34	5	.9%
	Brick	35	35	6.2%
	Burlington	36	1	.2%
	Freehold	37	10	1.8%
	Lakewood	38	1	.2%
	Michigan:			
	Vicksburg	39	13	2.3%
	Idaho:			
	Twin Falls	40	6	1.1%
	Pennsylvania:			
	Easton	41	1	.2%
	California:			
	West Contra Costa	42	1	.2%
	LA Unified	43	5	.9%
	Hemet Unified	44	1	.2%
	North Carolina:			
	Rocky Mountain	45	1	.2%
	Bertie County	46	1	.2%
	Caldwell	47	1	.2%
	Johnston	48	1	.2%
	Rockingham	49	1	.2%
	Winston-Salem	50	1	.2%
	Gaston	51	2	.4%
	Union	52	1	.2%
	Washington:			
	Ellensburg	53	1	.2%
	Evergreen	54	1	.2%
	Missouri:			
	Belgrade	55	1	.2%
	Oregon:			
	Silver Falls	56	1	.2%
	Lebenon	57	1	.2%
	Portland Public	58	1	.2%
	Tennessee:			
	Anderson	59	8	.2%
Grade Level	1st Grade	1	78	13.8%
	2nd Grade	2	73	12.9%
	3rd Grade	3	95	16.8%
	4th Grade	4	69	12.2%
	5th Grade	5	76	13.5%
	Kindergarten	6	59	10.4%

	Other	7	113	20%
Ethnicity	Caucasian	1	512	91.9%
	African American	2	25	4.5%
	Hispanic	3	4	.7%
	Multi-Racial	4	3	.5%
	American Indian	5	1	.2%
	Other	6	1	.2%
	Do Not Wish to Reply	7	11	1.9%
Gender	Male	1	14	2.5%
	Female	2	548	97%
	Other	3	2	.4%
Years of Experience	1-3	1	101	17.9%
	4-6	2	72	12.7%
	7-10	3	91	16.1%
	11-15	4	73	12.9%
	16-20	5	83	14.7%
	Above 20	6	140	24.8%
Highest Level of Education	Bachelors	1	199	35.2%
	Bachelors + 30	2	54	9.6%
	Masters	3	211	37.3%
	Masters + 30	4	99	17.5%
	Doctorate	5	1	.2%
National Board Certification	No	1	500	88.5%
	Yes	2	65	11.5%
National Board Certification	Prior to 2002	1	33	5.8%
	2002 and after	2	32	5.7%
Isolated/Ongoing PD	Isolated	1	303	53.6%
	Ongoing	2	231	40.9%
Hours of PD Annually	0	1	69	12.2%
	1-5	2	248	43.9%
	6-10	3	103	18.2%
	11-15	4	47	8.3%
	16-20	5	30	5.3%
	Above 20	6	67	11.9%
Perceived Change from PD	No Change	1	60	10.6%
	Little Change	2	118	20.9%
	Some Change	3	271	48%
	Significant Change	4	103	18.2%

Table 4.1:
Table of themes resulting from phase one data analysis

Table of Themes				
Credibility	**Support**	**Motivation**	**Management**	**Personality**

Knowledge
Content
Pedagogy
New
  practices
 	
Experience
Classroom
  (K-5)
With their
  topic
Ability to
  give hints
  or answer
  questions
Realistic
 	
Proof
Data
Research
 	
Professionalism
Dress
Language
Speech
	Providing Assistance
	Time
	Resources
	Available
	Incentives
	
	Reactions
	Answering
	  questions
	Listening
	Accepting
	  opinions
	Being
	  honest
	Ability to
	  read
	  audience
	Can respond to
	  needs
	Explains
	  information
	  in a way that
	  makes sense
	Establishing
	  personal
	  connections
	Developing a
	  community
	  of learners
		Rationale
		Why they are
		  there
		Not just there for
		  a paycheck
		There for the
		  students
		There to help
		Want to make a
		  change
		
		Belief in the topic
		Feel it is
		  important
		Think it will
		  work
		
		Excitement about topic
		Enjoy what they
		  do
		Positive
		Presents with
		  excitement
			Physically what they do
			Moving around
			Using group
			  work
			Not lecturing
			
			Making it meaningful
			Connecting to
			  current
			  practice
			Making it useful
			Making it
			  applicable to
			  their current
			  situation
			Challenging
			  them
			Doing what their
			  children will
			  do
			Providing a clear
			  focus
			
			Managing materials and session
			Staying on track
			Not wasting time
			Being organized
			Having
			  everything
			  they need
				Positive Qualities
				Sense of
				  humor
				Outgoing
				Friendly
				Facial
				  Expressions
				Energy
				Goofy
				Relaxed/calm
				Entertaining
				Confident
				Strong voice
				
				Negative Qualities
				Opinionated
				Arrogant
				Gruff
				Not animated
				Sad
				Boring
				Standoffish
				Monotone
				Rude
				Quiet

Table 5.1:

Quantitized data from phase one results.

Quantitized Phase One Data*																					
Themes	Participants																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	total
Credibility																					
Knowledge of content	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		19
Knowledge of pedagogy				x	x	x		x				x		x	x	x	x		x		10
Knowledge of new practices						x	x		x	x	x						x				6
Classroom Experience (K-5)	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	19
Experience with their topic	x	x		x	x	x	x		x	x	x	x			x				x		13
Ability to give hints/answers			x	x	x	x		x	x	x		x	x	x	x	x		x	x		14
Realistic of classroom expectations	x		x	x	x		x						x		x		x	x	x	x	11
Proof with data or research		x					x				x	x	x		x	x					7
Professionalism in dress	x				x			x						x	x			x		x	7
Professionalism in language								x					x		x			x			4
Professionalism in actions		x			x				x									x			4
Support																					
Providing assistance through time	x	x	x	x	x	x	x	x	x	x	x		x	x		x	x	x	x		17
Providing assistance through resources	x	x		x	x	x	x	x	x	x		x	x					x	x		13
Providing assistance through availability	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	20
Providing assistance through incentives								x	x								x	x			4
Reacting by answering questions	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	20
Reacting by listening	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	20
Reacting by accepting opinions	x	x	x	x			x			x	x	x		x	x	x	x			x	14
Reacting by being honest						x								x	x	x					4
Reacting by reading the audience	x			x			x		x	x			x	x	x	x	x	x	x		12
Reacting by responding to needs	x	x	x	x	x		x		x	x	x	x		x	x	x	x	x	x	x	17
Reacting by encouraging participants			x	x		x	x		x	x		x	x	x	x	x	x	x			13
Reacting by explaining information	x	x	x	x		x	x		x	x	x			x		x	x		x		13
Reacting by establishing personal connections	x	x	x	x					x					x	x			x			8
Reacting by developing a community of learners		x	x	x		x			x	x				x	x	x		x			10
Motivation																					
Rationale: Want to be there	x			x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	16
Rationale: Want to make a change		x			x				x			x					x			x	6
Rationale: There for the students		x			x		x		x		x							x			6
Rationale: There to help		x			x		x			x	x	x						x		x	8
Belief in the topic		x			x		x	x	x	x				x	x			x			9

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Row	Count
Excitement about the topic	12
Management	
Physically: moving around	11
Physically: Using group work	20
Physically: Not lecturing	18
Connecting to current practice	20
Making it useful	19
Making it applicable to current situation	17
Challenging them	9
Doing what their children will do	15
Providing a clear focus	12
Staying on track	11
Not wasting time	8
Being organized	10
Having everything they need	12
Personality	
Sense of humor	11
Outgoing	6
Friendly	8
Facial expressions	4
Energy	8
Goofy	1
Relaxed/calm	4
Entertaining	9
Confident	3
Sweet	1
Strong voice	7
Opinionated	4
Arrogant	8
Gruff	1
Not animated	3
Sad	1
Boring	10
Standoffish	2
Monotone	11
Rude	2

*Green shaded rows represent meaning units occurring among at least 30% of participants. Yellow shaded rows represent meaning units occurring among at least 50% of participants.

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Table 5.2:
Likert items written for survey by theme

Likert Items Written for Survey Based on Quantitized Data		
Theme	**Items** **(all begin with the stem: A facilitator should)**	**Percent of Total Likert Items**
Credibility	Have taught at the same grade level you currently teach. Have a strong understanding of how children learn mathematics. Be able to answer all relevant questions. Have a strong understanding of mathematical content. Provide evidence of the benefit of their topic. Include information about new practices in education. Be practical about how busy teachers are.	16%
Support	Share personal experiences with teachers. Be attentive to the teachers' needs during PD. Learn along with participants. Be available for support after a PD session. Be respectful of the opinions of teachers. Encourage teacher growth during PD. Share their teaching experiences with teachers. Be patient while interacting with teachers during PD. Be assertive while interacting with teachers during PD. Communicate that teachers are important during PD. Be approachable during PD. Be open to criticism. Adapt to teachers' needs.	31%
Management	Have the ability to manage time during PD. Communicate the focus of a PD session. Connect information to classroom practice. Lecture during PD. (reverse coded) Have teachers complete the actual activities that their students will complete. Move around during PD. Have teachers work in groups during PD. Have prepared materials in advance of a PD session. Provide challenging activities.	21%
Motivation	Have the goal to help teachers. Want to make a difference in education. Want to help teachers improve. Be passionate about mathematics. Be enthusiastic about teaching and learning. Want to defend what they believe about math instruction. Have the goal to help students.	16%
Personality	Be an interesting person. Be a friendly person. Be an energetic person. Be a respectful person. Be an entertaining person. Be an outgoing person. Have a sense of humor.	16%

Table 5.3:
Multiple choice items written for survey

Multiple Choice Items Written for Survey Section 4 Based on Quantitized Data		
Theme	Item (Participants are asked to choose the quality that is most important)	Percentage Occurring Across Participants
Credibility	Knowledge of mathematical content.	95%
	Elementary teaching experience.	95%
	Knowledge of how students learn mathematics.	50%
	Be practical about how busy teachers are.	55%
	Ability to provide answers to questions.	70%
Support	Availability.	100%
	Respect for participants' opinions.	70%
	Being a good listener.	100%
	Encouraging teacher growth.	65%
Management	Being organized.	50%
	Ability to connect information to classroom practice.	100%
	Use of group activities.	100%
	Being prepared.	60%
Motivation	Passionate about their work.	80%
	Enthusiasm about the topic.	60%
	Enjoy what they do.	60%
	A love of mathematics.	60%
	Believe their topic is important.	60%
Personality	Sense of humor.	55%

Table 5.4
T-tests for pilot survey Likert items

	t	Mean Dif.	SD	Effect	95% CI Lower	Upper
Item 1	t(34) = -5.730***	-1.557	1.608	-.968	-2.11	-1.00
Item 2	t(34) = -16.500***	-2.357	.845	-2.789	-2.65	-2.07
Item 3	t(34) =- 28.853***	-2.986	.612	-4.879	-3.20	-2.78
Item 4	t(34) = -10.253***	-2.071	1.195	-1.733	-2.48	-1.66
Item 5	t(34) = -37.958**	-3.243	.505	-6.422	-3.42	-2.78
Item 6	t(33) = -21.438***	-2.794	.760	-3.676	-3.06	-2.53
Item 7	t(34) = -30.369***	-3.100	.604	-5.132	-3.31	-2.89
Item 8	t(34) = -24.625***	-2.814	.676	-4.163	-3.05	-2.58
Item 9	t(34) = -9.709***	-2.043	1.245	-1.641	-2.47	-1.62
Item 10	t(34) = -19.990***	-2.729	.808	-3.377	-3.01	-2.45
Item 11	t(34) = -15.650***	-2.729	1.031	-2.647	-3.08	-2.37
Item 12	t(34) = -29.129***	-3.014	.612	-4.925	-3.22	-2.80
Item 13	t(33) = -16.135***	-2.618	.946	-2.767	-2.95	-2.29
Item 14	t(34) = -19.145***	-2.729	.843	-3.238	-3.02	-2.44
Item 15	t(34) = -18.049***	-2.557	.838	-3.051	-2.85	-2.27
Item 16	t(34) = -25.171***	-2.986	.702	-4.254	-3.23	-2.74
Item 17	t(34) = -34.639***	-3.157	.539	-5.857	-3.34	-2.97
Item 18	t(34) = -19.43***	-2.614	.796	-3.284	-2.89	-2.34
Item 19	t(34) = -7.503***	-1.271	1.003	-1.267	-1.62	-.93
Item 20	t(34) = -9.755***	-2.014	1.222	-1.648	-2.43	-1.59
Item 21	t(34) = -17.932***	-2.586	.853	-3.032	-2.88	-2.29
Item 22	t(34) = -15.860***	-2.357	.879	-2.681	-2.66	-2.06
Item 23	t(34) = -27.081***	-3.014	.658	-4.581	-3.24	-2.79
Item 24	t(33) = -11.469***	-2.235	1.136	-1.967	-2.63	-1.84
Item 25	t(34) = -5.597***	-1.243	1.314	-.946	-1.69	-.79
Item 26	t(34) = -18.500***	-2.643	.845	-3.128	-2.93	-2.35
Item 27	t(34) = -26.465***	-2.929	.655	-4.472	-3.15	-2.70
Item 28	t(34) = -23.322***	-2.900	.736	-3.940	-3.15	-2.65
Item 29	t(34) = -13.432***	-2.386	1.051	-2.272	-2.75	-2.02
Item 30	t(33) = -24.518***	-2.971	.706	-4.208	-3.22	-2.72
Item 31	t(33) = -24.340***	-2.941	.705	-4.172	-3.19	-2.70
Item 32	t(34) = -17.734***	-2.729	.910	-2.999	-3.04	-2.42
Item 33	t(33) = -24.739***	-3.000	.707	-4.243	-3.25	-2.75
Item 34	t(33) = -10.431***	-2.029	1.134	-1.789	-2.43	-1.63
Item 35	t(34) = -15.316***	-2.271	.877	-2.590	-2.57	-1.97
Item 36	t(34) = -14.367***	-2.186	.900	-2.429	-2.49	-1.88
Item 37	t(34) = -12.090***	-2.157	1.056	-2.043	-2.52	-1.79
Item 38	t(34) = -7.757***	-1.614	1.231	-1.311	-2.04	-1.19
Item 39	t(34) = -32.111***	-3.043	.561	-5.424	-3.24	-2.85
Item 40	t(33) = -13.996***	-2.235	.931	-2.401	-2.56	-1.91
Item 41	t(34) = -10.100***	-2.243	1.314	-1.708	-2.69	-1.79
Item 42	t(34) = -20.958***	-2.729	.770	-3.544	-2.99	-2.46
Item 43	t(31) = -26.308***	-3.094	.665	-4.653	-3.33	-2.85

Note: * *p*<.05, **p<.005, *** *p*<.001

Table 5.5

Chi-square results for pilot survey multiple-choice items

Item	Chi-Square	df	Significance
MC1	25.60	2	$p < .001$
MC2	25.00	3	$p < .001$
MC3	75.51	3	$p < .001$
MC4	15.40	3	$p < .005$
MC5	36.43	3	$p < .001$
MC6	10.83	3	$p < .05$
MC7	32.54	3	$p < .001$
MC8	18.14	3	$p < .001$
MC9	10.60	3	$p < .05$
MC10	51.29	3	$p < .001$

Table 5.6
Factor analysis rotated components

Factor	Item	Component Score
Factor 1 (Support)	Be a respectful person.	.781
	Want to help teachers improve.	.779
	Want to make a difference in education.	.743
	Be approachable during PD.	.731
	Have the goal to help teachers.	.660
	Be enthusiastic about teaching and learning.	.633
	Communicate the focus of a PD session.	.603
	Encourage teacher growth during PD.	.602
	Have the goal to help students.	.591
	Communicate that teachers are important during PD.	.570
	Adapt to teachers' needs.	.547
	Be patient while interacting with teachers during PD.	.535
	Be open to criticism.	.511
	Be practical about how busy teachers are.	.469
	Have prepared materials in advance of a PD session.	.450
	Include information about new practices in education.	.438
Factor 2 (Personality)	Be an outgoing person.	.767
	Be an entertaining person.	.765
	Have a sense of humor.	.717
	Be an energetic person.	.702
	Be an interesting person.	.677
	Be a friendly person.	.648
Factor 3 (Management)	Have the teachers work in groups during PD.	.726
	Have the teachers complete the actual activities that their students will complete.	.675
	Provide challenging activities.	.619
	Be assertive while interacting with teachers during PD.	.600
	Want to defend what they believe about math instruction.	.518
	Learn along with participants.	.493
	Move around during PD.	.409
Factor 4 (Knowledge)	Have a strong understanding of mathematical content.	.778
	Have a strong understanding of how children learn mathematics.	.743
	Be able to answer all relevant questions.	.580
	Connect the information to classroom practice.	.548
	Have the ability to manage time during PD.	.476
	Be passionate about mathematics.	.417
Factor 5 (Connections)	Share personal experiences with teachers.	.527
	Be respectful of the opinions of teachers.	.523
	Be attentive to the teachers' needs during PD.	.509
	Share their teaching experiences with teachers.	.496
	Have taught at the same grade level you currently teach.	.454

Table 5.7
T-tests for phase two survey Likert items

	t	Mean Dif.	SD	Effect	95% CI Lower	Upper
Item 1	$t(564) = -22.069***$	-1.412	1.520	-.929	-1.54	-1.29
Item 2	$t(564) = -50.766***$	-2.327	1.089	-2.137	-2.42	-2.24
Item 3	$t(562) = -90.982***$	-2.841	.741	-3.834	-2.90	-2.78
Item 4	$t(560) = -42.153***$	-2.142	1.203	-2.362	-2.24	-2.04
Item 5	$t(561) = -137.981***$	-3.219	.553	-5.821	-3.26	-3.17
Item 6	$t(562) = -68.453***$	-2.665	.924	-2.884	-2.74	-2.59
Item 7	$t(561) = -120.750***$	-3.148	.618	-5.094	-3.20	-3.10
Item 8	$t(560) = -89.104***$	-2.880	.765	-3.765	-2.94	-2.82
Item 9	$t(558) = -35.738***$	-2.078	1.375	-1.511	-2.19	-1.96
Item 10	$t(556) = -77.464***$	-2.730	.832	-3.281	-2.80	-2.66
Item 11	$t(559) = -71.022***$	-2.657	.885	-3.002	-2.73	-2.58
Item 12	$t(561) = -86.980***$	-2.840	.774	-3.669	-2.90	-2.78
Item 13	$t(561) = -78.473***$	-2.767	.836	-3.310	-2.84	-2.70
Item 14	$t(555) = -84.786***$	-2.809	.781	-3.597	-2.87	-2.74
Item 15	$t(564) = -85.644***$	-2.769	.769	-3.601	-2.83	-2.71
Item 16	$t(561) = -103.933***$	-3.080	.703	-4.381	-3.14	-3.02
Item 17	$t(556) = -132.246***$	-3.180	.568	-5.599	-3.23	-3.13
Item 18	$t(559) = -67.454***$	-2.570	.901	-2.852	-2.64	-2.49
Item 20	$t(561) = -42.240***$	-2.048	1.149	-1.782	-2.14	-1.95
Item 21	$t(563) = -74.921***$	-2.626	.832	-3.156	-2.69	-2.56
Item 22	$t(561) = -60.824***$	-2.388	.931	-2.565	-2.47	-2.31
Item 23	$t(560) = -100.834***$	-2.978	.699	-4.260	-3.04	-2.92
Item 24	$t(558) = -36.677***$	-2.062	1.329	-1.552	-2.17	-1.95
Item 25	$t(557) = -27.160***$	-1.500	1.305	-1.379	-1.61	-1.39
Item 26	$t(559) = -66.075***$	-2.562	.918	-2.791	-2.64	-2.49
Item 27	$t(558) = -96.702***$	-2.895	.708	-4.089	-2.95	-2.84
Item 28	$t(557) = -94.536***$	-2.971	.742	-4.004	-3.03	-2.91
Item 29	$t(562) = -56.176***$	-2.324	.982	-2.367	-2.41	-2.24
Item 30	$t(556) = -97.330***$	-2.324	.714	-3.255	-3.00	-2.89
Item 31	$t(559) = -102.470***$	-2.998	.692	-4.332	-3.06	-2.94
Item 32	$t(557) = -76.923***$	-2.790	.857	-3.256	-2.86	-2.72
Item 33	$t(561) = -107.186***$	-3.030	.670	-4.522	-3.09	-2.97
Item 34	$t(557) = -40.801***$	-1.903	1.102	-1.727	-1.99	-1.81
Item 35	$t(558) = -52.364***$	-2.223	1.004	-2.214	-2.31	-2.14
Item 36	$t(562) = -49.830***$	-2.086	.993	-2.101	-2.17	-2.00
Item 37	$t(557) = -34.652***$	-1.833	1.250	-1.467	-1.94	-1.73
Item 38	$t(553) = -29.400***$	-1.534	1.228	-1.250	-1.64	-1.43
Item 39	$t(556) = -98.409***$	-3.017	.724	-4.167	-3.08	-2.96
Item 40	$t(560) = -54.028***$	-2.250	.987	-2.280	-2.33	-2.17
Item 41	$t(560) = -46.894***$	-2.167	1.094	-1.981	-2.26	-2.08
Item 42	$t(556) = -77.573***$	-2.701	.822	-3.289	-2.77	-2.63
Item 43	$t(548) = -104.512***$	-3.039	.681	-4.463	-3.10	-2.98

Note: * $p<.05$, ** $p<.005$, *** $p<.001$

Table 5.8

Frequencies of important characteristics of facilitators of EMPD

Item	`	Frequency	Percent
Most Important			
Credibility		334	59.1%
Support		30	6.2%
Motivation		22	3.9%
Management		68	14.1%
Personality		29	5.1%
Second Most Important			
Credibility		95	16.8%
Support		224	39.6%
Motivation		57	10.1%
Management		115	20.4%
Personality		41	7.3%

Table 5.9

Chi-square results for phase two survey multiple-choice items

Item	Chi-Square	df	Significance
MC1	4.58	3	$p < .001$
MC2	6.18	3	$p < .001$
MC3	1.19	3	$p < .001$
MC4	2.47	3	$p < .001$
MC5	3.68	3	$p < .001$
MC6	3.43	3	$p < .001$

Table 5.10
Follow up Chi-square results for multiple-choice items

	Theme	Observed N	Expected N	Chi-Square	df	Significance
MC1						
	Credibility	356	229	1.41	1	$p < .001$
	Motivation	102	229	1.41	1	$p < .001$
MC2						
	Credibility	98	244	1.75	1	$p < .001$
	Management	390	244	1.75	1	$p < .001$
MC3						
	Credibility	492	261	4.09	1	$p < .001$
	Management	30	261	4.09	1	$p < .001$
MC4						
	Credibility	289	207	64.97	1	$p < .001$
	Support	125	207	64.97	1	$p < .001$
MC5						
	Credibility	332	204.5	1.59	1	$p < .001$
	Management	77	204.5	1.59	1	$p < .001$
MC6						
	Credibility	137	227	71.37	1	$p < .001$
	Management	317	227	71.37	1	$p < .001$

Figure 3.1:
Geographic areas represented with phase one sample*

*Red stars indicate represented areas.

Figure 3.2:
Geographic areas represented with phase two sample.

*Red stars indicate represented areas.

Figure 3.3:
Procedure for phase one*

Group I Data Collection: 10 transcribed semi- structured interviews	**Group I** Data Analysis: development of themes		
Phase One Dual Phenomenology		**Merging of Data** Data Analysis: examining common themes	**Mixing of Data** Data Analysis: Using themes to create survey
Group II Data Collection: 10 transcribed semi- structured interviews	**Group II** Data Analysis: development of themes		
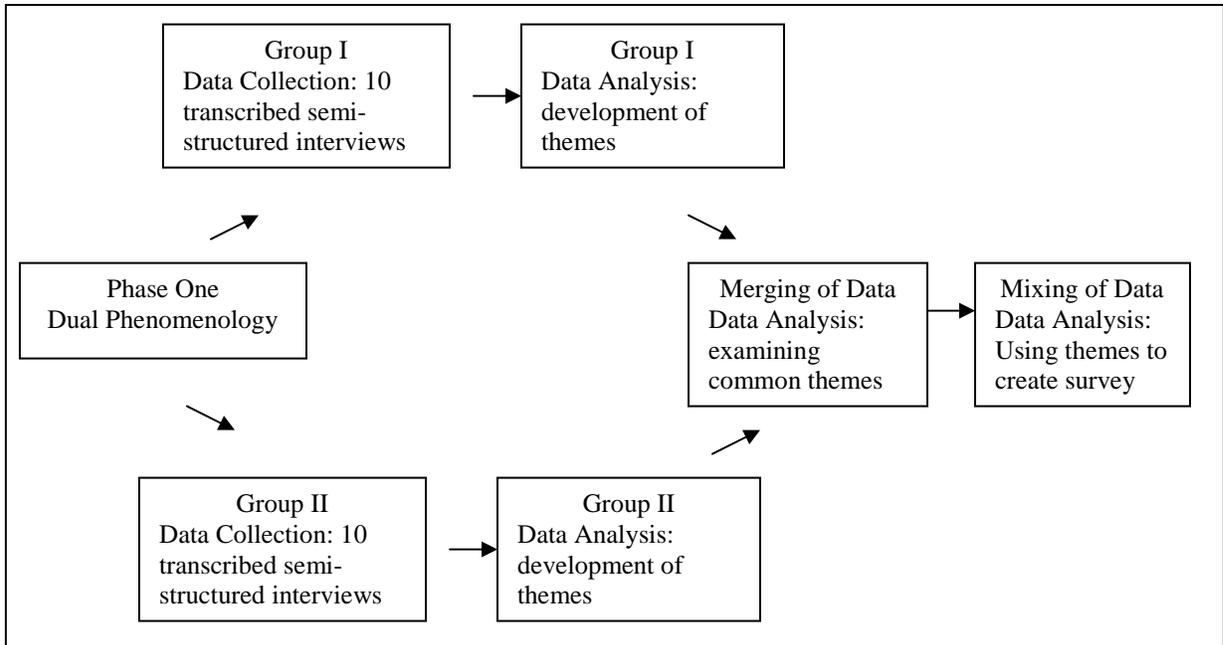
*Data collection and analysis procedures for phase one of research design

Figure 3.4:
Procedure for Phase Two*

Phase Two: Survey Research	**Data Collection:** Pilot Test Data Analysis: Determine validity and reliability	**Data Collection:** Large-Scale Survey Data Analysis: Examine Descriptive and Inferential Statistics
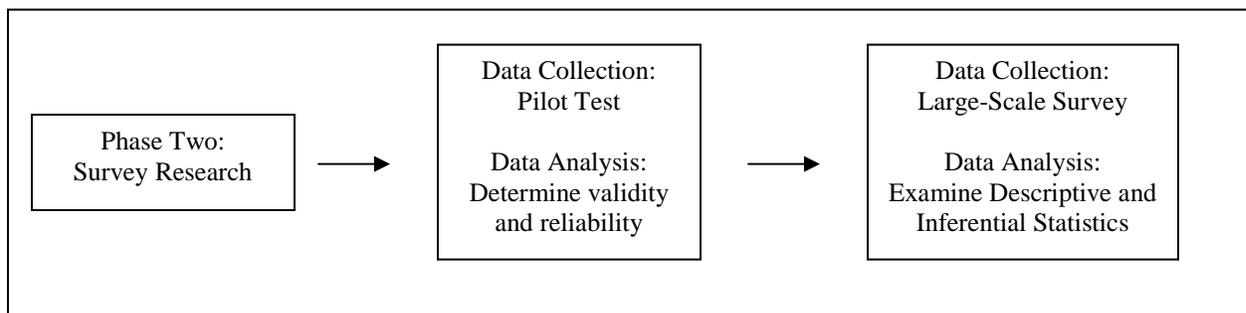
*Data collection and analysis procedures for phase two of research design

Figure 3.5:
Logic model of entire research design

Logic Model for Mixed Methods Exploratory Sequential Design
(Adapted from Creswell & Plano Clark, 2007)
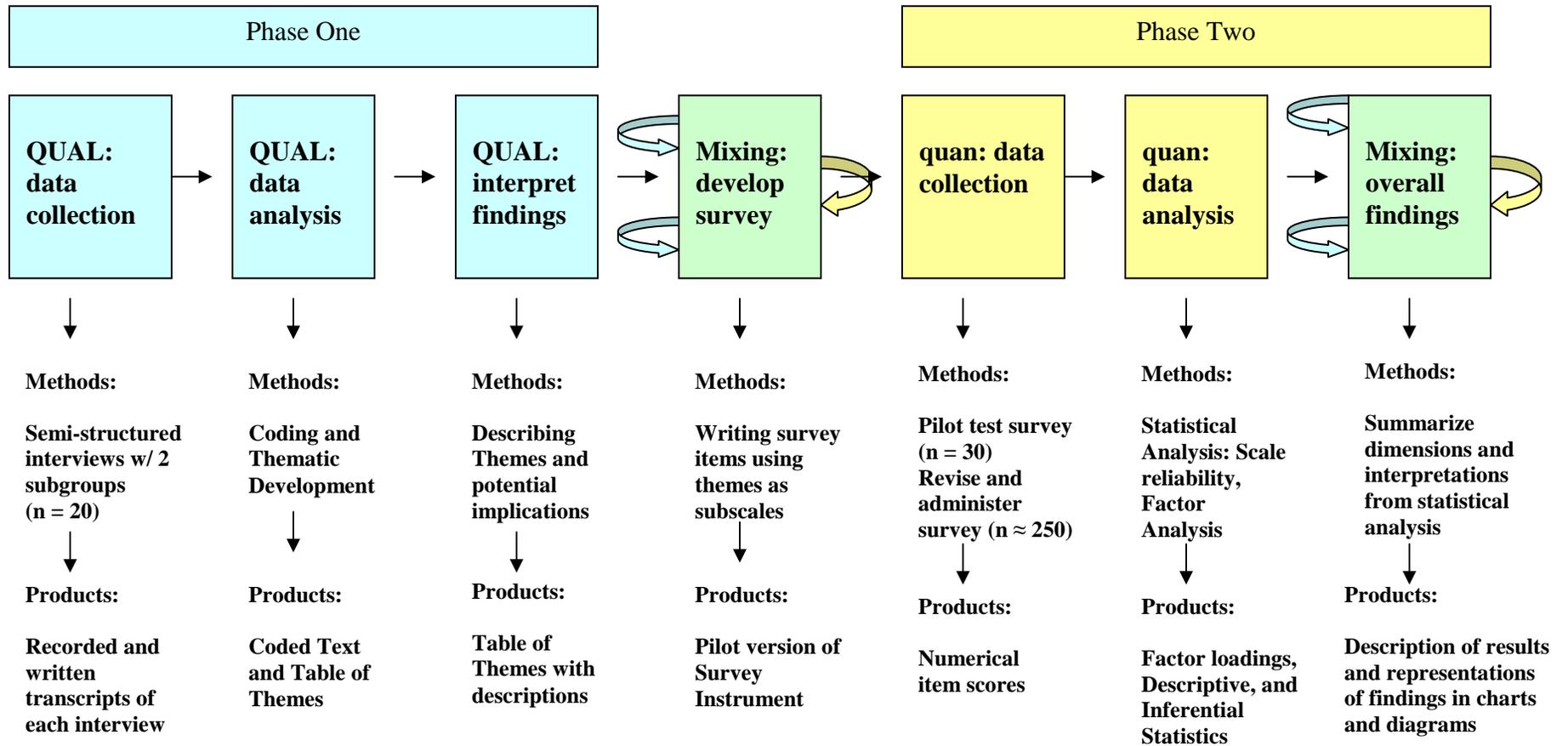
Figure 5.1
Frequencies of Open Ended Item Responses
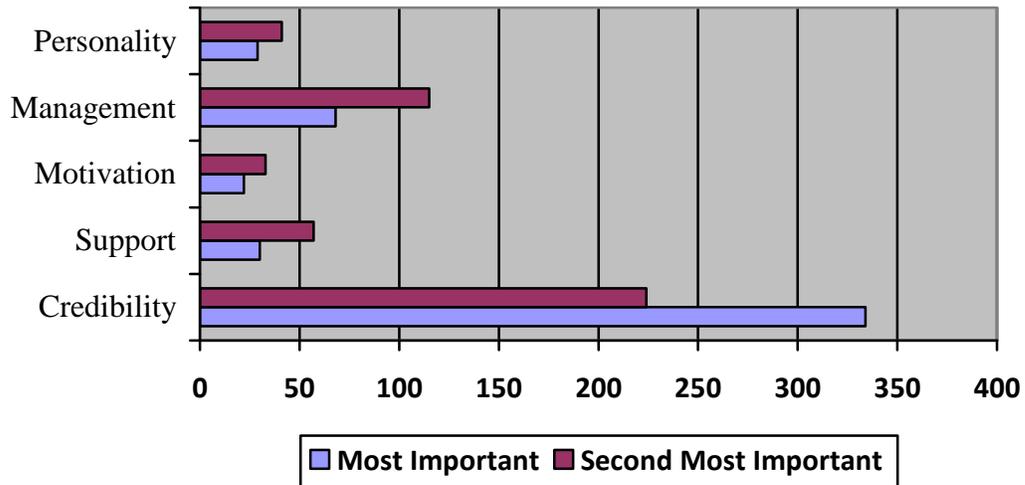
Figure 5.2
Frequencies of Multiple Choice Item Responses
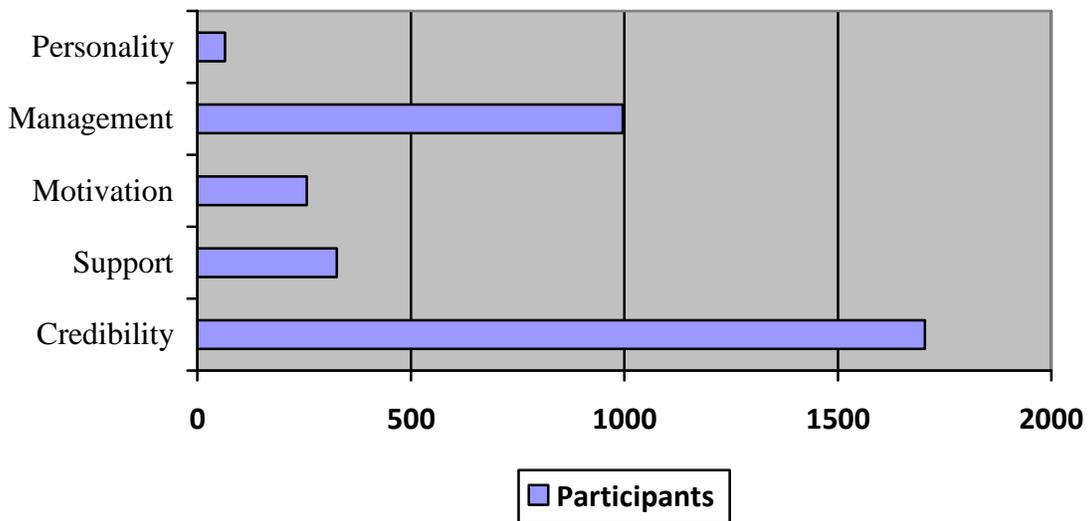
Appendix C

Informational Letters for Institutional Review Board

Phase I Participants

Information Concerning Participation in a Research Study
Clemson University

Examining Teacher Perceptions of Influential Facilitators of Elementary Mathematics
Professional Development

Description of the research and your participation

You are invited to participate in a research study conducted by researchers in the School
of Education at Clemson University. The purpose of this research is to identify what K-5
teachers percieve as influential characteristics of facilitators of elementary mathematics
professional development. Qualitative data consisting of semi-structured interviews and
quantitative data consisting of a survey design will be used to determine the qualities of
facilitators that teachers percieve as influential during professional develoment
experiences.

Your participation in this study will involve the following activity:
- *Participating in semi-structured interview experience. This interview will take last
  for approximately one hour and will be conducted at a time and place determined
  by the participant.*

Risks and discomforts

There are no known risks associated with this research.

Potential benefits

This research may help us to understand how teachers interact with facilitators of
elementary mathematics professional development. By investigating what teachers
perceive as influential qualities in professional development facilitators, researchers can
develop an understanding of the types of facilitators that will motivate participants and
support their learning during professional development experiences.

Protection of confidentiality

We will do everything we can to protect your privacy. Your identity will not be revealed in any publication or presentation that might result from this study. Pseudonyms will be used in all data collection procedures to insure confidentiality.

Voluntary participation

Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time.

Contact information

If you have any questions or concerns about this study or if any problems arise, please contact Dolores Stegelin at Clemson University (864)-656-0327 or Sandra Linder at Clemson University at (732)-859-2166. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864.656.6460.

<u>Phase II Participants</u>

Information Concerning Participation in a Research Study
Clemson University

Examining Teacher Perceptions of Influential Facilitators of Elementary Mathematics Professional Development

Description of the research and your participation

You are invited to participate in a research study conducted by researchers in the School of Education at Clemson University. The purpose of this research is to identify what K-5 teachers percieve as influential characteristics of facilitators of elementary mathematics professional development. Qualitative data consisting of semi-structured interviews and quantitative data consisting of a survey design will be used to determine the qualities of facilitators that teachers percieve as influential during professional develoment experiences.

Your participation in this study will involve the following activity:
- *Completing a survey related to the role of the facilitator in professional development. This survey will be completed electronically and will be submitted online.*

Risks and discomforts

There are no known risks associated with this research.

Potential benefits

This research may help us to understand how teachers interact with facilitators of elementary mathematics professional development. By investigating what teachers perceive as influential qualities in professional development facilitators, researchers can develop an understanding of the types of facilitators that will motivate participants and support their learning during professional development experiences.

Protection of confidentiality

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Appendix D

Interview Protocol

Participant:	Date:	Time:

Setting Description:

Participant Description:

Question	Response Notes	Body Language/Physical Reactions
1. Describe some of your experiences with professional development in mathematics. • What tasks were you asked to do? • Describe the structure of the experience • Describe the environment in which this PD occurred.		

2. Was there a time when you really got a lot out of a professional development experience? • Describe this experience • What made it rewarding? • What did the facilitator do to support this experience?		
3. What do you think of when I say the word facilitator?		
4. What does a facilitator need to do to motivate you to be engaged in professional development?		

5. Describe the qualities that good facilitators display during professional development experiences.		
6. Has there been a time when a facilitator turned you off to a professional development experience? • Describe this encounter. • What qualities did this person display that led you to be disengaged? • How could they have been better?		
7. What does the word influential mean to you?		

8. Describe an influential facilitator of professional development.		
9. Describe a facilitator of professional development that is not influential.		
10. Should a facilitator of mathematics professional development differ from a facilitator of other kinds of professional development experiences? • How should they differ?		

11. How do you use what you learned in professional development in your classrooms?		
12. Has there been a time when you did not want to attend a PD session, but you found the experience worthwhile? • Describe the experience • What happened to change your mind? • Describe the facilitator of this PD experience.		
13. Were there instances when a facilitator hindered the experience? • Describe your feelings toward this facilitator (intimidated, inhibited…)		

14. How should a facilitator support you during PD experiences?		

Appendix E

Results from Bracketing

Four things can be determined from an analysis of my own subjectivity:

1. I have experienced both the role of the participant and the role of the facilitator in professional development.

2. In my experience as a participant, I have encountered facilitators who were engaging and friendly and who presented information that was applicable to my own practice.

3. In my experience as the facilitator, I have encountered participants who have benefited from professional development and those who have not gained anything from the experience.

4. When analyzing my own practice, I am unable to determine what teachers want in their facilitators.

As a former third grade teacher, I have had many opportunities to attend professional development. I usually had a choice of sessions provided by district personnel and I typically attended professional development experiences related to mathematics because I enjoyed teaching that subject. In these experiences, I have always felt engaged and motivated. I assume I was motivated because I was interested in the topic, but I remember that the facilitators who led the sessions were always friendly and approachable. When I left the classroom, I was presented with the opportunity to conduct professional development in mathematics with elementary school teachers. I worked with

colleagues to create professional development experiences that were research-based and that met the needs of teachers based on our own perceptions. When implementing these experiences, I have found that there are two types of participants; those who want to be there and those who don't want to be there. It is very easy to conduct professional development with participants who choose to attend, they tend to be inherently engaged in the experience. When working with teachers who are not motivated, I try to present a friendly demeanor and to be accepting of their current circumstances. Sometimes I am able to get these teachers involved, sometimes I have no influence over their level of engagement in the session. When I am unable to engage these teachers, I come away from the experience with feelings of inadequacy and anger. I am unsure if it is a question of my own practice, if it is a question of the attitudes of participants, or if it is a combination of the two. I have no preconceived notions of the characteristics of an influential facilitator because my own practice is inconsistent. Therefore, because of this inconsistency, I am able to examine the data collected from participants without presumptions.

Phase Two Survey Instrument Items*

Perceptions of Influential Facilitators of Elementary Mathematics Professional Development

Introduction

You are invited to participate in a research study conducted by Dr. Dolores Stegelin and Sandra Mammano Linder in the School of Education at Clemson University. The purpose of this research is to identify what K-5 teachers perceive as influential characteristics of facilitators of elementary mathematics professional development. Your participation in this study will involve completing the following survey related to the role of the facilitator in professional development. This information will provide valuable feedback for future facilitators of mathematics professional development, enabling them to best meet the needs of the profession they serve. Completing the survey will take approximately 10-15 minutes. Your participation in this research study is voluntary and your responses cannot be linked to your name. If you have any questions or concerns, please contact Sandra Mammano Linder at sandram@clemson.edu. If you have questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864.656.6460.

Part One: Demographic Information

The following questions will help us categorize responses and are for descriptive purposes. Please answer each question to the best of your ability.

1. In what state do you currently teach? _____

2. In what district do you currently teach? _____

3. What grade level are you currently teaching?

   o K
   o 1
   o 2
   o 3
   o 4
   o 5
   o Other (Please specify)

4. What is your gender? _____

5. Including this year, how many years have you been teaching full time? _____

6. What is your highest level of education?

- o Bachelors
- o Bachelors + 30 credits
- o Masters
- o Masters + 30 credits
- o Doctorate

7. Have you completed National Board Certification?

- o No
- o Yes (In what year was it completed?) _____

8. What is your ethnicity?

- o American Indian or Alaskan Native
- o Asian
- o Hispanic or Latino
- o African American
- o Native Hawaiian or Other Pacific Islander
- o Caucasian
- o Multi-racial
- o Do not wish to reply
- o Other (please specify) _____

9. How many hours of mathematics professional development have you had in the past year?

- o 0
- o 1-5
- o 6-10
- o 11-15
- o 16-20
- o Above 20

Part II:

Please answer each question to the best of your ability

10. To what extent has the mathematics professional development you received over the past year resulted in changes to your instructional practice in mathematics?

- o Significant Change
- o Some Change
- o Little Change
- o No Change

11. Would you label the mathematics professional development you received in the past year as Isolated (one or two days long) or Ongoing (occurring throughout the school year)?

- o Isolated
- o Ongoing

12. List the top five characteristics you would want a facilitator of elementary mathematics professional development to possess.

1. Most Important _____
2. Second Most Important _____
3. Third Most Important _____
4. Fourth Most Important _____
5. Fifth Most Important _____

Part Three: Professional Development (PD) Scale

Indicate how strongly you agree or disagree with each of the following statements by marking the best representation of your opinion.

A facilitator should:

13. Have taught at the same grade level you currently teach.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree
   o Strongly Disagree
   o Completely Disagree

14. Be an interesting person.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree
   o Strongly Disagree
   o Completely Disagree

15. Have the ability to manage time during PD.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree
   o Strongly Disagree
   o Completely Disagree

16. Share personal experiences with teachers.

   o Completely Agree
   o Strongly Agree

- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

17. Have a strong understanding of how children learn mathematics.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

18. Be able to answer all relevant questions.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

19. Have a strong understanding of mathematical content.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

20. Be attentive to the teachers' needs during PD.

- o Completely Agree
- o Strongly Agree

- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

21. Learn along with participants.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

22. Provide evidence of the benefit of their topic.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

23. Be available for support after a PD session.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

24. Be respectful of the opinions of teachers.

- o Completely Agree
- o Strongly Agree

o Agree
o Somewhat Agree
o Somewhat Disagree
o Disagree
o Strongly Disagree
o Completely Disagree

25. Include information about new practices in education.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree
   o Strongly Disagree
   o Completely Disagree

Part Three: Professional Development (PD) Scale continued

Indicate how strongly you agree or disagree with each of the following statements by marking the best representation of your opinion.

A facilitator should:

26. Communicate the focus of a PD session.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree
   o Strongly Disagree
   o Completely Disagree

27. Encourage teacher growth during PD.

   o Completely Agree
   o Strongly Agree
   o Agree
   o Somewhat Agree
   o Somewhat Disagree
   o Disagree

- o Strongly Disagree
- o Completely Disagree

28. Be practical about how busy teachers are.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

29. Connect the information to classroom practice.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

30. Be a friendly person.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

31. Lecture during PD.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree

o Strongly Disagree
o Completely Disagree

32. Share their teaching experiences with teachers.

o Completely Agree
o Strongly Agree
o Agree
o Somewhat Agree
o Somewhat Disagree
o Disagree
o Strongly Disagree
o Completely Disagree

33. Be patient while interacting with teachers during PD.

o Completely Agree
o Strongly Agree
o Agree
o Somewhat Agree
o Somewhat Disagree
o Disagree
o Strongly Disagree
o Completely Disagree

34. Be an energetic person.

o Completely Agree
o Strongly Agree
o Agree
o Somewhat Agree
o Somewhat Disagree
o Disagree
o Strongly Disagree
o Completely Disagree

35. Have the goal to help teachers.

o Completely Agree
o Strongly Agree
o Agree
o Somewhat Agree
o Somewhat Disagree
o Disagree

o Strongly Disagree
o Completely Disagree

36. Have teachers complete the actual activities that their students will complete.

    o Completely Agree
    o Strongly Agree
    o Agree
    o Somewhat Agree
    o Somewhat Disagree
    o Disagree
    o Strongly Disagree
    o Completely Disagree

37. Be assertive while interacting with teachers during PD.

    o Completely Agree
    o Strongly Agree
    o Agree
    o Somewhat Agree
    o Somewhat Disagree
    o Disagree
    o Strongly Disagree
    o Completely Disagree

38. Communicate that teachers are important during PD.

    o Completely Agree
    o Strongly Agree
    o Agree
    o Somewhat Agree
    o Somewhat Disagree
    o Disagree
    o Strongly Disagree
    o Completely Disagree

39. Be approachable during PD.

    o Completely Agree
    o Strongly Agree
    o Agree
    o Somewhat Agree
    o Somewhat Disagree
    o Disagree

- o Strongly Disagree
- o Completely Disagree

40. Want to make a difference in education.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

41. Be open to criticism.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

42. Be a respectful person.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

43. Want to help teachers improve.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree

- o Strongly Disagree
- o Completely Disagree

44. Be passionate about mathematics.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

45. Be enthusiastic about teaching and learning.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

46. Be an entertaining person.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

47. Move around during PD.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree

- o Strongly Disagree
- o Completely Disagree

48. Be an outgoing person.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

49. Have teachers work in groups during PD.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

50. Want to defend what they believe about math instruction.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

51. Have prepared materials in advance of a PD session.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree

- o Strongly Disagree
- o Completely Disagree

52. Have a sense of humor.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

53. Provide challenging activities.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

54. Adapt to teachers' needs.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree
- o Strongly Disagree
- o Completely Disagree

55. Have the goal to help students.

- o Completely Agree
- o Strongly Agree
- o Agree
- o Somewhat Agree
- o Somewhat Disagree
- o Disagree

- o Strongly Disagree
- o Completely Disagree

Part Four:

Among each of the following groups of four, select what is most important for a facilitator of mathematics professional development to possess.

56. Group 1

- o Availability
- o Being organized
- o Knowledge of mathematical content
- o Passionate about their work

57. Group 2

- o Enthusiasm about the topic
- o Ability to connect information to classroom practice
- o Elementary teaching experience
- o Respect for participants' opinions

58. Group 3

- o Knowledge of how students learn mathematics
- o Being a good listener
- o Sense of humor
- o Use of group activities

59. Group 4

- o Be practical about how busy teachers are
- o Encouraging teacher growth
- o Being prepared
- o Enjoy what they do

60. Group 5

- o Ability to provide answers to questions
- o Sense of humor
- o Availability
- o Use of group activities

61. Group 6

- o Knowledge of mathematical content
- o Encouraging teacher growth
- o Enthusiasm about the topic
- o Ability to connect information to classroom practice

62. Group 7

- o Knowledge of mathematical content
- o Knowledge of how students learn mathematics
- o Elementary teaching experience
- o Be practical about how busy teachers are

63. Group 8

- o Availability
- o Encouraging teacher growth
- o Being a good listener
- o Respect for participants' opinions

64. Group 9

- o Enthusiasm about the topic
- o Enjoy what they do
- o A love of mathematics
- o Believe their topic is important

65. Group 10

- o Ability to connect information to classroom practice
- o Use of group activities
- o Being prepared
- o Being organized

Thank you!!

You have now completed the survey. Thank you for your participation.

*Note: The previous survey was altered slightly to fit the format of this dissertation. The

actual survey used in phase two can be viewed with the link below.

http://www.surveymonkey.com/s.aspx?sm=Jas1Zu_2b43l268so3raqT2w_3d_3d

Individual Textual Descriptions of Phase One Participants

Participant 1: She doesn't want facilitators to just show her a bunch of things to make. She felt her work with the math coach was beneficial because it was ongoing. They were able to start something in one session, try it in their rooms, and then follow up with it two weeks later. The reflection aspect of professional development is very important. The math coach would find resources to help with any questions from participants. If the math coach didn't have the answer, she would research the topic and bring the information to the next session. She defines a facilitator as a guide and as someone who would make professional development so interesting that you would want to go out and do it yourself. She likes facilitators who are well-prepared and organized and who provide current material that is relevant to what she could use in the classroom. If she encounters a facilitator who she does not like, she will sit there and think about other things. "I just daydream, grade papers under the table" (Participant 1, p. 4). She usually gets more from professional development when it is facilitated by a former teacher or a current teacher.

> Someone who has been where I am and knows what it's like to have 24 children and you're one person and trying to manage everything and they understand and have ways to help a lot of times, been there, done that, you know, that helps (Participant 1, p. 7).

She wants a facilitator to be motivational and confident and to have a good grasp of their topic. However, she doesn't want to be in a session where the content level is too high.

She doesn't want to work with someone who provides too much personal family history, she feels it is not relevant to what they are doing. She doesn't like when group projects are assigned and groups are given way too much time to get it done. She does not want to waste time during professional development. She also feels that appearance is very important. She expects that if she is going to sit and listen to someone that they be neatly dressed and groomed. She wants facilitators to move around the room and talk to participants to see if there are any problems or if they can assist in any way. "I just think it's neat when the facilitator goes around to all the groups and talks with them and works with them, just like a teacher" (Participant 1, p. 5). She wants to work with facilitators who love what they are doing and who want you to have a love for it. She feels that facilitators who are just there for the paycheck are not influential.

Participant 2: Working with a math coach impacted her the most because she was able to look at information from people who are professionals in the mathematics field. She was also able to look at student work to see that there is more than one way to solve a problem. It was an eye-opening experience for her. They had weekly meetings where she could hear what all the other teachers had to say and get ideas from each other. The math coach was very diligent and she changed a lot of minds. She could see people who had been teaching for 20 years who started to change their thinking about the way they taught math. The math coach accomplished this change by presenting the information in a way where she didn't talk down to the teachers. She would be learning along with the teachers. The math coach emphasized that their purpose was to help the children, it was

not to find what was easiest to do. She was very persistent and believed in what she was trying to do. Participant 2 feels that a facilitator should be or should have been a classroom teacher who has done the things they are asking teachers to do. She relates to facilitators who have taught at her particular grade level. She doesn't want to attend a session facilitated by someone who has taught in the upper grades. She wants to work with facilitators who are open and enthusiastic. They should be knowledgeable, but also not get flustered if they don't know the answer to a question. They should be willing to answer whatever questions participants have. They should be professional,

> She is the type of person, you could hate her guts, and she would know you hated her guts and she would be so nice to you to your face, you would never know that she had any kind of ill feelings toward you at all (Participant 2, p.13).

She doesn't want to work with people who are sarcastic or who talk over your head. She wants to be entertained during professional development, she doesn't want to listen to someone who talks for hours. A facilitator should try to relate to participants either personally or professionally. A facilitator should be a regular person who has a sense of humor and who can interact with participants during professional development. The activities that they use should be challenging and should connect to what they do in the classroom. Professional development should be an environment where you are learning, but it should also be an enjoyable experience. During a session, a facilitator should answer your questions in a way that makes you feel like your questions are important. A facilitator should be selfless. They should not act like they know more than everyone else. They should not talk down to you. Facilitators and teachers should be equals.

Participant 3: Professional development experiences should be hands-on where teachers are doing things that their children would actually do to give teachers the experience from the child's perspective. This type of experience helps Participant 3 because if he struggles with the content, then he knows his children will as well. He enjoys sessions where he learns something new. He has had many experiences where the facilitators had a smart alec attitude where a barrier was put up before the session even started. This attitude makes him not want to listen to the facilitator because they didn't value his opinions or thoughts. "Their method of coming across or interpersonal skills caused a situation where no matter what they said, you've already got a block to what they are trying to teach because they've already put you on the defense anyway" (Participant 3, p. 20). A facilitator is a professional who is pretty much equal to you, they just have insight that you might not have. They are there to assist and guide you and they understand that you are a professional. He is motivated during professional development when the facilitator hits on an area that he doesn't know much about. He likes when his own practice is challenged by someone who is knowledgeable but not arrogant. He likes reciprocity between the teacher and facilitator,

> It was as if we were learning together, so they knew that we were all in the same boat learning together and that attitude always helps too because it makes you feel like, well I can give input and it's important and they are giving me input, and it builds the relationship or the rapport (Participant 3, p. 19).

He wants to work with facilitators who are patient and friendly and who have enough knowledge to answer questions but also has the knowledge to realize that they need to learn things as well. An influential facilitator is on top of their game and can make you stop and think by challenging your practice. They have enough classroom experience to assist you and answer your questions. They ask questions as well as answer questions and they engage participants in discussions that build a community. They should listen to what participants have to say. They should put you in situations where you have to come up with the solution, like the Army where you don't know what to expect in the field so you are put in hypothetical situations to determine what you would do.

Participant 4: She wants facilitators to follow up with participants after a session to see if they need any assistance in her classroom. A facilitator should be supporting teachers during and following professional development by being flexible and by asking questions and by providing a way to contact them when issues arise. Their role is to guide, not to say that you are a terrible teacher or that you are doing everything wrong, but to help them change their own practice by challenging them and providing them with resources. She likes to experience hand-on activities where the facilitator walks around the room and asks questions to guide teachers towards understanding. She wants facilitators to share their own professional experiences with participants to make them feel more comfortable with trying something new.

> If they know that there is somebody that has been there in the trenches so to speak and you are opening it up to them to come back to you, sometimes that helps too, because

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they know that they have a sounding board to come back to and answer questions

(Participant 4, p. 26).

She doesn't want to work with facilitators who are boring or who have sessions where participants are not involved in any way except listening. "If I am going to be there, I want to do something. I want to be able to discuss the ideas. It is so important for children to discuss ideas, and you want adults to as well" (Participant 4, p. 27). A facilitator should not make teachers feel like they are dummies. They should be walking, talking, working with teachers, and making them part of the experience. A facilitator should be one of the group, not a high and mighty person who knows everything. A facilitator should have worked in the same types of settings as the teachers with whom they are working. They should be well-prepared, friendly, and very accessible. They should not use a monotone voice when speaking, they should act like they are interested in what they are doing.

Participant 5: She works with a math coach that has completely changed her practices in math. She meets with her coach weekly to touch base so that her coach can give her any resources or assistance that she needs. She enjoys working with this coach because the coach explains information in a way that she has no choice but to like it. She says there is nothing that her coach doesn't know. "She knows the standards, the indicators inside and out, any grade level. She eats, sleeps, and breathes it, I swear she does" (Participant 5, p. 31). At first when she began to work with this coach, she was negative and did not want to change her practice. The math coach never changed her attitude or gave up on her.

She was just always encouraging, always encouraging, no matter what. And we have

had some rough, where we didn't see eye to eye, simply because she knows a lot more

than I do, but sometimes I think I know more. But she just, I have seen the light and I

am glad that she put me through what she put me through last year (Participant 5, p.

31).

Participant 5 wants to work with facilitators that push or challenge her way of thinking.

She wants to work with manipulatives during sessions and she doesn't want to work with

people who are boring and stiff. A facilitator should have enthusiasm and a love for math.

There should be some belief in what they are trying to convey. They should be upbeat

and outgoing. They should have content knowledge and experience in teaching kids.

When I taught kindergarten, if you teach kindergarten, you've got to be able to get on

the floor. You can't wear heels and a dress every day. But there are those who do and

I know there is no way you get on the floor with those kids (Participant 5, p. 36).

A session should not be slow paced, a facilitator needs to know when the session is

lagging. They should be willing to accept the opinions of participants even if they are

different. An influential facilitator wants kids to succeed. "All the kids. Not just the high

group or not just bring the low kids from the bottom up, she really and truly wants to see

all the kids succeed" (Participant, p. 33). A facilitator should be professional, no matter

how participants behave.

Have you ever heard the term nice nasty? Just say that last year, I might have been a

little nice nasty to her with all the new stuff. I was just, not adamant, I just really

wasn't digging the whole kit thing, she never once, never once got nice nasty with me.

She always kept her cool. You know how women can get, but she was always level-

headed (Participant 5, p. 34).

A facilitator should not be trying to make themselves look better. They should not act

superior to participants. They should want to be doing their job and they should carry

themselves as someone who has worked with children and who wants to help children.

Participant 6: She doesn't want to sit through lectures. She wants to be in group doing

activities during professional development. She wants to work with facilitators who are

engaging and who feel comfortable sitting down and doing the activities with teachers. A

facilitator should be supportive and knowledgeable. They should be able to answer all

questions and be able to mediate when necessary. A facilitator should not lose focus

during a session and should not let the audience get off track. They should be organized

and should have good time management. They should keep the momentum going during

a session. They should provide handouts or visuals so participants can follow what is

happening. Facilitators should have a good sense of humor and they should be positive.

They should want to be there and they should be knowledgeable about mathematics at all

levels.

That person also is knowledgeable in the indicators and standards from the grade

previous and after so that you would know what the kids are supposed to know when

they come to you and what they are supposed to know when you leave them so that

you can help the wide variety of children that you have in your class (Participant 6, p.

38).

A facilitator should not be monotone or act like they don't want to be there. They should connect experiences to what participants see in the classroom and they should not give up on participants. They should support, reassure, and encourage participants. They should take the time to be available to provide feedback or to answer questions. The door should always be open.

Participant 7: She feels that a facilitator should be present whenever possible to go to with concerns or to observe and provide feedback on practice. A facilitator should be hands-on, not just a name or a position. A facilitator should also make professional development experiences hands-on where teachers work in groups to learn practical information that is useful to everyday practice. Teachers should not have to sit and listen to a lecture.

> There has been plenty where they do to you exactly what they tell you not to do, not to force feed students tons of information over a short period of time, and that has actually been state department trainings, and they will tell you that this is what we teach you not to do to students, but it is because there is a limited amount of time, but where you don't even have time to digest the material, it is so quickly force fed that you can't really process it (Participant 7, p. 43).

She feels that not everybody should be a facilitator. In addition to being knowledgeable and having experience, they have to pick out the key components that should come out of a session and be able to focus on them. Facilitators should have a lot of personality and a high level of energy. They should also have conviction and belief in their topic.

I think it makes for a buyable, believable facilitator, someone who is committed, not

just for the paycheck or to stand there and teach you the material or to try and get you

to buy into it and use it, but somebody who believes in it enough to be kind of a hand

holder to get you started or to make sure you are doing it right for the best interest of

the kids (Participant 7, p. 48).

Facilitators should not be monotone or boring. "It kind of makes you think, why did I

pick this career? It is the total opposite, very humdrum, very boring, you walk out of

there going, what exactly did they say? They lost you two seconds in" (Participant 7, p.

45). Facilitators should be organized in their speech and in the way that they present

material. They need to really understand the material, not just regurgitate it off of a script.

They need to have true experience so they can understand participants. "I think you

should have experience in kindergarten through fifth grade" (Participant 7, p. 47). Perfect

facilitators can speak from experience and can show how they have learned from a

situation.

Participant 8: She wants to work with facilitators who present information that makes

sense and that is useful. She is motivated by hearing the ideas of others. She feels that a

facilitator should know what they are talking about, but should also have a sense of

humor. She wants to work with people who have elementary teaching experience but who

also have enough content knowledge to be able to answer questions. Facilitators should

be inspiring or should present inspiring information. They need to be able to speak to

crowd and should act and dress in a professional manner. A good facilitator should keep

the interest of everyone in the session by presenting information in a variety of ways. They should exude a positive attitude and they should want to be there. The audience should be involved in professional development. Facilitators should be available during and following professional development to assist teachers. They should be patient and be willing to accept all opinions. A facilitator should not argue with participants, but rather should allow participants to express thoughts without being judgmental.

Participant 9: She likes to be challenged during professional development. She is motivated when engaged in a task where she is building her own content knowledge and where she knows that she could apply the information in her own practice. She is taking professional development to improve her own instruction, so she seeks out facilitators who connect the experiences to what she sees in her classroom setting. The facilitators she works with demonstrate a high level of content knowledge for every grade level. They have the ability to make the information meaningful for both kindergarten teachers and fifth grade teachers. They should also be knowledgeable about the pedagogy of children, especially when working with teachers in early childhood. These facilitators use questioning to connect professional development experiences to practice. These facilitators also act as resources, providing information and assistance when necessary. "She is constantly observing my classroom and giving me positive feedback as well as constructive criticism" (Participant 9, p. 56). Participant 9 emphasizes the importance of reflection during professional development. She stresses the use of discussion among colleagues and is adamant that lectures do not promote motivation.

I love the interaction, the not so much lecture, but here is a task, go work on that for a little while and let's come back, group work. I enjoy that as an adult. I learn from my peers and when I have the opportunity to sit with a group of other teachers in a professional development situation and the facilitator lets us work together, that is so powerful for me (Participant 9, p. 58).

Facilitators should be inspiring and they should be seeking out opportunities to improve their own practice. "She constantly is learning new information that makes me want to learn new information. When you watch somebody just soak up knowledge you say, I want that too" (Participant 9, 57). Facilitators should have passion for their work which, in turn, rubs off on participants. Facilitators should build camaraderie among the group, collaboration is imperative. They need to understand the baggage that participants bring to professional development experiences, whether it be personal or professional. A good facilitator will realize what teachers are giving up to attend a session and will do everything they can to make the experience enjoyable. Facilitators should be compassionate towards participants and be willing to put forth extra effort to help.

I think understanding is key in the sense of when you say, I don't get this or can you help me with this, and not blowing you off, really sitting down with you and helping you. If you care enough to want to make it better (Participant 9, p. 63).

Participant 10: She enjoys attending professional development experiences where participants are actively engaged in making activities or developing ideas that can be immediately implemented in the classroom. In the past, she was able to work with

facilitators who spent time answering questions and supporting teachers when they tried to implement something new in the classroom. Now, her experience with these same facilitators has changed, mostly due to a new administration at her school.

> This year they sit down and give us a lot of information. I guess it is so different with new administration, it is just like they just give us things, and last year I think it was so much more beneficial (Participant 10, p. 64).

She stresses how important it is for facilitators to model good practices in their own session. They should be bringing manipulatives and materials for participants to use during activities. They should be organized and should know what they are talking about. They should want to be there. "They are not like, I'm being paid to be here and I am going to teach you this, you can tell they love what they are doing, that transfers into the way they are teaching us" (Participant 10, p. 65). Facilitators should also tailor the experience to meet the specific needs of participants. If a third grade teacher is attending, there should be activities relating specifically to the third grade classroom. A facilitator should have experience in their field.

> One year, we had a coach who would look at our essential questions and she told one of my co-workers, 'Your essential question is too wordy'. The coworker asked her, 'Well, how would you suggest that I word this?' And she was stumped, she was like, 'Oh I haven't really thought of that', so I think experience, and especially if you are going to critique something, you should be very familiar with it. Even if she had just said something, but she didn't and that didn't go over well, and right there her credibility was kind of minimized (Participant 10, p. 66).

Good facilitators will have a high level of energy and will be understanding that teachers

may be skeptical because they have been trying new things for so long and they haven't

always worked. "I think you were so understanding, because we kept saying, 'This is the

way we learned it, there is no other way', and you were like, 'Just try it'" (Participant 10,

p. 68). Facilitators have to also be personable. They have to be comfortable around

teachers and teachers have to be comfortable around them.

> I think that is the only way to learn new things, if you are comfortable enough to ask
>
> questions and know that your questions won't be beat down, comfortable enough to
>
> disagree and not worry that you will be angry with me (Participant 10, p. 68).

Facilitators have to be present. Participant 10 is currently frustrated with her math coach

because the math coach never comes to her classroom. "They really don't observe in your

classroom if they consider you a strong teacher" (Participant 10, p. 69). If a facilitator

wants to motivate teachers, they must be engaging by both providing applicable

information and by being friendly, animated, and funny.

Participant 11: Facilitators should be able to give you a clear understanding of the topic.

They should use hands-on activities to engage participants. Facilitators should be

knowledgeable about their subject area. The way they carry themselves and respond to

teachers is very important.

> Even if you do ask a question, what kind of response are you going to get? Is it going
>
> to be where you're not going to feel, you know, there are times when you think, oh,

I'm not going to ask that question, I don't like how they are responding to that

(Participant 11, p. 75).

Facilitators should not be short with participants. They should be understanding and

patient. Facilitators should also be effective in time management. They should not rush

through a session just to get it over with. They should have tried new ideas and should be

sharing those new ideas with participants. They should challenge participants and want

them to try new things. They should have an open mind and listen to participants.

If you have a disagreement about what you are talking about, the facilitator needs to

listen to what you are saying and then if they can see that they can agree with part of

that, you know if they can say, well I can see that, you know, still, why don't you try

this? Instead of just having a closed mind, you know (Participant 11, p. 76).

Facial expressions are also very important. Facilitators should be cognizant of the

expressions they use among participants. Facilitators should be moving around and

talking to the entire group, not just one section of the room. Facilitators should smile and

be friendly, they should be energetic and eager to help. They should be there for the staff

and not for the paycheck.

Like teachers, you can't be in teaching just for a paycheck, you've got to have a love

for it and this is someone who has a love for training because they want to see growth

in the students in that school (Participant 11, p. 78).

Participant 12: Facilitators should use hands-on activities during professional

development, however, those activities should not be so rudimentary that participants are

not getting anything out of the experience. "Sometimes it's good to do the activities that the kids have to do and sometimes it's almost boring because we have to do it and it's like, year we know what's going to happen" (Participant 12, p. 80). She feels that facilitators should not talk down to teachers. They also should not be negative about students' abilities or achievement. Facilitators should act happy and should not criticize teachers or students. Facilitators should reassure teachers that they are there to help and that professional development is a safe environment where teachers should be able to express their opinions or share their thoughts. Facilitators should show that they have a sense of humor. "I like people who kind of make goofs of themselves and I make a goof of myself when I teach. And show that they are not afraid to have fun and look silly" (Participant 12, p. 82). She believes there may also be a difference between male and female facilitators, "I don't know, all of the men that I can think of have been very reserved, and the women seem to be less reserved and more outgoing maybe" (Participant 12, p. 82). Good facilitators are well prepared, they know what they are talking about, they are inviting to comments, and they enjoy what they do. They have to be excited about what they are doing so the teachers in there session can become excited as well. They should also be sharing interesting information that is new and can benefit students. They should stop to answer questions instead of rushing through. They want you to benefit from the experience. They want you to be successful.

Participant 13: Facilitators should be experienced in the area you are learning. They should be encouraging and should present activities that are interesting, fun, and

productive for children. They should be knowledgeable and should show research or data supporting their topic. Influential facilitators are energetic and organized. They move through sessions at a somewhat fast pace but also make connections to where you are professionally. "Sometimes people are far too removed from the classroom to be the most effective" (Participant 13, p. 91). They should have experience at the same level as the teacher with whom they are working.

> I think they ought to have the overall spectrum because it is definitely a continuum, but you know when you are talking about early childhood, you really need to have some experience with early childhood education. I think some suggestions maybe in my Masters classes were not necessarily appropriate for the age group (Participant 13, p. 94).

They have participants move around during sessions and use visuals and materials to get participants engaged in the experience. They peak your curiosity or encourage you to learn more. They are someone that you respect, someone that has experience and knows what they are talking about. The information they present is meaningful because it can be used immediately. They provide a way for teachers to follow up after a session.

Participant 14: She got the most out of professional development when she was able to build her own content knowledge through the experience. These sessions were presented in a way where participants developed their own content through the investigation. The investigations made the sessions more memorable. The facilitators of these sessions provided many opportunities to ask questions and discuss with groups. Everyone was

learning from each other and sharing, there was a chance to learn from your peers and

from the facilitator. A bad facilitator she had encountered was standoffish. When

participants asked questions, this facilitator didn't act like she wanted to answer them.

> She was kind of, not rude, but almost rude because it was like she really didn't want to
>
> deal with your questions, she just wanted to go through her talk and then leave. That
>
> is kind of the feeling that I got (Participant 14, p. 97).

A facilitator's responsibility is to be knowledgeable in order to answer questions and

address misconceptions. It is also the responsibility of the facilitator to read the group and

figure out what kind of misconceptions are happening during a session. The comfort level

in a session is very important. Participants should feel like facilitators are glad they are

there. Facilitators should work to make a connection with participants, to show that they

are interested in them as people, they should try to get to know the group.

> I think just that down to earth human connection. They try to share personal
>
> experiences that they had so that you can kind of connect with them and I think that is
>
> a real big thing that you just need to feel like you are connecting with that person
>
> (Participant 14, p. 98).

Being a facilitator shouldn't just be a job, they need to care about being there, and they

need to want to be there. An influential facilitator is someone that is knowledgeable, but

also on your level. They are connected to you in some way so you can respect what they

are saying. They do not talk down to you and they don't use jargon or language that you

do not understand. A community must be developed among participants during

professional development. If a facilitator is arrogant or doesn't want to answer questions, that community cannot be built.

Participant 15: Professional development should be filled with practical experiences that can be taken and implemented directly in the classroom. Facilitators of professional development should use discussion and hand-on activities to engage participants in these experiences. They should move around groups as they work to ask questions and address any problems. It is important that they speak to every group and for each group to reflect on the experience.

> I think the most beneficial thing that helps me is listening to each group share out because there is always something coming from each group, that accountability, and then hearing that it is not just this way, it can be this way or it can by this way (Participant 15, p. 105).

A facilitator should be open minded and accept that teachers may need to modify suggestions to meet the needs of their students. They should be knowledgeable about the content and about the way students learn. Facilitators should be teachers and friends. They should want to start a conversation with you. They should be outgoing and energetic. "To me, there are presenters or facilitators that are really energetic, you know, they make you excited even when they are just talking. And she was just very, she wasn't necessarily monotone, but she was just cut and dry" (Participant 15, p. 106). Lecture should not be used as a method of delivery during professional development. You should feel comfortable sharing your opinions and asking questions. Facilitators should not

create an environment where participants don't want to ask questions because they feel dumb. Facilitators should also use voice inflection when speaking and should move around the room during the presentation. They should dress and speak in a professional manner. Facilitators should believe that their topic will work, but they should also have proof to support it.

> I think if they believe in something that there should be some sort of example to go with it, I think there should be some evidence to back it up rather than just the belief. It is two separate things, but I think they should both be evident (Participant 15, p. 109).

Participant 16: She doesn't want to work with facilitators that are short and snippy with participants. Usually professional development is at the end of the day and everyone is tired already. If a facilitator displays a negative attitude, most likely teachers are not going to be engaged. Facilitators shouldn't be doing too much talking. They should be demonstrating or guiding teachers through activities. Active participation is necessary. A facilitator should be knowledgeable or should have someone there who is able to answer all questions. Having classroom teachers or former classroom teachers at the elementary level also makes a difference. This person should have an understanding of classroom management and should be able to give teachers a heads up of some of the struggles they might encounter when they try something new.

> I really think overall it would make a difference in general to most people because one of the comments we make as elementary teachers is when we get a principal that

comes from middle or high school and that is one of the comments that is made, they

have no idea of what it is like because elementary, middle, and high school are three

different functions within themselves (Participant 16, p. 115).

A facilitator should be able to move things along but at the same time allow for

discussion or questions. If a facilitator makes comments towards teachers in negative

tones, the teachers are less likely to ask questions or be involved in the discussion. The

facilitator needs to constantly have a positive attitude. Facilitators need to interact

comfortably with participants. If you have a bias or a prejudice, you cannot let it show.

Facilitators should be aware of their audience and know how to adjust. They should be

comfortable and confident in front of a group. They should provide a way to contact them

following sessions. Most importantly, a facilitator should be able to relate information to

practice.

There are some facilitators who have a lot of knowledge, but they can't break it down

so that everybody understands. Not to simplify it to make you feel that you are an

idiot, but simplify it in terms that make sense and that you can make connections to

(Participant 16, p. 117).

Participant 17: Facilitators should have everything they need when they begin a

professional development session. She feels it is necessary to experience activities just as

her children would so she can understand what they go through. She also stresses the

importance of ongoing professional development. "We never saw the person again. We

often make the joke that they got lost by the house that the deliverance people live at"

(Participant 17, p. 123). There needs to be an attempt made by facilitators to follow up with participants following professional development. She has had experiences where facilitators were degrading and talked down to teachers. She wants to work with facilitators who have experienced teaching in the same type of setting that she works in everyday. She describes facilitators as saying, "Well in my school district, which was always in the upstate or in an affluent area, we did dadadadada and if you would just do what we did, your kids could grow and you just didn't know any better" (Participant 17, p. 124). A facilitator to her is someone who is bringing information to another group of people that is to be used. It is not information for the sake of information. It is information that is going to be used for a purpose. Facilitators should not have any preconceived notions about the teachers or their students. They should display a genuine interest in what teachers have to say about their school settings. They should not be condescending or blame teachers for what is happening in the schools. They should be able to answer questions but they should not be arrogant. Facilitators should be friendly and supportive.

> They should be capable of listening, which seems like a silly thing to say, but a lot of times that is the difference between a facilitator and an instructor. A facilitator is going to listen and then start planning. An instructor just has a set of curriculum they are going to march down (Participant 17, p. 125).

A good facilitator knows their content material along with the research and the strategies for working with children. They should be an expert in the field but they should not provide too much information where teachers will not be able to process everything.

Facilitators should be aware of their audience's needs and be flexible enough to change their plans to meet these needs. They cannot expect anything to happen after one day of professional development. They should be present after a session is over. They should want to make a change.

Participant 18: Facilitators of professional development should be available to give advice whenever needed. When they come in your room, they should not just observe and leave, they need to be able to provide constructive feedback immediately. They should have resources for teachers to use in their classrooms and they should work to develop a sense of trust with teachers. Facilitators should create a laid back atmosphere in professional development where teachers feel comfortable taking risks or trying something new. To create this atmosphere, facilitators might want to tell stories or make personal connections. It is important for facilitators to treat teachers like professionals, not like a child in their class. During a professional development session, facilitators should provide incentives to get participants engaged. They should encourage participants to continue learning after a session is complete by providing follow-up opportunities. It is important to have new ideas in professional development. If teachers are hearing something new or different, they are invigorated and work to implement these new ideas in practice. Facilitators should use a hands-on approach to professional development. They should have all of their materials organized and they should present information with a variety of modalities. They should be peppy and act like they want to be there. They should know what they are talking about and be able to answer questions.

It would be helpful if they have taught in a classroom or to have at least observed in a lot of different classrooms. Facilitators should be moving around the room to make teachers accountable and to let them know that each teacher is important enough for the facilitator to observe. Facilitators should use proper English and avoid using curse words. They should use voice inflections to show teachers that they are excited about the presentation. They should allow teachers to ask questions during a presentation and provide a way for teachers to ask questions privately. They should make working with teachers a priority.

> We emailed her one day and said, 'When you get a chance, can you come and talk to us', well she rearranged her schedule so that she could meet with us that next morning because that was important. If it was important to us, then it was important to her (Participant 18, p. 136).

Teachers need to be engaged, they need to be entertained.

> It is almost like you have to entertain teachers just like we are expected to entertain students in the classroom. They say there is a little bit of drama and acting in what you do to keep them motivated. They all need to be motivated and want to be there regardless of what they are sharing (Participant 18, p. 136).

If facilitators see that teachers are not engaged, they need to find a way to change what they are doing to get the teachers more involved.

Participant 19: Professional development really needs to be something will help her out immediately. She needs to be able to use the information as soon as she gets back, otherwise she will tune it out. Facilitators should model how teachers are supposed to

implement new practices in their classrooms. They should be able to provide helpful hints or strategies for what might happen, which is why it is so important for them to have current classroom experience.

> If it comes out from someone else that they have been a classroom teacher 12 years ago, I am going to pay attention, but I guess it won't prick my ears as much as somebody who is currently a teacher (Participant 19, p. 143).

They should have teachers moving or having them working in groups during professional development.

> Good facilitators will put their learners so to speak in group so that they can talk to each other and they can share ideas and that sort of thing, especially if you are sitting with other teachers from around the state or other teachers even in your school (Participant 19, p. 144).

Facilitators should use humor and examples from their own experience to motivate a group. There needs to be a focus in professional development. Participants need to know why they are there and what the overall plan is for the day. Facilitators should have all of their materials prepared and organized so they are not fumbling around during the session. They should have a strong voice and have a commanding lead but also be friendly and greet participants with a smile.

Participant 20: Facilitators should be available if teachers have questions and should be able to provide suggestions or ideas if teachers are struggling. They should have lots of different ideas, but they should also be open if teachers have alternative opinions. They

should also be realistic of what teachers go through on a daily basis. They should, "Offer quality ideas for the real world, not the idealistic classroom, so I think that is why a classroom, or a former classroom teacher is so important" (Participant 20, p. 152). They need to be organize so their session runs smoothly and participants are not kept late. Most teachers have families at home and don't like to stay late after school, so facilitators should be cognizant of that fact and get through each session in a timely manner. Facilitators should choose atmosphere that are conducive to learning. They should avoid large auditoriums or open areas where it is difficult to incorporate group work or discussion. Facilitators should be excited about what they have to present. They should also leave participants with a challenge or something to do after the session so they can connect the information in the session to their own practice. Professional development should be a relaxed setting, so facilitators should be comfortable with teachers and should act like they enjoy what they do.

Observation Protocol for Evaluating Facilitators

Part 1: Demographics

Observer: _____   Observation Date: _____

Facilitator: _____

Facilitator email address: _____

Session topic: _____

Session location: _____

Time Start: _____   Time End: _____

Announced Observation (Y/N, explain) _____

Number of Participants: _____   Male: _____   Female: _____

Participant Ethnicity: (provide # for each)

_____ American Indian or Alaskan Native   _____ Asian

_____ Hispanic or Latino   _____ African American

_____ Native Hawaiian or Other Pacific Islander   _____ Caucasian

_____ Multi-Racial   _____ Other

Grade Levels where Participants Teach: (provide # for each)

Kindergarten _____   1st Grade _____   2nd Grade _____

3rd Grade _____   4th Grade _____   5th Grade _____

Other _____

Part II: Description of Environment

In the space provided below please describe the physical environment in detail. You may use diagrams or pictures if necessary. In your description, be sure to include such details as:

- Arrangement of furniture in the space
- Availability of materials
- How set-up affects management of materials and session
- Size of the room and use of space

Part III: Lesson Observation

This observation tool is divided into five separate sections. For part A in each section, please rate the individual indicators on a scale from one (Always) to five (Never). For part B of each section, please provide written evidence from the observation that relates to the overall topic.

$$1 = \text{Always, } 2 = \text{Very Often, } 3 = \text{Sometimes, } 4 = \text{Rarely, } 5 = \text{Never}$$

Section 1: Credibility

Part A: Rate each indicator on a scale from one to five.

1. The facilitator displays a high level of content knowledge in mathematics.   1 2 3 4 5

2. The facilitator displays a high level of knowledge about pedagogy.   1 2 3 4 5

3. The facilitator is able to answer questions.   1 2 3 4 5

4. The facilitator provides information about new practices in education.   1 2 3 4 5

5. The facilitator shows evidence of classroom experience.   1 2 3 4 5

6. The facilitator shows evidence of experience with their topic.   1 2 3 4 5

7. The facilitator provides hints or examples of how to implement practices with students.   1 2 3 4 5

8. The facilitator displays data to support the topic.   1 2 3 4 5

9. The facilitator provides research to support the topic.   1 2 3 4 5

10. The facilitator dresses in a professional manner.   1 2 3 4 5

11. The facilitator speaks clearly.   1 2 3 4 5

12. The facilitator uses professional language.   1   2   3   4   5

Part B: Use the space below to provide anecdotal evidence of each of the indicators rated above. Be as detailed and specific as possible.

Section 2: Support

Part A: Rate each indicator on a scale from one to five.

1. The facilitator provides adequate time for activities.   1 2 3 4 5

2. The facilitator provides resources for participants.   1 2 3 4 5

3. The facilitator provides a way for participants to   1 2 3 4 5
     make contact after professional development.

4. The facilitator provides time for participants to ask questions. 1 2 3 4 5

5. The facilitator answers participants' questions.   1 2 3 4 5

6. The facilitator allows participants to ask questions.   1 2 3 4 5

7. The facilitator takes time to listen to participants.   1 2 3 4 5

8. The facilitator is accepting of different opinions.   1 2 3 4 5

9. The facilitator displays the ability to assess audience needs. 1 2 3 4 5

10. The facilitator responds to audience needs.   1 2 3 4 5

11. The facilitator explains information in a way   1 2 3 4 5
     that makes sense to participants.

12. The facilitator works to develop personal   1 2 3 4 5
     or professional connections with participants.

13. The facilitator shows a sense of understanding   1 2 3 4 5
     towards participants.

14. The facilitator encourages participants.   1 2 3 4 5

15. The facilitator works to build a sense of   1 2 3 4 5
        trust with participants.

Part B: Use the space below to provide anecdotal evidence of each of the indicators rated above. Be as detailed and specific as possible.

Section 3: Management

Part A: Rate each indicator on a scale from one to five.

1. The facilitator uses group work during the session.   1 2 3 4 5

2. The facilitator moves around to each group.   1 2 3 4 5

3. The facilitator uses discussion during the session.   1 2 3 4 5

4. The facilitator does not spend the majority of the time lecturing. 1 2 3 4 5

5. The facilitator connects information to classroom practice.   1 2 3 4 5

6. The facilitator shows participants how the information
   from the session can be useful.   1 2 3 4 5

7. The facilitator applies information to participants'
   current situation.   1 2 3 4 5

8. The facilitator challenges participants with
   activities or questioning.   1 2 3 4 5

9. The facilitator has participants do activities
   their students will do.   1 2 3 4 5

10. The facilitator provides a clear focus of
    how the session will be organized.   1 2 3 4 5

11. The facilitator does not stray off topic during the session.   1 2 3 4 5

12. The facilitator displays evidence of time
    management abilities.   1 2 3 4 5

13. The facilitator is organized during the session.   1 2 3 4 5

14. The facilitator is prepared with all materials and handouts.   1 2 3 4 5

15. The facilitator displayed evidence of materials   1   2   3   4   5
       management abilities.

Part B: Use the space below to provide anecdotal evidence of each of the indicators rated above. Be as detailed and specific as possible.

Section 4: Motivation

Part A: Rate each indicator on a scale from one to five.

1. The facilitator acts like they enjoy what they do.   1 2 3 4 5

2. The facilitator displays evidence that he/she is there   1 2 3 4 5
     for the students.

3. The facilitator wants to help teachers.   1 2 3 4 5

4. The facilitator displays evidence that he/she   1 2 3 4 5
     feels the topic is important.

5. The facilitator displays evidence that he/she thinks   1 2 3 4 5
     the topic will help students.

6. The facilitator is positive during the session.   1 2 3 4 5

7. The facilitator is enthusiastic about the topic.   1 2 3 4 5

Part B: Use the space below to provide anecdotal evidence of each of the indicators rated above. Be as detailed and specific as possible.

Section 5: Personality

Part A: Rate each indicator on a scale from one to five.

1. The facilitator displays humor during the session.   1 2 3 4 5

2. The facilitator smiles during the session.   1 2 3 4 5

3. The facilitator is friendly towards participants.   1 2 3 4 5

4. The facilitator does not act arrogant towards participants. 1 2 3 4 5

5. The facilitator does not speak with a monotone voice.   1 2 3 4 5

6. The facilitator has a high level of energy.   1 2 3 4 5

7. The facilitator is entertaining.   1 2 3 4 5

Part B: Use the space below to provide anecdotal evidence of each of the indicators rated above. Be as detailed and specific as possible.

Part IV: Facilitator Information Form

Provide electronic copy of these forms for facilitators following observation.
Facilitators, please fill out these forms with as much detail as possible and return electronically to observer within five days of observation date.

Name: _____ Date: _____

Session Title: _____

Session Topic: _____

Highest level of education: _____

Gender: _____ Male   _____ Female

Ethnicity:
_____ American Indian or Alaskan Native   _____ Asian
_____ Hispanic or Latino   _____ African American
_____ Native Hawaiian or Other Pacific Islander _____ Caucasian
_____ Multi-Racial   _____ Other

Classroom Experience:

Type of teacher certification(s): _____

Years of experience: _____   Grade levels taught: _____

Professional Development Experience:

Types of PD provided: _____

Years of experience: _____   Content areas taught: _____

1. Please describe, in detail, the parts of the observed session you felt went well.

2. Please describe, in detail, the parts of the observed session you felt needed improvement.

3. How did you prepare for this session?

4. Do you feel the participants in this session were engaged? How did you motivate participants to be engaged?

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