THE IMPORTANCE OF FIDELITY OF IMPLEMENTATION AND FACTORS THAT IMPEDE IT FOR TEACHERS: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

A doctoral thesis presented
by
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to
The School of Education

In partial fulfillment of the requirements for the degree of Doctor of Education in the field of Education

College of Professional Studies
Northeastern University
Boston, MA
August 2016
Northeastern University Graduate School of Education Approval Record

Doctoral Thesis Title:
The Importance of Fidelity of Implementation and Factors that Impede It for Teachers. An Interpretative Phenomenological Analysis

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Abstract

Implementation fidelity refers to the degree to which an intervention or program is delivered as intended. The implementation of a new program or curriculum can be challenging for teachers in any educational system. While it is natural for teachers to exhibit some level of resistance toward change, mandates that are made without input from those who are directly involved in the implementation can meet with high levels of resistance. This study investigated factors that impede the fidelity of implementation of a new elementary math program from the perspective of the teachers. This case study of a group of elementary teachers, who are using the new program in their math classes for the first time, documents the decisions made in terms of both curriculum and instruction. The following primary question guided this study: *What do teachers think gets in the way of fidelity of implementation of the standards-based program?* The researcher utilized an interpretative phenomenological analysis (IPA) approach to examine the experiences of the teachers. The study revealed that teachers need support to meet their professional responsibilities while meeting the needs of their students, professional development at the district and school level, and time to work through pacing issues that arise in the first year of program implementation. District level administrators with decision-making power may find that this study contributes improved approaches for future educational program change efforts.

*Keywords:* fidelity of implementation, program change, urban, elementary, education, math
Acknowledgements

I would first like to thank my grandfather who, unfortunately, is no longer here and unable to see me complete this final requirement for my degree. My grandfather was my biggest cheerleader. He supported all of my aspirations and made me believe I can achieve anything I want. Without his voice inside my head as a constant reminder to push ahead when things get tough, I am not sure I would have made it to this point. I will be forever grateful for the times we shared and the values he instilled in me.

I would like to thank my parents for always having the highest expectations for me. Their belief in me made me who I am today. While I don’t always verbalize everything they have done for me in the past thirty-four years, I know that I would not be anywhere close to where I am without them.

I am so grateful that my advisor, Dr. Carolyn Bair, has stood by me during the final phase of a process that was much longer and more complicated for me than most others. She provided the encouragement I needed to make this happen and has been nothing but patient while guiding me through the dissertation process.

I would like to thank my external examiner, Dr. Gail Donovan, for encouraging me to get this done. While I have known her for less than two years, she has become such a powerful role model for me in the work I am doing by pushing me academically, personally, and professionally.
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Chapter 1: Introduction

Background

The 2013 National Assessment of Educational Progress (NAEP), also known as “The Nation’s Report Card,” revealed that only forty-two percent of fourth grade students achieved proficiency or higher on the test (NCES, 2013). This means that fifty-eight percent of fourth grade students had not mastered the skills routinely taught in the elementary grades. That study also revealed that students were generally unable to relate mathematical skills to situational, everyday, real-world problems. Additionally, NAEP results indicated that most students were proficient at only lower-order thinking skills and lacked the more complex skills necessary for advanced mathematical studies at the secondary level. A focus on mathematics instruction based on real-life application of mathematics requiring depth of knowledge skills was indicated for development of elementary school mathematics curricula (NCES, 2013).

According to the National Mathematics Advisory Panel’s 2010 report, math education in the United States “is broken and must be fixed” (p. xiii). A major flaw in the country’s math education is that “traditional U.S. textbooks rarely get beyond definitions and formulas” and instead focus on the mechanics of mathematics (American Institutes for Research, 2005). In an effort to establish an elementary curriculum that develops the deep, conceptual, rather than mechanical, understanding students need in the twenty-first century, the State of Massachusetts adopted the Common Core standards to address the problem of a curriculum that is “a mile wide and an inch deep” (Schmidt et al., 1996). “These new standards build on the best of high-quality math standards from states across the country. They also draw on the most important international models for mathematical practice, as well as research and input from numerous
sources, including state departments of education, scholars, assessment developers, professional organizations, educators, parents and students, and members of the public” (CCSSM, 2010).

The math standards provide clarity and specificity rather than broad general statements. They endeavor to follow the design envisioned by William Schmidt and Richard Houang (2002), by not only stressing conceptual understanding of key ideas, but also by continually returning to organizing principles such as place value and the laws of arithmetic to structure those ideas. In addition, the “sequence of topics and performances” that is outlined in a body of math standards must respect what is already known about how students learn. As Confrey (2007) stated, developing “sequenced obstacles and challenges for students…absent the insights about meaning that derive from careful study of learning, would be unfortunate and unwise.” Therefore, the development of the standards began with research-based learning progressions detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time. The knowledge and skills students need to be prepared for mathematics in college, career, and life are woven throughout the mathematics standards. The Common Core State Standards for Mathematics (CCSSM) have had a major influence on the development of district programs at the elementary school level (Kendall, 2011).

The Federal government is forbidden from intervening in school curriculum development by the 1965 Elementary and Secondary Education Act (ESEA). States independently adopted the Common Core, a set of math and English Language Arts standards for K-12 students to reach by the end of each grade level. School districts design the curricula, and teachers create their own methods for instruction, selecting the resources best tailored to their lessons (Golod, 2014). The Common Core State Standards for Mathematics are substantially
different from the previous frameworks for mathematics in Massachusetts and consequently have
caused schools and school districts in the State to significantly restructure their programs.

The following thematic emphases emerge when the CCSSM are examined and
summarized:

1. Greater focus on fewer topics.
2. Linking topics and thinking across grades (Coherence).
3. Pursuing conceptual understanding, procedural skills and fluency, and application with
equal intensity (Rigor).

**Problem of Practice**

Even though the CCSSM were “built on the best of existing state standards to provide
clear and consistent learning goals to help prepare students for college, career, and life,” there are
many challenges to implementing them. Typical coverage of topics lags two to three years
behind where they are intended in CCSSM. Additionally, topics unique to the CCSSM persist
over multiple grades. Results of a representative sample of teachers in each state that adopted
the CCSSM reveal that although 90% have heard of the CCSSM, 70% have read them, more
than 90% like the idea of them, and approximately 80% think the CCSSM is “pretty much the
same” as their former standards (Schmidt, 2012).

Elementary teachers tend to be generalists rather than math experts. In 2012, 73% of high
school mathematics teachers held degrees in math or math education. At the middle school level
that dropped with only 35% of mathematics teachers holding degrees in math or math education.
Yet, at the elementary level, where students are first introduced to math and can develop a strong
like or dislike for it, only 4% of teachers hold a degree in math or math education (Banilower et
al., 2013). Because the CCSSM require deep conceptual understanding of math, content training
is necessary for elementary teachers to implement the foundations of the CCSSM effectively. Some 34% of teachers identified changing practice to integrate the CCSSM effectively as a need. In addition, 40% of teachers reported needing support for creating lesson plans that embody the CCSSM Standards of Mathematical Practice (SMPs), and 37% needed help with the content standards (Schmidt, 2012). Teachers cited the lack of materials with the CCSSM as their biggest obstacle to implementing them (Schmidt, 2012).

The problem of practice addressed in this research study was whether or not the CCSSM could be successfully implemented through the use of a new math program in one urban district in New England. Changing instructional practices is difficult. New programs are frequently introduced in districts across the country in an attempt to increase student achievement. However, research over the last two decades of reform shows that limited results are actually achieved (Borman, Hewes, Overman, & Brown, 2003). Investigation into the data reveals that a variety of factors impact teachers’ implementation of new curricula and corresponding programs. It is clear that there is a need for strong and ongoing professional development as well as structural supports, including supportive leaders and access to resources (Garet, Porter, Desimone, Birman, & Yoon, 2001).

Even when structural supports and resources exist, other factors such as teachers’ resistance to mandates can limit the implementation of these initiatives (Russell, 2011). Moreover, the research on organizational coherence highlights the need for strong alignment between central office administration, school administration, and educators for instructional initiatives to be implemented with fidelity and to positively affect teaching and learning (McDougall, Saunders, & Goldenberg, 2007).
Researchers have also investigated the ways in which teachers and principals convey messages regarding instructional programs and initiatives mandated “from above” by personnel at the district level (Diamond & Spillane, 2004). Cynthia Coburn (2001) and Judith Warren Little (2007) examined the ways in which teachers make sense of new instructional mandates when they close their classroom doors and teach, as well as how their perceptions impact the implementation. Both principals as instructional leaders and teachers as facilitators of student learning respond differently to the implementation of new instructional programs. However, little research has been done on how to best support teachers in the classroom implementation of a new elementary math program in an urban district.

**Purpose of the Study**

The purpose of this study was to analyze the factors that impede fidelity of implementation (FOI) for a new math program that aligns with CCSSM in an elementary school located in an urban school district in New England. Fidelity of implementation (FOI) has been defined as the determination of how close the program is implemented according to its original design or as intended (Dobson & Shaw, 1998; Dusenbury, Brannigan, Falco, & Hanse, 2003; Witt & Elliott, 1985). The study focused on district and site factors associated with implementation of the goals of the CCSSM; impact of the implementation on teachers, classrooms, and schools; roles of the central office in the implementation; and the outcomes related to student achievement and teaching practices. Additionally, this research study focused on the teaching strategies necessary to accomplish this goal, as well as their successful implementation.

The newly adopted CCSSM is shifting towards an emphasis on mathematical reasoning and problem solving in a true sense, thinking mathematically in order to solve a problem that the
individual does not know how to solve. In this view, what makes a problem a problem is that it is “problematic” for the person engaging in trying to solve it. Further, the Standards and other current reform documents emphasize that in order to solve problems, students must learn to describe, compare, and discuss their approaches to problems (Pellegrino & Hilton, 2012). Alternative strategies are valued, and multiple strategies, rather than a single, sanctioned approach, are encouraged. In order to learn mathematics, students must learn from each other, as well as from the teacher's questions. They must communicate about their mathematics (NCTM, 2000).

Mathematics classrooms are constantly changing. In a traditional elementary mathematics classroom, students worked alone, focused only on getting the correct answer, recorded only by writing down numbers, completing as many problems as possible in as little time as possible, and using a single, prescribed procedure for each type of problem (Pellegrino & Hilton, 2012). Currently, however, the mathematics classroom is a collaborative one where students work together, consider their own reasoning and the reasoning of other students, communicate about math orally, in writing, and by using pictures, diagrams, and models, carry out a few problems thoughtfully and in depth during a class period, and use multiple strategies to check and verify their work (NCTM, 2000).

Many elementary school teachers are eager to change their classroom practice in order to engage their students more deeply in mathematics. However, most elementary teachers have not themselves had deep mathematics training and experience (Wu, 2009). One of the biggest tasks we face in elementary education in the United States is the staff development of the elementary teachers in mathematics. One of the critical needs these teachers currently have is for new
curriculum materials that can help them learn mathematics content and pedagogy as they are teaching their students (Wu, 2009).

This research study was conducted in an attempt to understand who implements the new math program with fidelity and why teachers may or may not, by providing a descriptive account of what teachers in one particular school say and do as they engage in the elementary math program implementation process during the first few months of its implementation. Data collected from interviews provided a clear picture of teachers who are feeling under pressure to complete a lesson each day and not feeling like they were reaching all students because they were unable to fill learning gaps. Because the participants believed their students needed a strong foundation in numeracy, they took more time than allowed by the district to complete lessons and units and were falling behind the intended pacing. Additionally some teachers were missing parts of the lesson in their entirety.

**Research Questions**

The primary questions that were used to guide this research study were: 1) What do teachers think gets in the way of fidelity of implementation of the standards-based program? 2) Do teachers feel committed to the concept of fidelity of implementation of the standards-based program? 3) What concerns do teachers have about the standards-based program, its components, and district expectations for implementation?

The study examined teachers’ perspectives on the implementation of a new math program in an urban elementary school to see how those perspectives influenced the degree to which they implemented the program with fidelity in their classrooms. The teachers were in a school in a New England district that had been without a math program for over a decade. The new math program was adopted district-wide from kindergarten through grade five. The new
comprehensive elementary mathematics program was developed using research-based instructional practices that have been shown to improve student learning (Resendez, Azin, & Strobel, 2009). The fundamental goal of this study was to gain information from the teachers about their implementation experiences with the new program.

**Positionality Statement**

The researcher in this study is the Director of Mathematics in the district in which the study was conducted. It was important for study participants to understand that their participation in the study would have no impact on their evaluation. As the director and a liaison for the Office of Instruction, the researcher understood that she had power and influence over the teachers due to the nature of her position. The district administrator acknowledged this and stated that her role as researcher would be used solely for the purpose of addressing teachers’ concerns related to the program’s fidelity of implementation. The researcher’s goals aligned with her position as the Director of Mathematics in that she would be able to tap into teachers’ perspectives to help districts and their administrators understand the constraints related to fidelity of implementation and what it feels like to be under a high level of pressure.

**Organization of this Study**

The remainder of this research study includes five sections: literature review and theoretical framework, research design, findings and analysis, and discussion and implications for practice. In the following chapter, Fullan’s Change Theory is presented, along with discussion of how that framework informs the investigation. In the next section, streams of literature are reviewed to help place the research study in a broader context. First, literature on program implementation is reviewed, including a discussion of what is meant by fidelity of implementation in education. Second, literature related to the factors that have traditionally
affected fidelity of implementation is reviewed. Finally, literature on teacher sense-making and instructional change is reviewed. Because this research study focuses on a group of teachers who implemented a new, comprehensive math program in an elementary school, particular attention is paid to their description of their classroom practices and the phenomenon of implementing a new, comprehensive math program with fidelity. Following the literature review, the research design is described. An Interpretative Phenomenological Analysis approach was used, which allowed the researcher to deeply hear and understand the elementary school teachers’ experiences with the fidelity of implementation of the comprehensive math program. After explaining the data collection and analysis procedures, a description of the validity and credibility of the study, as well as the ethical implications of the study for the participants, is described. Chapter four focuses on the research findings, and the final chapter is devoted to a discussion of the study’s outcomes and their implications for practice and future research.
Chapter 2: Theoretical Framework and Literature Review

Fullan’s Change Theory

Understanding educational change is complex because it is multidimensional rather than a single entity (Fullan & Hargreaves, 1992). As Fullan (2007) suggested, “educational change is technically simple and socially complex” (p. 84). Though there are several theories that investigate the complexity of change, when considering a framework for examining the implementation of a new curriculum for change, Fullan’s perspective was selected as appropriate and relevant in grounding this study.

Three broad stages of the change process identified by Fullan are: initiation, implementation, and institutionalization/continuation. Initiation is the signal that things are going to proceed with a change. Implementation, in the first few years of use, occurs when the plan is put into practice. Institutionalization/continuation refers to whether the innovation becomes ingrained in the principles, practices, and policies of a program or system. Each phase is described for the purpose of this review; however, the study relates specifically to the implementation phase, which ties more directly to the scope of the study.

Initiation. Initiation is the process that leads up to and includes a decision to adopt or proceed with implementation of an innovation. Multiple variables influence whether an innovation is initiated. Fullan identified eight factors influencing the initiation process: the existence and quality of innovations, access to information, advocacy from administration, teacher advocacy, external change agents, community pressure/support/opposition/apathy, new policy and funds at the federal, state and local levels, and problem-solving and bureaucratic orientations. The eight factors imply that change will be initiated from a variety of these sources.
However, in many ways it matters less who initiates the change; rather, it is more about the “quality of the change process” being proposed (Fullan, 2007, p. 81).

Initiation is when an individual or group, for whatever reason, begins or promotes a certain program or direction of change (Fullan, 2007). Initiation decisions occur often and come from a variety of educational stakeholders. It is important to lay strong groundwork, allowing for the inclusion of all affected parties, during the initiation phase of a new innovation.

**Implementation.** Implementation follows the decision to initiate an innovation and refers to the “process of putting into practice an idea, program, or set of activities and structures new to the people attempting or expected to change” (Fullan, 2007, p. 84). Fullan suggested that the implementation phase is the most crucial for “real change” to occur (p. 84). It is critical because it requires the change to be applied in real and meaningful ways.

The idea of implementing a new innovation that has been successfully documented may seem like a simple task. However, whether an implementation is a success or failure is determined by factors influencing the dynamic nature of the process. The nine individual factors that influence the implementation are organized in three main categories relating to the characteristics of the innovation or change project, local roles or characteristics, and external factors (Figure 1). The list of characteristics is simplified, but the “unpacking” of the factors is complex (Fullan, 2007, p. 87). Each factor is explained by describing how it relates to the overall category.

The characteristics of change refer to and define four factors of implementation. These factors are need, clarity, complexity, and quality or practicality (Fullan, 2007). First, the implementers must see a need for change. Need defines the perceived relevance of change in a given context. If teachers do not recognize a need for change to their program then
implementation will be difficult. If, however, teachers think that change is relevant then the innovation objectives must meet the educational beliefs of the teachers. Additionally, an innovation or program proposed by a school district must be considered appropriate by the school in order to have positive efforts towards implementation. Second, clarity refers to the teachers’ understanding of the innovation and how it should be implemented. For example, in curricular change, clarity is needed regarding objectives and strategies for the implementers to understand what is to be accomplished. Even when there is agreement that some kind of change is needed, the adopted innovation may not be at all clear about what teachers need to do differently. Third, complexity refers to the difficulty and extent of change required.

**Figure 1. Interactive Factors Affecting Implementation**

Complexity generally increases the difficulty of the change and can be examined with regard to difficulty, skill required, and extent of alterations in beliefs, teaching strategies, and use of materials (Fullan, 2007). Less complex changes are often easier to implement, although they may not make much of a difference; more complex changes are more beneficial, but require
more effort, and failure receives more attention. Fourth, quality and practicality are two factors that relate to the characteristic of change and are often used interchangeably. Quality refers to the combination of the three previous factors of change, need, clarity and complexity. Practicality relates to the readiness or ability to make change. The failure to produce quality and practicality to change is usually apparent when the adoption of the innovation happens too quickly and there is a lack of preparation and resources or “adoption is more important than the implementation” (p. 91).

The second interactive constructs impacting change are the local factors. These factors are “the social conditions of change; the organization or setting in which people work; the planned and unplanned events and activities that influence whether or not given change attempts will be productive” (Fullan, 2007, p. 93). Within Fullan’s (2007) model, local factors or roles include the school district, the community, the principal, and the teacher.

School districts often adopt innovations with haste; and, unfortunately, many attempts seem to fail. More times than not, failed attempts are due to the lack of adequate follow-up or initial development. A lack of success often produces negative feelings among the implementers, resulting in low enthusiasm or even apathy towards the next idea proposed. However, if the implementers think that a change has been successful and beneficial, they become more willing to give effort and attention to something new because “success can beget more success” (Fullan, 2007, p. 93). The support of the district administration has also been identified as crucial to the success of implementation within the educational research (Campbell & Fullan, 2006; Fullan, Hill, & Crevola, 2006; Sharratt & Fullan, 2006; Supovitz, 2006). District level support is only effective when administrators show active knowledge and understanding of the complex nature of the specific change. There are examples of successful
implementation attempts within individual schools and classrooms, but without central administrator support, district-wide change will not happen (Honig, Copland, Rainey, Lorton, & Newton, 2010).

Second, the school committee and community play a fundamental role in change. The school committee can indirectly affect implementation with funding. Funding can provide or detract from important supports such as professional development during the implementation phase of a new program. Additionally, the school committee is ultimately responsible for the appointment and dismissal of the district’s educational leader, the superintendent, who has control over the hiring and firing of the individual schools’ instructional leaders, principals. Conflicts may occur between the community and the implementation proposed by the district, especially if results are not quickly realized. There are examples where the school committee and the district actively worked together and improvement was achieved (Campbell & Fullan, 2006). Simply stated, communities and school committees must be involved to some extent, or at least supportive, for district-wide change to be successful (Knoff, 2007).

Third, the principal must be a leader or facilitator of change and take actions to legitimize change. The principal is in the middle of the relationship between the teachers and district level administration. Several studies of school leadership across different districts provide consistent and clear messages that principals shared four qualities: (1) inclusive, facilitative leader of orientation, (2) institutional focus on student learning, (3) effective management, and (4) combined pressure and support (Bryk & Schneider, 2002; Day, Harris, Hadfield, Toley, & Beresford, 2000; James, Connolly, Dunning, & Elliot, 2006; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Marzano, Waters, & McNulty, 2005; Fullan, 2006). These four factors are
major influences to effective implementation. The qualities of the principal are important in providing successful support for teachers’ implementation of change.

Fourth, the role of teachers is the most important consideration when implementing any type of change in schools. “Educational change depends on what teachers do and think” (Fullan, 2007, p. 129). Both individual teacher characteristics and collective or collegial factors play roles in determining implementation. Therefore, two notions influence the teacher’s role when implementing change, teacher knowledge and how professional learning efforts occur.

The last set of factors that influence implementation places the school or school district in the context of the broader society (Fullan, 2001). In the U.S., the main external authorities consist of state departments of education and federal agencies. Agencies such as regional research and development laboratories and centers, philanthropic foundations, and other external partners also attempt to support educational implementation.

The Department of Education has an influential role in the implementation of change that is sometimes not recognized. More recently, through greater standardization and accountability, the Department of Education (DOE) has had direct influence on accomplishing specific learning outcomes (Coulson, 2011). However, the DOE’s lack of role clarity and communication has been a deterrent of implementation. In the past, relationships between schools and government agencies have been categorized separately because the government agencies did not place as much of a role in school accountability. With a new role in accountability, government agencies have become increasingly aware of the importance and difficulty of implementation. Therefore, it is not uncommon for government agencies to require resources that clarify standards of practice, assessments, established implementation units, support for professional development and monitoring of policies when attempting implementation (Coulson, 2011).
Successful implementation depends on the combination of all the factors (need, clarity, complexity, and quality/practicality), local characteristics (district, community, principal, and teacher), and external factors (government and other agencies) described. The nature of the change, the makeup of the local district, the character of individual schools and teachers, and the existence and form of external relationships interact to produce conditions for change or non-change (Fullan, 2007). Therefore, implementation is very complex and requires the alignment of multiple factors for success.

**Institutionalization/Continuation.** The final phase of change is continuation or institutionalization and refers to whether or not the change becomes an ongoing part of the system. The majority of change efforts do not make it to the continuation phase because of factors such as a lack of interest, lack of money for teacher development, teacher turnover, and lack of support from the central office (Fullan, 2007). These factors, either individually or collectively, are what contribute to the demise of 75% of reform attempts (Fullan, 2007).

In short, the broad aspects of the initiation, implementation, and institutionalization/continuation processes have several related components. Effective innovations depend on the combination of all factors and characteristics described in this section. To bring about effective change, reform efforts need to be able to explain not only what causes success, but how to influence those causes. Significant educational change results when there are changes in beliefs, teaching style, and materials that come about through teacher knowledge and development (Fullan, 2007).

Acknowledging the complexity of the dynamic process of change, Fullan (2007) identified three dimensions to the change process. The first dimension refers to the potential change of materials, equipment, and/or the adoption of a curriculum package. The use of
different materials is referred to as surface level, or superficial change (Fullan). The second dimension of change includes the use of new skills, teaching approach, instruction, and strategies. Implementing change to one’s teaching practices is more difficult (Fullan). Third, is the transformation of beliefs, values, and perspectives (2007). The dimensions describe the difficulties experienced in an educational change effort.

**Defining Curriculum, Instruction, and Teacher Effectiveness**

Actions or processes that influence the dimensions are described as phases of curriculum implementation. The fidelity with which these phases are implemented can occur on multiple levels and involve numerous aspects of education. Therefore, curricular change is one example of significant change that is impacted by fidelity of implementation.

Educators use the term curriculum to describe a range of educational experiences associated with student learning (Ennis, 2003). A curriculum may refer to the content taught in a subject area, such as mathematics, or the topics covered in one lesson, one unit, or one course. Additionally, curriculum may be defined as the knowledge, skills, and learning experiences that are provided to students within the schools program (Lund & Tannehill, 2005). The selected program facilitates learning and asks questions of “why” and “what,” while providing the framework for its goals, objectives, decisions, assessments, and evaluation procedures. The new math program that is examined in this study builds upon and develops students’ prior knowledge. In 1985, Jewett and Bain outlined the notion that “curriculum models are designed to provide a basis for decisions regarding the selection, structuring, and sequencing of educational experiences” (p. 45). Good math instruction “involves good teachers, an effective math environment, and a curriculum that is more than a mile wide and an inch deep” (Protheroe, 2007). Curriculum models and program do not stand in isolation and must be delivered by some
form of instruction. The degree to which the teachers’ delivery of that instruction matches the program’s intentions impacts the quality of instruction and outcome of the change effort.

Instructional strategies and techniques are necessary to implement a program with fidelity and can influence the eventual learning that results. While instruction and curriculum are related, they are different; and making a distinction between the two is important. Instruction has been defined as the delivery system that promotes the teaching-learning process for implementing the curricular plan (Jewett, Bain, & Ennis, 1995). Instruction focuses on the question of “how,” and is implemented by the overall objectives of the program. The concept of instruction is based on a view that includes learning theory, long-term learning goals, context, content, classroom management, related teaching strategies, verification of process and the assessment of student learning (Jewett, Bain, & Ennis, 1995).

Embedded in the instruction are effective teaching methods, strategies, styles, and skill. These methods are typically used for one or a few short-term learning activities and outcomes, before giving way to another method, strategy, style, or skill within a single lesson. Teaching methods, strategies, styles, and skills have to do with “how” and “why” of delivering content, not the “what” (Wilson, 2014). Effective teaching strategies, styles, approaches within the instructional setting must provide students with developmentally appropriate content, clear instructions for practice, opportunity to practice at an appropriate level of difficulty, opportunity to participate in appropriately designed task progressions, and accurate feedback and assessment about subject matter and role performance (Wilson, 2014). In order to provide learning opportunities, there must be an alignment of instructional strategies and effective teaching. The district is responsible for providing the teachers with the professional-development they need to implement the program with fidelity so that students can learn.
In order for a program to meet the schools and district’s standards and objectives, the teacher must understand how to instruct and communicate the content effectively. Poor delivery of a program will affect the degree to which full implementation is realized (Carroll, C., Patterson, M. Wood, S., Booth, A., Rick, J. & Balain, S., 2007). The level of effectiveness is measured by student performance outcomes. This basic assumption exemplifies the need for not only a meaningful curriculum with clearly-defined objectives, but fidelity of implementation in terms of both the curricular and instructional approaches.

Teachers must employ the program design that allows objectives and learning outcomes to be met. In this study, the objectives relate to the Common Core State Standards for Mathematics. Teachers must realize that they will have to understand and implement a program with fidelity in order to achieve these standards, which shift students’ learning from procedural algorithms to conceptual application. In order for any program to meet its objectives, teachers must effectively design appropriate learning experiences and tasks, present tasks clearly, develop content, foster and maintain a learning environment, motivate students, plan, and assess appropriately. These effective teaching constructs are the foundation of an effective educational program. Teachers have an enormous amount of influence on the program’s implementation. Richardson (1992) pointed out that a critical factor in teachers’ decisions to select a particular curricular approach is the extent to which the curricular plan is effective. To be effective, a curriculum must fit within the educational context and the teachers’ values and beliefs (Ennis, 1995). Moreover, teachers’ values and beliefs are influenced by their past experiences, career stage, and their own sense of competence, leading them to act accordingly. A literature review, relevant to implementing a new curriculum in an urban, elementary school, involved inquiry on
many levels. It began with an investigation of research about what fidelity of implementation means and the factors that affect it.

The depth and quality of a program implementation is a powerful factor in the success of school reform programs (Duncombe & Yinger, 2003; Lockwood, Waller, & Walawender, 2006; Vernez & Goldhaber, 2006). Comprehensive reform efforts can succeed if they are implemented well. In particular, schools should pay attention to how widely staff members embrace the program and how well they understand it (Kirby, Naftel, & McKelvey, 2001). Schools should ask, “Is the program being implemented as intended?” Programs can have a strong positive impact on student learning when they are put into practice every day in the way developers intended because “No program – no matter how sound it is – can have impact if its essential elements are not used” (Yap, Aldersebaes, Railsback, Shaughnessy, & Speth, 2000, p. 10). An effective program in one setting might be ineffective in another if the way it is being implemented takes it far away from its original design.

Implementation connects to student learning because “improved outcomes in education are the product of effective innovations and effective implementation efforts” (Wallace, Blase, Fixsen, & Naoom, 2008). “Schools with high levels of implementation [and] … uniformity of high implementation across program components” experience improvements in achievement, especially in the areas of math and reading (Aladjem & Borman, 2006, p. 7). Their analysis revealed that the prescriptive nature of materials and instruction is what likely resulted in high levels of implementation and consequently, higher levels of achievement.

Positive effects on student achievement are most likely to occur when the teachers use inquiry-based materials and when there is high fidelity of implementation to the instructional strategies embedded in the materials (O’Donnell & Lynch, 2008). Fidelity of implementation is
critical, both in terms of the school-level process and teacher use of the approach (Johnson, Mellard, Fuchs, & McKnight, 2006). Delivery of instruction must match instructional design, including what will be taught, when particular content and skills will be covered, and how the lessons will be taught, in order to maximize program benefits (Protheroe, 2008). Even if schools and teachers follow the “what” and “when,” the “how” has a significant impact on whether or not students will meet the standards. General teacher competence is one aspect of the “how” (Does the teacher know the content? Is the teacher an effective classroom manager? Does the teacher know how to differentiate instruction in an ongoing way to meet the needs of an often wide range of student knowledge and abilities?). Even if a teacher has the general competence, he or she may have his or her own ways of interpreting and implementing the how-to’s of a program. This distinction can be problematic if instruction in practice looks significantly different than instruction as designed (Protheroe, 2008).

Four factors have been identified that affect FOI: complexity, materials and resources required, perceived and actual effectiveness (credibility), and teachers (Johnson et al., 2006). The more complex the program, the lower the fidelity because of the level of difficulty. If new or substantial resources are required, they need to be readily accessible. Even with a solid research base, if teachers believe the program will not be effective or if it is inconsistent with their teaching style, they will not implement it with fidelity. The number, expertise, and motivation of the teachers who deliver the program are factors in the FOI (Johnson et al., 2006). “Core components” as identified by Wallace et al. (2008) is another element that affects FOI. These include the “essential and indispensable” elements of practice – those that were critical to the likelihood of achieving positive results (Wallace et al, 2008, p. 8). Programs can be
implemented both quickly and successfully when the core components of it are known and defined.

To ensure a new program is implemented accurately, teachers need more than just training and information about different practices. Coaches play an integral part in teachers’ fidelity of implementation by helping them to master the core components of the new program (Wallace, 2008; Joyce & Showers, 2002). A school’s preparation for work with a new program should include the following key components:

- Learning the program – both curriculum content and approaches for instructional delivery, including ways to provide explicit instruction, demonstrate skills and strategies, guide student practice, and provide corrective feedback;
- Staff observation of the program in operation – either by visiting other schools or classrooms, or by allowing teachers time to practice and observe one another during initial implementation;
- Teaching time during which teachers develop comfort and fluency and assess how the program works with their students;
- Observation by other staff members who have been trained in what they should be observing, with feedback provided as a way to increase FOI, not as an evaluation of teaching quality in general; and
- Refinement through teacher use of observation feedback, grade-level or team meetings to discuss the practice and its implementation, and development of calibration checks for teachers to use to monitor their own implementation (Gunn, 2004, PowerPoint p. 7).
Gunn also provided some specific suggestions for principals to ensure the “how” of teaching is on target. In particular, principals need a working knowledge of the adopted program or strategy and should make special efforts to observe in classrooms during the initial phase of implementation, and facilitate fidelity without evaluation (Gunn, 2004).

**Contextual Factors**

Elementary school reform efforts of the last two decades focused heavily on increasing student outcomes through improved instruction. This naturally led to increased research in this area. Recent research has taken a broader perspective in examining these reforms by looking at the organization as a whole (Desimone, 2002). A variety of interdependent, contextual factors is important for effective implementation, including: strong leadership, clear goals, benchmarks of success, and extensive professional development (Desimone, 2002; Durlak & DuPre, 2008). Despite the importance of these contextual factors, researchers agree that teachers are the final arbitrators of the implementation (Coburn, 2001; Little, 1990; Morris, 1985; Tyack & Tobin, 1994).

**Structural Factors**

Teachers’ implementation can be affected by a variety of factors within the context of schooling (Durlak & DuPre, 2008). Structural conditions surrounding the new program, such as time, access to resources, teacher training and support can impact teachers’ implementation. While researchers suggested that these structural conditions are often the easiest to control, they agreed that they are often not in place when reforms are implemented (DuFour, Eaker, & DuFour, 2005). The majority of instructional time in elementary classrooms is spent on reading, leaving little time for the implementation of a new math curriculum (Gamse, Bloom, Kempe, & Jacob, 2008).
Access to technology and other resources is also an important part of program implementation (Wetzel, 2001). Access to computer technology and high-speed Internet is essential, in that teachers’ ability to implement the program with fidelity can be impacted (Smerdon et al., 2000).

Teachers must have training and support when implementing a new curriculum that requires them to change their existing practice (Darling-Hammond, 1997; Richardson, 2000). A new elementary math program is one in which teachers need ongoing training and support to overcome pacing, content, and technical obstacles. Support in the form of instructional coaching or technical troubleshooting can help teachers more readily implement new instructional programs (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). However, the most effective support is provided directly in the classroom during the implementation (Wei et al., 2009).

**Cultural Factors**

The culture of the school and the message sent from the principal as the instructional leader can have the greatest impact on teachers’ implementation of instructional initiatives (Hargreaves, 1995; Little, 1990). A district’s coherence, as well as its culture and that of the school, impacts teachers’ implementation of new programs (Achinstein & Ogawa, 2006). Teachers have direct control over implementing new initiatives, so it is important that they feel supported so that they, in turn, support the implementations (Turnbull, 2002). While many teachers will comply with directives from their evaluators, they may ignore the changes that are necessary to change their classroom instruction if they lack the appropriate support.

Organizational coherence is a process where district administrators support school leaders in negotiating external demands as they develop and implement school-wide goals with their
faculty (Honig & Hatch, 2004). Collective decision-making is necessary in order to align the district’s goals with the goals of the school (Bryk & Schneider, 2002). Having shared norms also plays a role in aligning goals (Tschannen-Moran & Hoy, 2001). When organizational coherence exists, instructional initiatives are closely tied to the district’s goals and have a clear framework that guides their use (Newmann, Smith, Allensworth, & Bryk, 2001).

School culture can also play an important role in impacting teachers’ implementation of new initiatives even when the goals of the school and district are aligned. School culture is evident in the ways in which people treat each other (Fullan & Hargreaves, 1992) and in the shared beliefs of the faculty members (Schein, 1993). Peterson and Deal (1998) and Fullan and Ballew (2001) define a positive school culture as one that includes collaborative collegial relationships, collective decision-making, and high standards for student achievement. The culture of a school impacts the quality of a teacher’s practice, as well (Angelides & Ainscow, 2010). Fostering a positive school culture allows teachers to implement instructional initiatives that are designed to improve their practice.

Teachers’ buy-in and sense of agency also impact the implementation of reforms at the individual level. Teacher volunteerism and their own beliefs in an instructional program provide the motivation to implement it with fidelity (Guskey, 1988). Teachers must believe they can have an impact on student achievement with the new instructional methods. A sense of personal agency in student learning is a central factor in teacher self-efficacy and is also a socially-derived construct among school faculties (Bandura, 2000; Goddard, Hoy, & Hoy, 2000).

**Technological Factors**

Technological factors can also have an impact on a program that incorporates technology. Electronic features present a unique condition that potentially affects teacher buy-in and
implementation. Using Everett Rogers’ (1995) typologies of adopters, teachers are categorized as “early adopters” (Means & Olsen, 1997, p. 67) or “late adopters” (Ronau, Rakes, & Niess, 2012, p. 149). Early adopters more readily integrate technology into instruction and are more receptive to technology. Late adopters are more hesitant and do not adopt technology until after it has been adopted by their peers. Also, elementary teachers often have personal philosophies about children using technology instead of traditional means of learning that impact their use of technology in the classroom (Means & Olsen, 1997). These beliefs can limit teachers’ willingness to use technology (Nissenbaum & Walker, 1998).

Sound program implementation can be negatively affected by computer and Internet problems. Ninety-two percent of teachers in one study said the Internet has a “major impact” on their ability to access materials (Purcell, Heaps, Buchanan, & Friedrich, 2013). Additionally, computer glitches and network service, which are experienced by more than half of teachers of the lowest income students, can limit sound implementation even when the technology and technical support are provided. Late adopters of technology often approach the use of technology with some anxiety that something will go wrong. Teachers who are under 35 years old are more comfortable with technology while teachers over 55 tend to fall into the category of late adopters (Purcell et al., 2013). Computer bugs are one of many technological problems that can occur with implementation. Bugs are errors that are directly embedded in the program code from the developer and that cause problems when used with technology. They can cause the user to repeat the same action over and over or the program can crash and need to be restarted. Sometimes, the computers must be shut down and restarted as well. Since bugs are embedded in the computer program itself, computer technicians at the school level are not usually equipped to handle the problems that can arise. Bugs can be time-consuming, thereby leading to anxiety for
teachers when using technology with students. Oftentimes it is these fears that discourage late adopters from using technology (Bunch & Broughton, 2002).

Network infrastructure is another technological condition that can impact implementation of computer-based programs in schools. The online delivery of instructional programs and assessments is increasingly popular. Many states are requiring districts to deliver the Common Core assessments for math and language arts online (Wong, 2013). Online delivery includes content delivered to computers via the Internet and content such as software programs housed on a district’s server that are accessible to district users.

As school districts move from paper to electronic texts, problems with network infrastructure have arisen and impacted implementation. In July 2013, the State Superintendent of Instruction in Oklahoma acknowledged significant statewide problems that occurred in a pilot of online assessments and said the primary cause was inadequate school district network infrastructure (Lindsey, 2013). Consequently, Oklahoma opted out of implementing Common Core assessments online to avoid placing undue stress on students and teachers (Herold, 2013). At about the same time, a Minnesota teacher stated that program failures that happened for students in the middle of completing their online tests would certainly impact the students’ performance (Costantini, 2013).

While late adopters of technology have heightened concerns, network failures during times of high-stakes testing can further dissuade their implementation of programs with technology components. According to the CDW-G survey of school district technology directors, network infrastructure improvements became a high priority in 2013 as IT personnel prepared to implement the Common Core online assessments (Smith, 2013). However,
technology directors were concerned that school district networks were still underfunded and were inadequate to meet the technology demands (2013).

Unfortunately, school district personnel cannot easily remedy bugs and network infrastructure issues. In many cases, the publisher’s IT personnel hold the power to fixing all of the technological glitches. This forces IT personnel at the school district level to spend much time troubleshooting with them, further complicating the implementation of online components (Lindsey, 2013).

**Teacher Sense-Making and Instructional Change**

Structural, technological, and cultural factors collectively influence teachers’ beliefs about any new initiative, particularly one with a technology component. Therefore, it is important to consider not just these factors, but also how teachers perceive the initiative. Teacher sense-making occurs at both the school and classroom level and serves as an arbitrator implementation (Schmidt & Datnow, 2005). Teacher sense-making includes teachers’ ideas about a new initiative and is influenced by teachers’ peers (Coburn, 2001), principals (Coburn, 2005), and emotions (Schmidt & Datnow, 2005). When implementing a new curriculum, Coburn (2001) found that teachers consider messages in their environment with a self-selected group of peers. They then serve as gatekeepers of these messages about how to teach under the new curriculum by choosing to ignore messages that don’t fit with their collective beliefs (2001). Thus, in Coburn’s study, the same curriculum was implemented to varying degrees across classrooms. In her research, Coburn referred to “deep engagement” as a process by which teachers sought to deeply understand the new curriculum and engage in conversations with their peers about how to implement it (2001, p. 158). Clearly, teachers’ social interactions combined with their beliefs play an important role in the implementation of new programs.
Teacher sense-making has often been described in terms of resistance to change. Research in schools about the teaching profession identified instruction as especially resistant to change (Lortie, 1975, p. 29). In “The Persistence of Privacy,” teachers’ resistance to sharing their pedagogy is highlighted (Little, 1990). It was also determined that teachers undergo phases of change when implementing new instructional initiatives (Schon, 1983). Evidence of change or lack thereof can be noted in teachers’ comments and instructional practices.

**Summary**

Curriculum implementation is a process problem. Any new curriculum or program represents a change for teachers, who must adapt, despite any reluctance they might have. Yet, extant research has failed to examine what those change processes actually look like by studying the depth to which teachers implement a new curriculum with fidelity. Currently there are limited data grounded in practice regarding specific school environmental and teacher characteristics that facilitate or impede the process. What motivates teachers to implement with fidelity or not is unclear. Fullan wrote, “innovations are rationally sold on the basis of sound theory and principles, but they turn out not to be translatable into practice with the resources at the disposal of teachers” (1982, p. 115).

This research study was designed to provide insight about specific factors that appeared to impede or facilitate math curriculum implementation by obtaining first-hand data from the teachers based on their current, personal involvement with new math curriculum implementation. It also sought to analyze how each of these factors can impact the success of the program’s implementation.
Chapter 3: Research Design

The problem of practice in this research study involved factors that impede fidelity of implementation with new educational programs that are required of teachers. To address this problem, the researcher proposed to investigate teachers’ concerns about fidelity of implementation and what gets in the way of their implementing a new program with fidelity.

The primary research question was: *What do teachers think gets in the way of fidelity of implementation of the standards-based program?* Two secondary questions served to contribute to the understanding of why programs are not always implemented with fidelity: *What concerns do teachers have about the standards-based program, its components, and district expectations for implementation?* *Do teachers feel committed to the concept of fidelity of implementation of the standards-based program?*

This research study documented teacher perspectives on several factors that impede fidelity of implementation that are not often recognized by administration at the school or district level. The teachers’ chronicles of their experiences contributed to an understanding of their daily classroom experiences, including the many challenges they face that may detract from their focus on fidelity of implementation. The decisions the participants made surrounding the planning and delivery of their lessons in response to the district’s mandate to implement the new program with fidelity were analyzed.

This chapter describes the research design and tradition, including methodology, participant selection, data collection, data storage, data analysis, and trustworthiness. Strategies for ensuring rigor and for addressing ethical considerations, including approval from the Institutional Review Board (IRB), are also explained.
Methodology

Elementary school teachers are responsible for teaching all subject areas and are expected to have general knowledge in each area. When the district adopts a new program, they are expected to implement it with fidelity. This research study sought to understand the lived experiences of elementary school teachers who were asked to implement a new program in their school. A qualitative research method, interpretative phenomenological analysis (IPA), was selected as the methodology. This phenomenological approach specifically seeks to understand situated-personhood, what it is like to be an individual in an everyday situation. Heidegger called situated personhood “Dasein,” which translates to “there-being.” Husserl, Heidegger’s mentor, called everyday situations the “life-world.” Husserl used this term to refer to the often mundane, taken-for-granted experiences we encounter each day (Smith et al., 2009). Individuals are constantly attempting to make sense of the world around them and can only do so using lenses created by social context – historical experiences, social experiences, potential futures, and larger cultural norms and values (Pascal, 2010; Wilcke, 2002).

Qualitative Research. The purpose of qualitative research is to divulge a range of behaviors and the perceptions that drive them with reference to a specific issue. Denzin and Lincoln described qualitative research as involving “…an interpretative naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them” (2005, p. 3). It is generally agreed that the emergence of qualitative research methods occurred at the University of Chicago in the 1920s and 1930s (Platt, 1985, p. 449). At that time some researchers rejected positivism, the theory that positive knowledge is based on natural phenomena and their relations. Positivists believe that the researcher and researched person are
independent of each other. Postpositivism is a stance with a qualitative focus that critiques positivism, believing the researcher can influence what is observed.

**Research Design**

Heidegger’s concept of situated-personhood in IPA extended to the researcher, who was unable to make sense of what was being studied apart from her own social context and life-world. Using a qualitative approach for the study allowed for a deep exploration of the complexities of teachers’ experiences when implementing a new program in their classrooms. The research questions in the study served as the guide in exploring the sense-making of the participants in relation to classroom decisions that were made both within and outside of what is outlined by the new program. The purpose of qualitative research is to understand the meaning of human experiences, rather than attempting to define causal relationships (Alexander, 2006). Thus, a qualitative approach allowed the researcher to appropriately address the research questions and create a transparent researcher-researched relationship in the research process.

**Research Tradition**

In this study, all participants had the common experience of implementing a new math program in the same school within the same district under the same administrators. This study was conducted utilizing an interpretative phenomenological analysis (IPA) approach, which “offers insight into a particular perspective on a phenomenon” (Handley & Hutchinson, 2013, p. 188). Smith (2011) described the three-pronged nature of the IPA approach to research. IPA is phenomenological in nature in that it intends to examine individuals’ experiences and their sense-making of those experiences. The IPA approach is also hermeneutical in that it allows for the interpretation of the participants’ reflections. Further, IPA is an ideographic undertaking, because it calls for a highly in-depth analysis of individual cases. The goal of this research was
to better understand the unique challenges that teachers face in implementing a new math program at the elementary level where fewer than 4% of teachers hold degrees in math. IPA was chosen as the methodology for this study, as it helped explore “how people make sense of their major life experiences” (Smith, Larkin, & Flowers, 2009, p. 1).

**Participants**

The research site for this study was an elementary school in an urban school district in New England with an enrollment of over 10,000 students. A homogeneous group of three to ten participants was recruited for the study, in accordance with guidelines for conducting an IPA study provided by Smith et al. (2009). The guidelines indicate that the parameters of a homogeneous group may vary from study to study. With IPA, the goal is to develop a homogeneous group of participants “to whom the research question will be meaningful” (Smith et al., 2009, p. 57). Participants who would most likely be experiencing the phenomenon in a similar way were included in the study. The goal was to identify teacher participants who were homogeneous in that they are living a common experience (Smith et al., 2009). In order to participate in this study, participants were required to meet the following criteria:

a) be a full-time teacher in the district

b) work in grades K-5

c) teach math as one of their subject areas

**Recruitment and Access**

Following Northeastern University IRB approval, the recruitment process began through contacting the principal at the participant site. Documentation of approval of the study was presented, as well as information about the purpose and design of the study, to the school’s
principal. The principal acted as a facilitator of the study, recruiting and providing access to potential participants (Creswell, 2012).

Once permission was granted, the school’s principal was provided with all of the information and materials needed to recruit and to obtain informed consent from the research participants. A list of the criteria required to be in the sample was shared and, using a script provided by the researcher, the principal contacted all teachers who qualified. As the potential participants expressed a desire to take part in the study, the principal asked them to sign a basic consent form allowing for the release of their names and personal email addresses to the researcher.

A minimum of three participants was needed for the study, so five were scheduled in case anyone needed to withdraw or did not follow through with the interview. Once the principal provided a list of the volunteer participants and their contact information, each one was sent an email by the researcher requesting to speak by telephone to discuss the participant criteria and confirm their desire to participate. The researcher subsequently spoke to each of the teachers in person or by telephone to confirm that they met all of the participant criteria and scheduled interviews accordingly.

All communication and interaction with participants was conducted in a manner that maintained strict confidentiality and protection of their privacy. Only the contact information provided by the participants was used. The privacy of the participants was also taken into consideration when an interview location was selected. The participants were given the opportunity to select the location, and the researcher confirmed that each one was comfortable with the location. Prior to each semi-structured interview, the researcher reminded participants
of the research protocol, what their consent included, and that they had the right to withdraw from the study at any time without penalty.

The sampling strategy and criteria that were used for this study enabled the researcher to appropriately address the research questions. The relatively small sample size of five participants allowed the researcher to fully explore the rich nature of the data obtained in an IPA study. Further, the sample criteria allowed the researcher to isolate participants who experienced the same phenomena with some similarity.

Data Collection

For this study, data were collected through in-depth, semi-structured interviews, which focused on uncovering meaning behind taken-for-granted activities and events. In the semi-structured interviews, the interviews were considered to be dialogues – open-ended conversations using open-ended questions. This strategy redefines researchers and participants as co-researchers and co-creators and grounds them in the “meanings, skills, practices, and embodied experiences” associated with a phenomenon (Leonard, 1994, p. 56). This interviewing technique is also a good philosophical fit for an IPA study because the act of shaping the interview as it is happening is an example of the double-hermeneutical nature of IPA, wherein the researcher is engaged in sense-making even as he or she is studying the sense-making of the participants (Smith & Osborn, 2008). The participants’ responses during personal interviews were reflections of their own sense-making processes (Smith et al., 2009). The interviews were scheduled to take between 60 to 90 minutes. Additionally, all of the participants were provided with the interview transcripts within one week of their interviews, so that they had the opportunity to formulate and provide additional information or clarification during the interview.
In an effort to make the participants feel comfortable as participants of a conversation, rather than as research subjects, notes were not taken during the interview. Dragon software was used to instantly transcribe the conversations and took place during the interviews. The participants were informed of the transcription protocol in the consent documents that were provided to them at the beginning of the study, and they were reminded at the beginning of each interview.

**Data Storage**

This study posed minimal risk for the participants. Personal interviews gave participants an opportunity to share their perspectives and their stories in a safe, non-threatening environment. However, it was very important to consider the fact that the participant population may have had concerns about privacy when sharing their stories. Clear information was provided to the participants about the measures that were taken to protect their privacy. Further, pseudonyms were used to de-identify each participant and to keep the names of the school and district private. All data were kept locked and secured. The researcher did not disclose any identifiable information about the participants to their school or to the district. This was important because the interview questions had the potential to elicit concerns, or criticism, about the participants’ school and district.

**Data Analysis**

To study the lived experience of educators working with under-prepared students, the researcher followed Smith, Flowers, and Larkin’s (2009) Interpretive Phenomenological Analysis (IPA) process outlined in the following six steps. A Heideggerian approach to IPA was taken.
1. Reading and rereading: The first step entailed reading and re-reading the first transcript. The researcher immersed herself in the participant’s experiences and developed an overarching understanding of the interview as a whole (Smith et al., 2009). She familiarized herself with the contextual elements of the interview, including uncovering conversational patterns.

2. Initial noting: This step offered a detailed exploration of the participant’s narrative. The researcher conducted an open-ended textual analysis, writing comments throughout the transcript on words, phrases, ideas, patterns, or details that emerged. Initial noting was not intended to organize ideas, but rather to uncover possible elements for further inquiry. Smith et al. (2009) offered three categorical examples of comments that might be used during initial noting: descriptive comments, linguistic comments, and conceptual comments.

   a. Descriptive comments highlight the face value content of the transcript—the words, phrases, or ideas that are fundamental to the participant’s narrative.

   b. Linguistic comments focus on the way in which content is presented—the presence of pauses, metaphors, sarcasm, laughter, repetition, slang, etc.

   c. Conceptual comments allow the researcher to expand ideas beyond the face value content and explore underlying or connective ideas. These comments point to potentially important elements of the participant’s experience for the researcher to assess in more depth.

3. Developing emergent themes: The researcher began to organize ideas as they emerged from the data set, which included both the participant’s narrative and the notes from the previous two steps. The researcher’s notes were organized into provisional themes that
represent essential, underlying ideas—the imbedded meaning—found in parts of the interview (Smith et al., 2009). In this step, the researcher’s comments momentarily took prominence, as emphasis was given to her interpretation of the participant’s experience. This step also momentarily moves the researcher from the whole interview to pieces of the interview. However, this focus on the pieces was later tied to what was learned through analysis of the whole.

4. Searching for connections across emergent themes: In this step, the researcher mapped out the themes identified in step three and created a structure that highlighted the most relevant or noteworthy experiences in the participant’s narrative (Smith et al., 2009). Related themes were grouped together. Grouped themes may have pointed to a new, overarching theme, i.e., abstraction; or one theme in the group may have emerged as an overarching theme under which related themes were collected, i.e., subsumption. Smith et al.’s (2009) recommendation was followed to collect transcript excerpts that helped shape each overarching theme to evaluate the available support for each theme, and, later, to present these excerpts in the research results to allow others to evaluate the researcher’s interpretations of participant experiences. Throughout stage four of analysis, the researcher documented comments and emerging ideas in the research notes.

5. Moving to the next case: The researcher moved on to the next participant narrative and analyzed the next case by repeating steps one through four.

6. Looking for patterns across cases: In the final step, the researcher mapped out the most salient themes as they emerged across all of the participants’ transcripts. Themes were examined for their fit with the whole data set, and conversely, the whole data set was examined for ways it might highlight or reshape the initial themes. As in step four,
themes might be elevated to an overarching status under which other themes were grouped, while other themes might be discarded. In this phase of analysis, the researcher looked for common experiences and meanings across the data as well as unique experiences that were interpreted as integral to the phenomenon. Participant statements used to interpret predominant themes were included as support within the results and offered as a means for others to critically examine the researcher’s interpretations.

**Limitations**

The relatively small number of participants who were included in the study limits the findings from being broadly applicable to the general population. However, Starks and Trinidad (2007) argued that an appropriate sample size for a qualitative study is dependent upon the researcher’s purpose and goals. With respect for “the complexity of most human phenomena” (Smith et al., 2009), the sample size of five participants will allow a deep exploration of the challenges the teachers face in implementing the new math program with fidelity.

**Validity and Credibility**

In their text on formulating and conducting an IPA research study, Smith et al. (2009) offered Yardley’s assessment guidelines for qualitative research as a method for ensuring quality. This study was conducted utilizing these four broad principles. Sensitivity to context was ensured through the careful review of the data and close consideration of each participant’s individual lived experiences. Further, written descriptions of the data analysis included verbatim comments from the participants to support and clarify the researcher’s interpretations. A strong sense of security and trust with the participants was established and maintained through the interview process. The researcher’s ultimate goal was to find out the participants’ experiences when they implemented the new program.
The researcher performed member checks, in which each participant was given an opportunity to review the interview data for accuracy (Russell, 2008). The data were offered to the teachers via personal email or a de-identified paper copy. Peer review was also employed through the researcher’s doctoral committee during the study (Russell, 2008).

The protection of human subjects participating in research studies is a critically-important consideration. This IPA study involved the personal interviewing of teachers in an urban school district. Northeastern University's protocol for human subject research protection and that of their Institutional Review Board were followed. All appropriate steps were taken to ensure that a legal and ethical study was conducted with respect to working with human subjects.

Trustworthiness

A participant recruitment protocol was created for the facilitator (school principal) to follow, allowing her to reach out to teachers without any appearance of coercion. The information she provided included the purpose of the study. The consent forms stated that there was minimal risk involved and that teachers were free to withdraw their participation at any point until the data were collected, and that there would be no consequences for withdrawing.

Conclusion

Alexander (2006) argued that educational research endeavors naturally emerge from problems occurring in practice. Further, in order to craft quantifiable generalizations about the problem, one must first understand detailed examples of specific cases. This conceptualization supported the researcher’s style of exploration and research design. In order for teachers to give their students the best education possible, they must be provided with adequate support from their administrators. The purpose of this research was to explore how participating teachers make sense of fidelity of implementation with a new program that emphasizes a shift from
procedural to conceptual understanding of math. This study was qualitative in nature and was conducted as an interpretative phenomenological analysis in accordance with Smith et al., (2009). A homogeneous group of participants was chosen at one school in one district, and data were collected through semi-structured interviews. Data were coded and analyzed for themes, with each participant’s data being considered individually. As described by Smith et al. (2009), once each participant’s experiences were fully considered, the researcher engaged in the process of analyzing for convergence and divergence across participants.

The research design described here is congruent with the overall purpose of the study, as well as the research questions guiding the inquiry. The IPA framework, which includes individual interviews as a data collection technique, allowed the researcher to explore the richness present in each participant’s individual story. The researcher’s goal was to gain a deep understanding of how these participants make sense of implementing a new program with fidelity in their classrooms. The research design enabled the researcher to achieve this goal in a manner that protected and respected the participants as valuable human beings with unique experiences to share. The following chapter details the research participants’ experience implementing the new math program and provides an analysis of those findings.
Chapter Four: Findings and Analysis

The purpose of this study was to investigate the unique perspectives of elementary teachers who were implementing the new math program, particularly in terms of specific factors that influence the fidelity of implementation of the program in the classroom. The program emphasized a major shift from procedural fluency to conceptual understanding and application.

Below is a participant chart followed by a summary of each participant’s interview.

<table>
<thead>
<tr>
<th>Participant Pseudonym</th>
<th>Alexis</th>
<th>Jill</th>
<th>Tara</th>
<th>Kristie</th>
<th>Jen</th>
</tr>
</thead>
<tbody>
<tr>
<td>What grade are you currently teaching?</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4 (previously 2,5 &amp; 6)</td>
</tr>
<tr>
<td>How many years have you been teaching at this grade level?</td>
<td>5</td>
<td>10</td>
<td>25</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>How many years have you been teaching at City School?</td>
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<td>12</td>
<td>13</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>How many years have you been teaching in the district?</td>
<td>5</td>
<td>18</td>
<td>30</td>
<td>20+</td>
<td>1</td>
</tr>
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<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
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<td>White</td>
<td>White</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
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<td>Irish</td>
<td>Greek</td>
<td>Italian</td>
<td>Other</td>
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</tr>
<tr>
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<td>English</td>
<td>English</td>
</tr>
<tr>
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<td>Masters</td>
<td>Masters</td>
<td>Masters</td>
<td>Masters</td>
<td>Masters</td>
</tr>
</tbody>
</table>

**Alexis.** Alexis is a teacher with professional status. She has been unable to find the time to do center activities with her students, as they need a lot of support with the content contained within the lessons as well as the practice exercises. She finds that on a typical day she gets through the first two parts of the lesson, but is unable to differentiate and assess all students in the 90-minute math block. She finds herself spending a lot of time re-teaching concepts that the students don’t initially understand. She is working toward having students gain more independence, noting that “I need help” is their go-to phrase without even attempting a problem.
on their own. Alexis admits that she is not fully comfortable with the Common Core shifts and has found them to be “more intense.” She finds that she is retraining herself to do math in a way that was never taught to her. She uses the video support provided by the program and finds that her principal and coach have been supportive of her efforts to implement the new program.

**Jill.** Jill is a veteran teacher who has been with the district when there were other programs in place, as well as when there were no programs at all. She appreciates having the new program, as she no longer has to go searching for materials to use with her students. She has a small class of fewer than twenty students and utilizes the program’s manipulatives at the start of teaching any new concept. While the lesson is supposed to begin with students independently completing the Solve and Share, Jill finds she has to provide them with some type of background knowledge. Her biggest concern with the program is the fast pacing. She has adopted backwards planning to make sure she stays ahead of the district’s pacing. Jill does not believe that students need to see multiple representations of all concepts as it takes a lot of her limited class time. She sees the value of having such a rigorous program and believes the district has good intentions. She stated that before there was a program, people did whatever they wanted. Now that there is a program with accountability for pacing, students throughout the district will be learning the same things even if they move during the year.

**Tara.** Tara was the most veteran participant with thirty years of classroom experience. While she attended the optional trainings provided by the district, she thinks she needs more support from the district with providing interventions for struggling students. Before the program was purchased, she had the autonomy of teaching any given topic in her class for however long she needed to reach her students. With the new program she feels she is spending two to three days on a single lesson and falling farther and farther behind the district.
expectations. Tara has utilized her school’s coach and has found ways to break the monotony of the three-part lesson by using different approaches. Because she runs short on time, Tara keeps an intervention group after school so that her students get the extra support that they need.

**Kristie.** Kristie is a veteran teacher with professional status who has been teaching at the school for fourteen years. While she appreciated the summer sessions, which gave her an overview of the program, she did not feel prepared to use it at the start of the school year. She indicated that you really don’t get to know a program until you use it; and the students were coming in shortly after the voluntary sessions, so there was not much preparation that could be done ahead of time in the summer. Kristie spent much of her interview talking about the needs of teacher. She said the program is great for teachers who are strong in math and students who are strong in math, but if you are not, there are too many things being thrown at you at once. She stated that the Common Core shifts were having students do things at a much earlier age, and she didn’t think they were necessarily ready. Kristie did not like the monotony of the program. She stated that doing the same three steps day after day is boring for the students, and she tries to switch things up by using her creativity for the math centers. She believes she receives enough support and that although the pacing is fast, it is necessary to teach all of the new standards. Kristie thinks that the growing pains of the quick first year pacing will subside in subsequent years as the younger students will have been exposed to the program and new ways of learning math.

**Jen.** Jen is in her first year with the school district. This is her first year teaching fourth grade in a public setting, as she previously taught second, fifth and sixth grade at a Catholic school. Jen was hired just before school started and attended the voluntary training at the suggestion of her principal. She thought there was a lot of good information, but it was
presented in a short period of time and she needed more time to digest it. Jen has found the online components to be useful in supporting her own professional development as well as her classroom practice. The training did not address the online components, and she thought it would have been beneficial if it had. She believes she is implementing the program with fidelity. She does admit that she has combined more than one lesson into a single class period if there was a Performance Assessment that was due to the district and she was a little behind on pacing. Jen believes the greatest obstacle to the program is the length of the tests as they are taking up to two class periods for her students to complete.

**Themes**

Three superordinate themes emerged from the analysis of the data provided by the five teachers who were interviewed in the study. The superordinate themes were: 1) Teachers are committed to meeting their professional responsibilities, meeting students’ needs, and providing the benefits of the program. 2) Teachers need support from the district and at the building level in order to be adequately prepared to implement the program with fidelity in their classrooms. 3) Teachers are concerned with the expectations for pacing, checking for understanding, and testing.

**Teachers’ Commitment**

The first superordinate theme that emerged in this study captured the participants’ level of commitment to their work. In this research study, commitment refers to the state or quality of being dedicated to a cause. The researcher found three specific areas of convergence among participants related to teachers’ commitment. The teachers were committed to meeting their professional responsibility of providing their students with high-quality teaching and learning experiences that would help them gain problem-solving skills and be prepared for the work they
would be doing as they advanced to the next grade the following year. Additionally, the participants were committed to meeting the needs of the students who sit in front of them each and every day, despite the students’ needs sometimes being different from their professional responsibilities. Finally, in talking through their commitment to their career and their students, the participants reflected on how the program directly benefits the work they do on a daily basis. Thus, the three nested themes discussed here are *meeting professional responsibilities, meeting students’ needs, and program benefits*. 

**Meeting Professional Responsibilities.** The participants were all committed to doing their work to the best of their ability and having as many students as possible meet the learning goals set forth by the district. Participants’ years of teaching experience ranged from five to thirty years. This is important to note because according to Richard Ingersoll, a leading scholar of the nation’s teacher workforce, an estimated 46% of new teachers leave the profession within their first five years (Brown, 2015). With the exception of one participant who is in her first year of urban education after leaving a private Catholic school, the participants all had five or more years of experience in this urban district (Appendix E). All participants’ attendance at a minimum of one out of two launches of the new math program over the summer, without compensation, evidenced their commitment to their own professional learning. The publisher sponsored the first launch and the district sponsored the second launch.

One participant explained the willingness of teachers at her school to attend unpaid trainings on their own vacation time stating, “Teachers at City School are willing to go to any training as long as it’s beneficial because it’s only going to help us.” While all participants wanted to attend to get an introduction to the new program they would be using, they knew that “You can’t delve into things until you’re really working with it (the program).” Despite not
being able to work with the program until the school year started, teachers liked being able to get
the materials ahead of time to begin their lesson planning. According to one participant, “I found
it most useful to listen to the advice of teachers that had previously piloted the program.”
Participants also shared the work they do to ensure that they plan and deliver high quality lessons
for their students. One participant stated, “When I first received the materials I immediately
typed up what we needed to do. When I started off with Topic 1, I was kind of excited to start
multiplication right away; because the kids love multiplication, so you don’t have to hook them
into math. They’re like cheering and, ‘Oh my God, Mrs. James, we’re doing it.’” This teacher’s
words indicate her strong desire to meet her professional responsibilities as a teacher.

**Meeting Students’ Needs.** While all the participants were committed to their
responsibilities as teachers, they maintained a focus on the needs of their students. This was
difficult for some to do as they explained that their responsibilities sometimes conflict with the
needs of their students. The first part of every lesson in the program is called *Solve and Share.*
This part of the lesson is intended to take a maximum of twenty minutes, including time for
*Analyze Student Work,* where a couple of students share the method they used to solve the
problem with the whole class. Students are posed with a problem and asked to solve it using any
strategy they want. When asked how long the *Solve and Share* was taking, one participant said:

> It depends on what the topic is; like I just did one where they didn’t do very well with it
> and I did a little mini model with dry erase boards and my pictures hoping that it would
> click when they went over it. So then I’m going to say it took twenty minutes. But, they
> got it wrong. And I went around and said ‘Ah, not one person got it right.’ I got very
dramatic and then I went up and did it and they’re like ‘I knew that. We did that on the
rug.’ I said, ‘Oh, but nobody did it.’ You know, so sometimes they need more. You
want to help them and give them more time. You want them to have that aha moment. Whizzing through the *Solve and Share* does not do it for anybody.

Another participant expressed concern that after testing there is no opportunity to reteach important skills that students might have missed. Referring to a schedule of lessons for the month, the participant stated:

This is my schedule for this month. And the problem is, there’s no reteach. But, I want to do a reteach because they need it. But look, I have no time. So, what we’re doing, is when I have both classes, I’m taking both classes and doing data analysis, interpretation, and all of that with the half hour when the other teacher’s at lunch to expose them so we can get through the chapter. You know we’ve tried to come up with tricks of the trade to do that too. But, we’re cutting into other subjects.

The teachers in this study expressed that they very much want to give their students the education that they deserve. Unfortunately, factors beyond their control sometimes impair their ability to meet the individual needs of each student. For example, with the elementary school day being just six hours long, inclusive of breakfast, lunch, recess, art, music, and physical education, every minute available for teaching and learning is valuable. Further, students in the district average fourteen absences a year, one of the lowest attendance rates in the state. This means that students are missing upwards of three school weeks in addition to the already-limited time for teaching and learning. Even if the new program is implemented with complete fidelity, student outcomes will not improve if students are not present in school to learn.

**Program Benefits.** In fulfilling both their professional responsibilities and their responsibility to meet their students’ needs, participants discussed several benefits of the new program. With rigor being a key shift of the Common Core standards, this program provides a
level of rigor that has not traditionally been experienced by either teachers or students. In response to the question, “What do you think are the greatest benefits to using the program?” one participant responded:

Definitely rigorous … definitely higher level thinking. A lot of us were doing our own things, searching our own rigor, which I think we were really good at; but, other schools are not as consistent as that. And taking that old Heath book and just doing it all in the old Heath book, well, you’ll never survive. If you don’t do the PARCC-like tests or the old MCAS, you’re never going … to reach that level. So, I think this is a little over the top, but I think it will benefit (us) in the long run.

Teachers have to delicately balance their professional responsibilities with their personal desire to reach all students. One teacher’s concern was captured in her statement, “It’s almost like I’m worried if she (principal) comes in and I’m not doing the new program, which I’m always doing, I’m going to be in big trouble.” Because urban districts are faced with a multitude of structural, cultural, technological and financial challenges, their students, on average, have lower achievement scores than their suburban counterparts. Teachers struggle with the balance of giving the students what they really need (basic literacy and numeracy skills) and holding them to the same high standards and rigorous expectations that are dictated by the Common Core.

**Preparation**

Participants in this study were expected to prepare for the lessons they teach before they actually had students in front of them. However, there are certain things that teachers need in order to be able to do their necessary preparation. The second superordinate theme in this study captures the participants’ need to receive appropriate training and professional development from
their district. When the district fails to prepare its teachers, it is directly failing its students.

While teachers are willing to give their own time to receive training and professional development, the district must assume responsibility for preparing its teachers. The participants are committed to their work, but they need opportunities for professional collaboration in order to give their students everything they need to succeed. The nested themes of convergence across participants’ views on preparation were *district responsibility* and *building support*.

**District Responsibility.** While all of the participants found participating in one or more launch opportunities helpful, they did not feel they were adequately prepared to begin using the program at the start of the school year. The district never officially announced the adoption of the new math program. Rather, the participants learned about it “through the grapevine,” “by word of mouth,” or “gossip” at the end of the last school year. It was only when the teachers received an email invitation for the launches that were held in August that the adoption of the program was confirmed, to some extent, at the district level. Unfortunately, some teachers do not check email over the summer. The launches were a missed opportunity for teachers who did not check their email or hear about the launches from colleagues. While one participant liked the opportunity to go through a lesson at the launch, she did not think the presentation was timely. She stated, “It was an appropriate overview, but it was way too close to (school) starting. It was more like… tomorrow you know they’re coming through the door, and I have a first couple of days that, you know, you do certain things anyways; and it was… okay try to digest what you got and see.” Another participant expressed the need for additional time during the school year to have teacher questions addressed, because the program was brand new and people did not know what to ask during the summer launch sessions. She stated, “Until you do it yourself in real time
with real kids, that’s really when you have the questions.” Teachers also provided specific reasons why they did not feel adequately prepared:

I think we really needed some more training on how to answer the questions, so maybe they could have made something for us… the program requires the kids to do a Part A and Part B, four parts to the question, and I don’t think I prepared mine for myself. Now they know how to answer it, but I think they should have gotten a heads up that the program requires PARCC-like, it is PARCC-like in labeling, but I don’t think that we introduced it that way, and we should have. We should have come up with some templates or something to prepare the kids before we even opened the book, to be honest, because… we were just told “go.” The kids don’t realize there’s a Part A and Part B. I mean it took us ‘til probably Topic, I don’t know, Topic 2, to say: Oh you can’t, you’re never going to get any points if you don’t do what they’re asking. So that’s definitely a challenge and I think that that will go for kindergarten, first grade, second grade. So that’s something we need to be better at -- giving strategies for this type of testing.

The language of the program was also something that came up in the majority of the interviews. One participant stated, “It’s like looking at a foreign language, almost. You don’t know what it’s about. I mean you just got to keep on learning all that new terminology. You know you look at something at first and you don’t really know what it’s about until you keep looking at it and going through it.” This was affirmed when another participant stated,

We all need to have a better grip on the language, and the language is different, so some of the fifth grade was asking, “What is this?” I’m like, “I’ve never heard of it.” I mean so we need to kind of get back on board with all speaking the same way about how you solve things, what you call things because that’s going to bite us later on,
too. And that was a big push. I don’t know maybe ten years ago where the district offered courses where you need to call this an equivalent equation, you cannot say you know equal or I don’t know. We just had a few things that we were all doing. You know and it’s a disservice to the kids because they’ll ask it that way. That’s another thing we probably need to work on.

Another participant shared her frustration when she stated,

There’s new terminology, like, every day there’s something different that pops up and I never really have enough time to be ahead of myself where I could know it was coming up and so all of a sudden okay we’re going to annex zeros. I’ve never in my teaching ever used that term before or ten to the zero power, that’s something else that was different.

Teachers also believed that they should have received more training with the technology. There are several online components, but teachers were not provided with opportunities to access and explore these during the professional development. The district made a decision not to train teachers on the online components because not all schools have access to technology. Teachers felt that a “one size fits all” approach was not appropriate given that the different schools have different technological capabilities.

**Building Support.** Participants believed that, despite attending a voluntary launch and a mandatory professional development half day of training, they were unprepared to teach using the program the way it was intended, given limited exposure to the program just prior to the start of school. Participants felt that ongoing support was something equally as important as training prior to the use of the program in their classrooms. The teachers use a new reading program from the same publisher and have a district-wide specialist who supports all schools specifically
with the reading program. The participants all stated that having a similar support person for the math program to “bounce ideas off of” would be helpful. While the math coaches provide the support they can, they are “spread thin” and are learning the program alongside the teachers rather than having expert knowledge of the program. Because the program was developed with all of the Common Core shifts and standards, there is a lot of conceptual understanding that is much different from “the way we were taught” that teachers must learn. The participants shared that their coaches were easily accessible and they would help them with anything they needed, but they did not have all the answers. One stated, “Sometimes I do need the coach and I’ll ask her for something. She’s come in and done a couple of lessons for me so that has helped. I feel like I always have someone to run to.” Another participant agreed that support was accessible, but preferred to help herself. She said,

You tell me what to do and I’ll do it. If I don’t know something, I’ll look it up. That’s pretty much how it is. You want to do it as well as you can. Every year it’s different for your class. Like one year you don’t have to back track and do the basics or whatever and another year the kids are in 5th grade doing 2nd grade work. It’s crazy and you have to change your practice every year. Everything keeps changing so (laugh) it’s hard to keep up, it really is.

While teachers were willing to do what they need to do to successfully implement the new math program, they indicated that they needed more support prior to the start of the year. They also wanted specialized support from people who had experience with the program during the year. Teachers did not feel adequately prepared when they walked into their classes at the start of the year, and new questions continued to arise as traditional concepts were taught using several new strategies that no one had previously used.
Expectations

Expectations are a natural part of everyday life. For the purpose of this study an expectation is defined as a strong belief that someone will or should achieve something. As a result of the program launches (publisher and district sponsored) and a contractually-mandated half day of professional development the day before school started for students, there were certain expectations for teachers. The main take away from the trainings was that every lesson has three mandatory parts and each part must be taught every day. Also, the district messaged that the program was to be implemented with fidelity. This meant that, in addition to following the three-part lesson structure, pacing would go according to the pacing guides provided by the publisher, which were further outlined in the district’s curriculum map for each grade level. The three nested themes regarding program expectations are pacing, checks for understanding, and testing.

Pacing. The purpose of the pacing guide is to ensure that the program, which covers all of the Common Core mathematical content standards for the given grade level, is completed within the school year. The number of lessons varies by grade level with the largest number of lessons being one hundred and sixteen. The program is designed in such a way that all lessons can be completed in a single, sixty-minute class period. The participants’ district allocates ninety-minutes per day to math instruction, giving the teacher adequate time to teach the lesson and fill in learning gaps (as identified by results from a placement test given at the start of the school year) from the previous years. In addition to ensuring that the program is completed by the end of the year, the district curriculum map (with time frames for the completion of each topic) ensures that teachers are teaching the same concepts at the same time. This is important for many urban districts that have a large population of transient students. By keeping all classes
on the same concept at the same time, a student who moves from one school to another does not lose valuable instruction.

Interview data revealed that pacing was the biggest concern among participants. According to one participant, “The pacing, I think, is probably my biggest issue. There are some lessons there that I’ve really had to try to figure out myself that I’ve never taught before. You know so these things keep popping up and I you know feel like I’m flying by the seat of my pants and I don’t like to operate that way. You know, but there’s only so much time and I have all the other subjects to teach as well so you know.” Another participant did not believe the district pacing expectations for the program were realistic responding with the following:

No, really. Um, a lot of it is the time. You know just trying to rush through, I think, being the first year; it’s been tough trying to you know to retrain their (students) thinking and at the same time trying to, you know, teach the curriculum and then do a good job at it. Like I… would love to have more time to do more small groups, to do more activities with them to reinforce the skills, and there’s just not. I’m constantly just trying to keep my head above water, just kind of treading.

While other participants agreed that the pacing expectation was unrealistic, they expressed understanding for its need. One participant stated:

…but then I will say that I understand it’s the first year and obviously in math you need to get through all the topics before the spring testing, like we’ve always done. I mean we’ve always had maps, I don’t know if you’ve seen them, our previous maps gave you a general guide as to where you need to be at a given time. I think part of the frustration with the new program is that one lesson per day is the expectation. Having a daily lesson by lesson expectation becomes the sticker point for me because they are
(lessons) not always valuable and I kind of feel like I don’t want to throw things at them (students) because that’s not good education either. It shouldn’t be “be done with this by a date,” but on the other hand, you go on and on forever because if we wait for every student to “get it,” you’ll never finish anything. But, I guess we’re coming from pacing that does not allow the teachers to say, “I need more of this or less of that” depending on the needs of your students that year. Having to teach a lesson each day and have students understand it that same day doesn’t always work out. I understand the reasoning, but I would kind of hope that maybe that’s something that’s revisited for next year. The district can provide guidelines for time with the understanding that every once in a while Performance Assessments will be collected for purposes of checking across the district. But, maybe within that time frame, we can have a little more professional latitude in terms of specific strategies that are taught or skipped within each lesson when a handful are presented.

While the district openly stated that adjustments would be made after the first year to “iron out the kinks,” many participants believed some immediate adjustments were necessary. The sentiment of professional latitude was echoed by another participant who stated:

You want to make them better, and we have the means to get to the higher level with some kids, but we still have to be able to have that time to backtrack to the ones; otherwise, they’re always going to be left behind. So that’s a concern. And I think that that month at the beginning where it’s also (name of reading program), jump in, jump in. You’ve got to teach these kids how to do everything how you want to do it. That month should be a grace period for your rules, for your how you run your room, and it’s not. And then it kind of gets too, I don’t know, we don’t get to share enough of what
works, you know, when like they say, “Oh City School, you’re number one. What works?” When we say what works, nobody lets us do it. You know? And what worked for us is (former principal’s name) gave us the leeway. “You do whatever you need to do to get those kids to get the concept.” And we don’t have that anymore. So if you walked through and saw me using an old… you know what I mean? You invested all of this money in that program and I do want to use the program, but I also have to use some other stuff. And the kids respond so much better when we use the old manipulatives.

Pacing is a problem because many students are entering their grade with less than grade-level skills and knowledge. Because they are behind when the school year starts, teachers feel compelled to teach them what they are missing before moving on to grade-level content standards. Unfortunately, this perpetuates the existing learning gaps, doing a disservice to the both the students and the teachers who will have them in future.

**Checking for Understanding.** Teachers found that the expectation for checking the three problems for all students during the class period to differentiate instruction was difficult. When asked what changes had been made to the structure of the lesson one participant stated, “I’d say probably the quick check part, because I’d do that first, and I’d go around trying to check to make sure everybody had it done; and I was going crazy trying to keep up with everybody because, you know, twenty-six kids is a lot of kids. And, I’m checking them, trying to check to see if it’s right and then get them on the list. And I think differentiating their homework was another issue. I tried to do that based on the quick checks but, there’s just not enough time to be able to do that for all those students.” Another participant described the frustration she felt when, after doing the quick checks; she found that the whole class was below level indicating that a re-teach for everyone was necessary. She stated:
The Independent Practice you know they (publisher) that was one of the things that they made it seem, “Oh you just walk around real quick, you check it off real quick and that’s it.” Well, then I was finding if that’s the case, I’m going to be re-teaching my whole class because they’re getting those two on the front right, but now they’re getting the three wrong on the back, those higher-order questions, you know the application. And if that’s the case, and if they need to have four right to be considered on level, the whole class needs to be retaught. So that was an issue there. So that was another thing that kind of had to be revamped.

One participant expressed concern that there is only one test per topic stating, “I have eleven lessons or nine lessons; there’s no little quiz in between, you know, we’re just going day to day to day and all of a sudden whoops, this big test.” Checks for understanding is an important piece of instruction as it allows teachers to make just in time adjustments to their instruction to maximize the success of their students during the lesson. Student understanding during daily instruction ultimately affects student performance on summative assessments.

Having inadequate time for test preparation leads to lower student achievement results. There is a district-wide Performance Assessment each quarter that tests students’ application of the skills they have learned. Modeled after the PARCC assessment the students receive a score that is indicative of the following five performance levels:

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Descriptor</th>
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<tbody>
<tr>
<td>1</td>
<td>Did not yet meet expectations</td>
</tr>
<tr>
<td>2</td>
<td>Partially met expectations</td>
</tr>
<tr>
<td>3</td>
<td>Approached expectations</td>
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<tr>
<td>4</td>
<td>Met expectations</td>
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<tr>
<td>5</td>
<td>Exceeded expectations</td>
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**Testing.** The pacing itself directly impacts testing. One participant shared, “Ah the pace. The pace is fast, and I feel that pressure to keep up with one lesson every single day because sometimes there are just lessons that take you two days. You know and things happen you know like you might have Phys. Ed. or something so your time block is cut a little bit, so you like got to continue part of it the next day, and then you start to fall behind and there’s no space for that and it’s kind of hectic and I don’t feel like I prepare enough for a test, like review.”

Another participant revealed that there is a degree of public shaming when district-wide results are released, stating, “The pacing is way too fast, and if you look at my progress with like that last performance one, which is absolutely crazy, and we were on the naughty list. So if you look at Topic 4, I had fifteen one’s and one two. I mean we didn’t even score, you know?”

When the researcher asked the follow up question, “Were you done with the topic when you gave it (Performance Assessment)?” the participant replied:

Rush job. Absolute rush job like panicking how in the world are we going to do it? Um, absolute rush job and we’re finding that’s going to happen again. So, but it is what it is. So, Topic 3 I had four ones, three um five threes, six twos, four ones, so, (pause) disconnect, you know? So it just to me, these scores, they’re not legit. So, I mean we usually do very well in math. I’m worried about us next year in PARCC, but we’ll, we’ll see. I mean we’re laying the foundation, but we’re laying the foundation too rigid into what category we’re in, so I’m worried about the other categories. Hopefully we’ll get there (laugh). At this pace I think we are.

**Conclusion**

The results of this research study revealed that, while each participant’s experience implementing the new math program in their classroom was a little different, there were
commonalities in three major areas. The participants identified specific factors that they felt influenced their fidelity of implementation, or lack thereof, with the program. All of the factors were similar or identical; there were no unique factors or “outliers” identified by any of the five study participants. All of the participants reported that they were committed to their jobs and students and would do whatever was asked of them. All participants also reported that they were not adequately prepared to teach the program exactly as prescribed by the publisher when they entered their classrooms in September. Finally, the participants shared their frustration with the district’s expectations, specifically regarding pacing, checks for understanding, and testing.

While there was deviation from fidelity of implementation based on the participants’ interviews, most of the participants believed they were implementing the program with fidelity.

The purpose of this study was to investigate the unique perspectives of elementary teachers who are implementing a new math program to: 1) identify factors that got in the way of fidelity of implementation of the standards-based program; 2) identify the concerns that teachers had about the standards-based program, its components, and the district’s expectations for its implementation; and 3) determine whether or not teachers felt committed to the concept of fidelity of implementation of the standards-based program. The study identified the factors and concerns; and it also revealed that teachers were committed to the concept of fidelity of implementation, despite having made adjustments to suit their needs.
Chapter Five: Discussion and Implications for Practice

The overarching goal of this study was to investigate the unique perspectives of elementary teachers who are implementing a new math program to identify specific factors that influence the fidelity of implementation of the program in the classroom.

The primary research question was: What do teachers think gets in the way of fidelity of implementation of the standards-based program? Two secondary research questions served to contribute to the understanding of why programs are not always implemented with fidelity: 1) What concerns do teachers have about the standards-based program, its components, and district expectations for implementation? and 2) Do teachers feel committed to the concept of fidelity of implementation of the standards-based program? The researcher used interpretative phenomenological analysis, a qualitative approach, which allowed her to deeply explore the sense-making of the participants with regard to their experiences with the implementation of the new elementary math program. The three superordinate themes that emerged as a result of the study were 1) Teachers are committed to meeting their professional responsibilities, meeting students’ needs, and providing the benefits of the program. 2) Teachers need support from the district and at the building level to be adequately prepared to implement the program with fidelity in their classrooms. 3) Teachers are concerned with the expectations for pacing, checking for understanding, and testing.

Discussion

The research participants entered the field of education because they want to make a difference in the lives of their students; they are committed to their students. They want to prepare them for the future and give them the best possible chance to reach their dreams and attain success in whatever they choose to do with their lives. The participants want their students
to know that the world is full of opportunities and they have control of their own destiny. While the veteran teachers no longer have the freedom to do what they once did in their classrooms, the Common Core standards were developed to provide equity, ensuring that all students receive an education that holds them to the same high standards and rigorous expectations, regardless of location, race, and socioeconomic background.

Checking for understanding is a daily focus for all classes. By conducting formative checks for understanding throughout the lesson, teachers are able to assess which students are advanced, on level, and below level. They can use these designations to pull intervention groups for re-teaching or extra practice with a skill as well as differentiate group work so students are being challenged at a level that is academically appropriate while having access to the same grade-level mathematics standards. An expectation of the new math program is to informally assess student understanding using quick checks, three problems designated by the publisher in the student’s Independent Practice section of the lesson.

A major shift in the common core is to go deeper in fewer topics. While there are fewer topics, there are more strategies. For example, division was traditionally taught using only the standard algorithm. Now, students are taught how to divide using estimation, patterns, multiples, models, and partial products in addition to the standard algorithm. In order to teach deep conceptual understanding, teachers must give their students several strategies. Eventually the students select the strategy that works best for them. Because each topic goes deeper by giving students multiple means of accessing the content, students are learning a new strategy every day, rather than just practicing an algorithm for a few days at a time.

This final chapter discusses the research findings in relationship to the study’s theoretical framework. The researcher then examines the superordinate themes and their alignment with the
literature review. The implications of these findings are then discussed in the practical setting, focusing on the perspectives of teachers implementing a new program. Next the researcher makes suggestions for improving the practice of implementation of standards-based programs in urban, public school districts. The chapter concludes with recommendations for further research.

**Findings and Their Relationship to the Theoretical Framework**

This section will relate the findings to the selected theoretical framework, Fullan’s Theory of Change. The findings confirmed the characteristics of change outlined by Fullan, specifically the four factors of implementation. First, with the exception of the one participant who was new to the district, the participants were in agreement that there was a need for change. The district’s Superintendent brought about the initiation of change after students had been functioning without a revised math program and materials for more than a decade. The teachers knew how much the students needed resources to access the content. Because the participants were dedicated to their students, they purchased materials for them with their own money and spent time looking for ideas to use in the classroom from the Internet and books. Their awareness of the need for a change that would provide students materials that would give them access to the curriculum allowed for the program to be introduced without any objections.

Second, the findings confirmed the need for clarity during implementation. Only one out of the five participants affirmatively responded to the question, “Did you feel adequately prepared to use the program after the mandatory Professional Development you attended prior to the first day of school?” As a result, the fidelity with which the program was implemented was negatively affected. Third, complexity was a non-restrictive factor of implementation. The findings revealed that the program’s three-part lesson design eliminated complexity concerns among participants. While other factors affected the fidelity with which each of the three parts was
implemented, the design itself was basic and accessible to all users. Quality was the fourth and perhaps the most telling finding that emerged as a result of the interviews. Participants believed that the program was being implemented too quickly and that the adoption of the program was given more importance than a successful implementation. The participants believed that the quality of instructional delivery was compromised for the speed in which the lessons were to be implemented.

The findings show that the participants in the study were not implementing the program with fidelity despite their own beliefs that they were. Teachers serve as the greatest agent of change for implementing a new standards-based program. With direct command of their classrooms, they have the ability to implement with fidelity or to make changes to a program. Although the school’s administrators play a role in overseeing the district’s plan for program delivery, they are not able to be in every classroom every day for a particular subject. Additionally, some school leaders have their own agenda and allow their teachers to conduct business as usual without holding them accountable for implementing the new program. Although interview data revealed that the participants for this particular study, through their own sense-making, are implementing the program with fidelity, they have made several changes to the publisher’s intended design with respect to the delivery of the program. This relates to Fullan’s Theory of Change where the teachers serve as a local factor of change and both planned and unplanned events influence their change attempts (Fullan, 2007). Because this study involved the implementation of a new math curriculum in an urban, elementary school, Fullan’s Change Theory was used to bring forth what the relevant literature reveals regarding the lessons learned about effective curricular change and factors affecting change. This was important because, as Fullan (2001) pointed out, curricular initiatives are seldom completely successful. It
is important for urban districts to be aware of the problems that are faced when trying to design and implement their curricula so that they can try to anticipate the problems, if possible, and deal specifically with problems that are unique to urban districts.

Because participants were committed to implementing the program with fidelity at the start of the school year, they believe the adjustments they made were for the benefit of their students based on their professional judgment. They do not consider the changes they made to the implementation as a deviation from implementing the program. Fullan stated that there must be a change in beliefs, teaching style, and materials to see significant educational change results (2007). In this study, the materials were changed, but teachers maintained their beliefs and teaching styles.

This study unearthed aspects of implementation that influence and impede the fidelity of implementation of a standards-based program in a public, urban, elementary school setting. The findings show that the elementary teachers who are in the thick of the program implementation placed their professional judgment ahead of the directives from their school system. This fact highlights the need for the clarity of the implementation to be explicit and the quality of the implementation to be done well as opposed to done quickly. The participants in this study made a clear case for teachers to receive more professional development in content and pedagogy and a slower roll out of a district-wide standards-based program.

The findings clearly demonstrate the need for the district to listen to the unique perspectives of the elementary teachers who are implementing the new math program. All of the participants experienced some degree of frustration with the implementation process. While some level of frustration was natural, some was exacerbated by overall demands of the district. The district implemented a new literacy program the year before and was in the process of
selecting a new science program for the following year. This means that elementary teachers were expected to learn and implement three new programs during a three-year period. According to Fullan, “If any one or more factors are working against implementation, the process will be less effective (2007, p. 86).” The implementation of the program was an external imposition that was done with a lack of clarity and quality. Additionally, each of the participants considered ways that their implementation experiences could have been facilitated better at the logistical level. Interview data confirmed their main source of frustration was time. While professional development was necessary, participants believed that having more time would provide them with the professional collaboration they needed to have with their grade-level colleagues. The structural and cultural factors that were previously discussed align with these data. While the structure of providing teachers with more time for collaboration is something that can be accomplished by a restructuring of the school’s schedule, changing the capacity (culture) is more difficult to do (Fullan, 2007).

**Findings and Their Relationship to the Literature Review**

This section will align the three superordinate findings to the literature review. The participants’ experiences with the implementation and their resulting perspectives intersected with much of the information found during the literature review that was conducted at the commencement of this research study. Current literature on fidelity of implementation in educational settings focuses on contextual, structural, cultural and technological factors. Teacher sense-making and instructional change are also relevant to how well a new program is implemented.

The first superordinate theme that emerged from the researcher’s findings was teachers’ commitment. Teachers’ commitment ties into existing literature on teacher sense-making and
instructional change. It is the teacher’s own sense-making that determines the degree of fidelity with which he or she adopts or rejects a new program (Little, 1990). We learned from Coburn’s (2006) research that sense-making is related to teachers’ personal values as well as their professional practice as educators. Participant data from the interviews in this study confirmed that their own ideas about what they needed to do to fulfill their responsibilities as educators superseded the district’s mandate to implement the new math program with fidelity.

The second superordinate theme that emerged from the researcher’s findings was preparation. This theme closely connects to existing literature on structural factors that influence teachers’ beliefs about implementing a new program with fidelity. Time and training are structural conditions that are usually not in place when reforms are introduced despite the ease with which they can be controlled (DuFour, Eaker, & DuFour, 2005). This held true for this study because participants stressed that they did not have enough time to unpack and absorb all of the program’s components ahead of time. They believed they were being rushed and only had a chance to preview a lesson just before it was taught, without adequate time to prepare their instructional delivery. Richardson’s (2000) research indicated that training is especially important when the new program being implemented because it requires teachers to change their existing practice. The study participants admitted to reverting back to past practice when they were unclear of the direction of a lesson in the new program. Because the new math program required teachers to have a flexible knowledge of math content as well as the Common Core shifts, the district needed to continue to train and support teachers as they approached the continuation phase of Fullan’s Change Theory. Additionally, research by Wei et al. (2009) found direct classroom support to be the most effective support for implementing a new program with fidelity. While research participants thought their coaches were accessible when necessary,
they had no basis for comparison to see the true impact of ongoing, targeted support.

Technology was a factor that appeared in much of the literature that was reviewed on program implementation. However, participants in this study did not think that technology hindered their ability to deliver the contents of the program to their students.

The third and final superordinate theme that emerged from the findings was related to expectations. This theme closely connects to existing literature on the contextual and cultural factors that play a role in how well a new program is implemented with fidelity. Durlak and DuPre (2008) found that strong leadership, clear goals, and benchmarks of success are contextual factors that are important for the success of a program’s implementation. In this study the participants believed that professional collaboration with peers who were going through the same challenges with the program’s implementation was more important than strong leadership. They believed that although the goals of the program were clear, they were unrealistic given that the students had not come with prior knowledge of the program as assumed by the publisher. While review of the literature did not specifically define “benchmarks of success,” participants used student assessment scores as a measure of success. Participants were concerned that program assessments were only given at the end of a topic, which could have upwards of three weeks of lessons. They felt that having more frequent, regularly-scheduled assessments would provide a better picture of student achievement and program success.

**Implication of Findings in the Practical Setting**

As a result of the participants’ interviews, three superordinate themes emerged. First, all of the participants were committed to their careers, had their students’ best interests at heart, and saw the benefits to having a new math program with resources that would support their students’ learning goals. Second, all of the participants felt that preparation was a vital factor in delivering
the program as intended. Third, all of the participants had concerns with the district’s expectations for pacing with respect to delivery of all instructional lessons during the academic year.

Consequently, this study has identified specific factors that influenced the degree of fidelity in which the program was being implemented. It has also raised questions about whether the district’s pace for adoption and implementation was appropriate.

In terms of concerns, all participants interviewed struggled with the time frames that teachers were expected to follow. The primary issue was that teachers were required to teach grade-level standards to students whose performance on standardized tests showed that they were not entering the particular grade having attained competence in the previous year’s grade-level standards. Because data were used throughout the district as a means of qualifying teachers’ instructional practices, teachers were concerned that despite evidence of student growth, their work would never be validated when students arrive in a third, fourth or fifth grade classroom lacking basic numeracy and/or language skills. Participants expressed their concerns asking, “How are we expected to teach three or more years of math content while implementing a new program with fidelity and meeting the needs of each student as an individual?” Surely the task of teaching all of the grade-level standards that are incorporated in the new math program would not be as daunting to teachers if their students arrived in their classrooms with grade-level skills.

The pressure teachers are under to teach the grade level standards conflicts with their desire to do what is best for their students. The National Board of Professional Teacher Standards (NBPTS) specifically states that teachers commit to their students and their learning by adjusting their professional practice based on the observed need of the students they serve. Told to implement
the program with fidelity by their district and held to professional teaching standards, which directive should teachers follow?

While this study acknowledges the participants’ pacing concerns, there is no immediate solution. Standardized testing, as a means of educational accountability that measures student achievement, is a requirement of public schools in every state that went into effect with the No Child Left Behind Act, which has been replaced by the Every Student Succeeds Act. The results of these tests are publicly available, and it is every teacher’s responsibility to prepare his/her students to succeed when assessed on their grade-level standards. As long as testing and accountability are in place to ensure that all students receive an excellent education and are held to the same high standards, teachers must provide their students with the teaching and learning experiences that are relevant to the grade they are teaching. The larger issue of student placement and student support services will be further discussed in the recommendation section.

Another implication for implementation is the strategic use of resources. The math coaches who were hired to support teachers’ implementation of the program did not have experience with the program itself. The coaches who were hired were classroom teachers of math at the secondary level. This was a conscious decision of the district based on the fact that only 4% of elementary teachers hold degrees in mathematics or math education. The coaches’ expertise in secondary math allowed them to see the bigger picture and help teachers focus on the major standards that will be important for the development of students’ conceptual understanding down the road. However, because the program was new to teachers and coaches alike, the specialized support they provide with regard to different strategies for multiplication, division, fractions, etc. that are new to the Common Core occurs as the lessons are happening as opposed to before the lessons are delivered. Participants believed that their coach had a strong
mathematical background, but that she was “stretched thin.” They did not believe they received a dedicated amount of time with her because she services teachers in two different schools and is often pulled out of the building to attend other trainings. They felt that even having her in just City School was not enough because there are six grades and twelve teachers that need support.

**Recommendations for Professional Practice**

Based on data collected from this study, improvements are recommended in new program implementation in four major areas: roll out, leadership training, district placement and promotion policies, and Common Core training.

**Roll Out.** Data from participant interviews indicated that the program was rolled out too quickly and too close to the opening of school. While there was an urgent need for immediate change, the program assumed that students in any given grade level had used the program in all prior grade levels. Having students and teachers use a program without the appropriate background knowledge did not appropriately set them up for the expected successful outcomes.

**Leadership Training.** Principal training is another area that must be improved in order to build capacity within each school. In this district only 5% of school principals had a background in math. By supporting the principals as leaders of instruction, the support that teachers receive is not limited to the less-than-optimal time that coaches are available.

**District Placement and Promotion Policies.** Revisiting and revising district placement and promotion policies to ensure a seamless implementation is a third area of consideration. Chronic absenteeism is a problem. When a student misses close to three weeks of instructional time in a school year of only thirty-six weeks, they will lose out on important learning. By promoting them regardless of their absences and academic achievement, they are only being set up for failure. The outcomes of a program that require students to master all of the content
standards contained within approximately one hundred and ten lessons can only be achieved if the students are present for the lessons.

**Common Core Training.** Finally, it is recommended that any district tackling the implementation of a new program provide all stakeholders with the necessary background knowledge. Participants’ interview responses revealed that the participants were not comfortable with the Common Core shifts although they answered in the affirmative. Programs are oftentimes developed with the onset of curriculum changes. The math program that was implemented during this study was developed as a result of the Common Core. Without the necessary background knowledge related to the Common Core shifts, the program cannot be implemented as successfully as intended.

By tackling the logistics of a program’s rollout, providing support to the principals to serve as leaders of instruction, having appropriate interventions for students who miss important academic content, and providing teachers with the background they need related to the content they will be teaching, fidelity of implementation can be improved for any standards-based program in an urban district.

Compared to a spiral program, in which learning is extended over time and repeatedly revisited, the new program that was at the center of this research took a different approach, where learning occurred in shorter, concentrated periods. Because the program did not revisit concepts, there was an expectation that students had prior knowledge and were able to build on it. The participants indicated that when students are introduced to a program without any familiarity with respect to design and vocabulary, teachers must take the time to introduce them to these elements. Additionally, teachers must make a judgment call and either re-teach concepts from the previous years where students have learning gaps before beginning the grade level
standards or start immediately embedding the missed content in the current year’s work. Because neither of these approaches is ideal, the logistics of the program’s rollout must be considered.

The implementation in this district occurred at the same time for students in kindergarten through grade 5. Because primary grade students are just embarking on their educational journeys, it is easier to introduce them to a program that will become part of their daily routine for the next several years than it is to introduce students who have been without a program for all of their educational experience. A two-year roll out of the program, beginning with grades K-2 and extending to grades 3-5 the following year, is recommended. By extending the roll out an additional year, the students in the primary grades will have familiarity with the vocabulary, manipulatives and three-part lesson structure from the start. Teachers in grades 3-5 will have the opportunity to spend the first year getting familiar with the program and the Common Core shifts by working collaboratively with grade-level colleagues previewing the content, reviewing what they already know, and planning for the following year’s implementation, including pacing. Additionally, principals and coaches can better help lead teachers with their work because they will have only one area of focus during the first year of implementation. By increasing the roll out from one year to two years, principals and coaches will have more time to learn, digest, and share lesson modeling with all classroom teachers.

Providing leadership training to the school principals would have a direct impact on classroom teaching practices. As evaluators of educators, principals involved in the implementation of a new standards-based program in their school would then know what to look for during classroom observations so they can give their teachers growth-producing feedback.
The district that was researched in this study provided school principals with two half-day trainings on the new program. These training sessions gave the leaders a sense of the actions they should be looking for during a math class. For example, “Make sense of problems and persevere in solving them” is the first Standard of Mathematical Practice (SMP). All educators who have a responsibility for teaching mathematics are expected to develop the varieties of expertise set forth in the SMPs. Without training on these standards, a principal might observe a classroom of students who do not appear to know what to do rather than seeing students who are engaging in a productive struggle to problem solve asking themselves, “Does this make sense?” as they work.

In addition to the program’s components, principals must have some basis for judgment in terms of the content. While it has long been argued that “good teaching is good teaching,” the inability to identify archaic classroom practices will ultimately hinder the academic growth that is an expected outcome of implementing a new standards-based program. In the district that was researched for this study, there was a healthy mix of new teachers (less than five years of classroom experience) and veteran teachers (greater than 15 years of classroom experience). Data revealed that veteran teachers believed that doing things the way they have always done them is what is best for students despite research that shows students need conceptual understanding and application of mathematical ideas over procedures. As stated by one participant, “I don’t think I read it word for word, but I kind of like interpret it in my own words and kind of teach that way.” Unless principals are well versed in both traditional practices of using procedural algorithms and identifying key words for problem solving, as well as the new practices that embody the Common Core shifts of focus, coherence, and rigor with heavy
emphasis on application, they will be unable to give teachers the feedback they need to improve their teaching practice and, ultimately, students’ understanding and achievement.

Each program also has its own design. The program in this study used a three-part lesson design. There were also a variety of resources to supplement each part. While the *Solve and Share* that was previously discussed allows students to grapple with problem solving in any way they choose, the teacher has a responsibility to monitor student work and progress. Teachers should be taking anecdotal notes as they circulate the room and observe their students working. The program recommends that two to three student work samples be shared with the whole class. In the event that all students use the same method of solving the problem, the program provides additional student work samples that will generate content-rich conversations in the classroom.

Publishers develop programs based on the assumption that material for a certain grade will be used with students in that grade, achieving at that grade level, and taught by teachers with a clear understanding of the grade level standards as well as those taught in the previous year and those that will be taught the following year. This study revealed that in addition to teachers not having the necessary knowledge to teach students content in new ways using multiple strategies, students were often placed in a less-than-optimal setting. Some students need to be taught in a small group, while others need services that help them with language barriers. Additionally some students are promoted to a certain grade based on age appropriateness without having ever mastered the skills taught in earlier grades. Oftentimes this “social promotion” is due to an excessive number of absences. Because there is no consequence for absences, students are promoted rather than retained and run the risk of falling even farther behind as they move forward in their education.
By revisiting district placement and retention policies, changes can be made. Interventions that provide supplemental services for students who need extra support or have missed too much school to be successful if promoted can help students achieve at their grade level.

Appropriate placement of students is important when implementing a new standards-based program. To begin a new program where students are grade levels behind the academic knowledge and skills of their peers results in a loss for all students. Students who are on level or advanced do not get challenged adequately, and those who are behind fall victim to low self-esteem when the program has expectations and academic activities that cater to a specific grade. In order to implement a new standards-based program with fidelity, districts must be mindful of the assumptions set forth by publishers. To implement a program and be unable to keep pace due to student learning gaps will not allow a district to achieve the desired results. Therefore, in preparation for implementing a new standards-based program, it is necessary to appropriately place students based on their grade-level achievement.

Common Core training is something that all educators of mathematics should have to effectively teach the new standards. In order for any standards-based math program to be implemented with fidelity, teachers must have the right background knowledge. Interview data revealed that teachers did not have a clear understanding of the Common Core shifts. The participants’ responses to the question, “How comfortable are you with the Common Core shifts in math?” revealed that they were not necessarily aware of the shifts. Not one of the participants stated one of the three shifts in their response. Rather, participants answered with an affirmative response or a rather vague and generalized response to the content standards. Feeding back to
the need for leadership training, educators and administrators alike need to have this knowledge for a successful implementation.

The Common Core emphasizes focus, coherence, and rigor. In teaching depth over breadth, teachers need to understand that focus means they will need to have expert knowledge of the standards, what they mean, and the multiple representations needed to make the content accessible to their students. Teachers need to have the time to sit with the standards they are teaching and see their progression across grade levels. This coherence will allow teachers to build upon students’ existing knowledge and prepare them for what lies ahead of them.

Providing students with applications that allow them to put the Standards of Mathematical Practice to use will give them the rigor that will help them be effective problem solvers whether or not they are working on math or in a school setting. Without clear knowledge of these shifts and why they are important, educators will continue with traditional teaching practices - those that show students are able to apply a procedure without any real understanding.

By spending time training teachers in the Common Core shifts, they will have a better understanding of how to teach and why they need to teach with these shifts in mind. Additionally, as with any new program, there will be questions from parents and other stakeholders. Because Common Core math is the new way of doing things, different from anything any adult ever learned in school, knowledge of the shifts will better prepare teachers to help parents understand why we are changing the way we do business. With more knowledge comes less resistance. Being able to implement a new standards-based program with knowledge that increases stakeholder support will improve the chances of it being delivered with fidelity.


**Recommendations for Further Research**

Although this phenomenological study achieved its goal of identifying specific factors that influence the fidelity of implementation of a new standards-based program in the classroom through the unique perspective of the teachers using it, more research is needed to determine whether these findings can be applied in a greater number of settings, as well as to standards-based programs in other content areas and in secondary grades. The unintentional homogenous traits of the teachers who agreed to participate in this study present an assortment of variables researchers can, and should, investigate in more detail. Among the variables are: 1) sex, 2) race, 3) ethnicity, 4) native language, 5) highest educational degree, 6) years of teaching experience. A quantitative study using a survey that creates its questions based on the data collected from this study’s small, yet representative, sample of elementary teachers could be designed to obtain a larger scale of responses from a much larger, and more heterogeneous, sample size. Given the study’s findings, three specific variables, sex, native language, and years of teaching experience, invite further research. It would be interesting to explore how the experiences of male teachers, teachers who speak a language other than English at home, and teachers who are new to the classroom feel about the implementation of the new program and see how their experiences and perceptions align with the inadvertent homogenous sample of teachers who volunteered to participate in this research.

Additionally, it is important to note and remember that this was a phenomenological study exploring the experiences of a small number of elementary teachers implementing a new math program. It is possible that their traditional teaching practices, combined with their desire to do what is best for the students who sit in front of them influenced the results. It would be interesting to conduct casual-comparative studies to determine if 1) teachers in suburban districts
2) teachers implementing programs in other content areas and 3) teachers implementing programs at the secondary level had similar opinions and experiences as the teachers at the research site.

Whereas this study focused on the opinions and experiences of teachers, a follow-up study on the opinions and experiences of students and parents could provide a very valuable comparison. A study could explore the specific implementation practices of teachers that students find beneficial and detrimental to their learning. By asking students what practices of the program they think are currently working and what practices they wish to change, a dialogue among students and teachers could develop in order to improve the implementation experiences for everyone.

It is clear that teachers want to do what is best for their students and follow the directives of their district. By applying the change formula, district level leaders can evaluate and reflect upon their own implementation initiatives to achieve the intended student achievement outcomes. A well-planned roll out as well as appropriate training for all stakeholders will increase the benefits of fidelity of implementation for districts in the future. The results of this research study have implications for systematic change. While an entire district may not have the capacity to follow all of the previously outlined recommendations, change is more manageable on a smaller scale. By working towards fidelity of implementation in a single, smaller school and tracking the results, a district is better poised for continuous change that eventually becomes all-encompassing, even at the largest schools.
References


Educational Leadership, 56, 28-31.


Professional learning in the learning profession: A status report on teacher development in the United States and abroad. Dallas, TX: National Staff Development Council.


Appendix A – IRB approval

NOTIFICATION OF IRB ACTION

Date: December 21, 2015
IRB #: CPS15-12-10

Principal Investigator(s):
Carolyn Bair
Victoria Roman

Department:
Doctor of Education Program
College of Professional Studies

Address:
20 Bevidere
Northeastern University

Title of Project:
The Importance of Fidelity of Implementation and Factors that Impede it for Teachers: An Interpretative Phenomenological Analysis

Participating Sites: [Redacted for privacy]

DHHS Review Category: Expedited #6, #7

Informed Consent: One (1) signed consent form

Monitoring Interval: 12 months

APPROVAL EXPIRATION DATE: DECEMBER 20, 2016

Investigator’s Responsibilities:
1. The informed consent form bearing the IRB approval stamp must be used when recruiting participants into the study.
2. The investigator must notify IRB immediately of unexpected adverse reactions, or new information that may alter our perception of the benefit-risk ratio.
3. Study procedures and files are subject to audit any time.
4. Any modifications of the protocol or the informed consent as the study progresses must be reviewed and approved by this committee prior to being instituted.
5. Continuing Review Approval for the proposal should be requested at least one month prior to the expiration date above.
6. This approval applies to the protection of human subjects only. It does not apply to any other university approvals that may be necessary.

C. Randall Colvin, Ph.D., Chair
Northeastern University Institutional Review Board

Nan C. Regina, Director
Human Subject Research Protection

Northeastern University FWA #4636
Appendix B – Recruitment letter

Dear City School teachers:

My name is Victoria Roman, and I am a doctoral student with Northeastern University in Boston, MA. I also work as the Math/STEM director for the district. Your principal has graciously agreed to help me recruit teachers to participate in a doctoral research study for my thesis, which is titled:

The importance of fidelity of implementation and factors that impede it for teachers: An interpretative phenomenological analysis

I am recruiting participants who meet the following criteria:
   a) are a full-time teachers in the district
   b) work in grades K-5
   c) teach math as one of their subjects

Teachers who agree to participate will be asked to do the following:
   a) talk with me by telephone to confirm their interest in participating and to set up the in-person interviews
   b) Meet with me one-on-one at a location of their choice to participate in a confidential 60-90 minute interview about their experience implementing the new elementary math program. The conversation will be instantly transcribed through the use of software.
   c) Read an emailed copy of the interview transcript and then let me know if they would like to add or clarify anything

Participation is voluntary, and teachers would be free to withdraw from the study at any time. Teachers who participate in the interviews will receive a $25 Barnes & Noble gift card.

If you meet all of the above criteria, and wish to participate in this research study, please stop by the principal’s office at City School to sign a consent form allowing her to provide me with your name, your contact information, and confirmation that you do meet the study criteria.

Thank you for your time,

Victoria Roman
Appendix C – Informed consent

Northeastern University, College of Professional Studies, Graduate Programs – Educational Leadership

Name of Investigator(s): Dr. Carolyn Bair, Victoria Roman

Title of Project: The importance of fidelity of implementation and factors that impede it for teachers: An interpretative phenomenological analysis

Informed Consent to Participate in a Research Study
We are inviting you to take part in a research study. This form will tell you about the study, but the researcher will explain it to you first. You may ask this person any questions that you have. When you are ready to make a decision, you may tell the researcher if you want to participate or not. You do not have to participate if you do not wish to do so. If you decide to participate, the researcher will ask you to sign this statement and will give you a copy to keep.

Why am I being asked to take part in this research study?
We are asking you to be in this study because you are a teacher who:
   d) works full-time
   e) works in grades K-5
   f) teaches math as one of your subjects

Why is this research study being done?
The purpose of this research is to explore the unique perspectives of elementary teachers who are implementing the new math program in the district. The intention of the researchers is to learn more about specific factors that influence the implementation of the program in the classroom.

What will I be asked to do?
If you decide to take part in this study, we will ask you to:
   a) talk with the researcher by telephone to confirm your interest in participating and to set up the in-person interviews
   b) meet with the researcher one-on-one to participate in a confidential interview about your experience implementing the new math program in your classroom
   c) read an emailed copy of the interview transcript, and then let me know if you would like to add or clarify anything

Where will this take place and how much time will it take?
The initial telephone call will take no more than 10 minutes. You will subsequently be interviewed at a time and place that is convenient for you. The interview will take about 60-90 minutes. Within a week, you will receive an email copy of the interview transcript, which I will ask you to read. You may then let me know if you would like to add or clarify anything.

Will there be any risk or discomfort to me?
There is no foreseeable risk or discomfort anticipated with your participation in this study.
Will I benefit by being in this research?
There will be no direct, immediate benefit to you for taking part in the study. However, the information learned from this study may help districts provide additional support to teachers in implementing a new math program.

Who will see the information about me?
Your part in this study will be confidential. Only the researchers on this study will see the information about you. No reports or publications will use information that can identify you in any way as taking part in this project. Pseudonyms will be used to keep your name, the name of your school, and the name of your school district confidential. Only the researchers will have access to the data materials during the research study. An outside transcriptionist will be provided with the audio-recordings of the interviews, but no additional identifying information will be included. Transcriptions will be completed in accordance with the confidentiality standards of that industry. The data will only be used for the purposes of the current research study. All data, both paper and electronic, will be kept locked and secured in one of the researchers’ home office. Paper data and information, including interview notes and signed consent forms, will be stored in a locked filing cabinet along with the digital audio recorder containing the original interview recordings. Electronic data will be stored on a password-protected computer that is only accessible to the researcher.

If I do not want to take part in the study, what choices do I have?
You may voluntarily withdraw from the study at any time without penalty.

What will happen if I suffer any harm from this research?
There is minimal risk of harm for you in this study. During interviews, there is the possibility that you may experience psychological vulnerability as you address experiences or concerns of a sensitive nature. However, these risks are minimal in nature and are unlikely to cause harm to you.

Can I stop my participation in this study?
Your participation in this research is completely voluntary. You do not have to participate if you do not want to and you can refuse to answer any questions. Even if you begin the study, you may quit at any time. If you do not participate or if you decide to quit, your working conditions will remain unaffected.

Who can I contact if I have questions of problems?
If you have any questions about this study, please feel free to contact Victoria Roman (508.852.8582 or roman.v@husky.neu.edu), the person mainly responsible for the research. You can also contact Dr. Carolyn Bair (617.390.4197 or c.bair@neu.edu), the Principal Investigator.

Whom can I contact about my rights as a participant?
If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, E-mail: n.regina@neu.edu. You may call anonymously if you wish.
Will I be paid for my participation?
You will be given a $25 gift card to Barnes & Noble as soon as you complete the one-on-one interview with the researcher.

Will it cost me anything to participate?
There is no anticipated cost to you to participate in the study.

Is there anything else I need to know?
n/a

I agree to take part in this research.

____________________________________________  ______________________________
Signature of person agreeing to take part              Date

____________________________________________
Printed name of person above

____________________________________________  ______________________________
Signature of person who explained the study to the participant above and obtained consent  Date

____________________________________________
Printed name of person above
Appendix D – Interview protocol

1. What grade are you currently teaching?

2. How many years have you been teaching at this grade level? What other grade levels have you taught (if applicable)?

3. How many years have you been teaching at City School? In this district?

4. Did you participate in the publisher’s launch of the program over the summer? If so, how useful did you find it? Please describe.

5. Did you describe in the district’s launch of the program over the summer? If so, how useful did you find it? Please describe.

6. When did you first hear about the new program?

7. How did you hear about it?

8. Did you feel you were adequately prepared to use the program after the mandatory PD you attended prior to the first day of school?

9. Were you committed to implementing the program with fidelity at the start of the school year? If not, why not? Has that changed? Why or why not?

10. How comfortable are you with the Common Core shifts in math?

11. How comfortable are you with the math standards for your grade level?

12. What does a typical math block look like in your classroom?

13. What are your biggest concerns with the program? Have they changed since the beginning of the school year?

14. Do you feel supported in using the program in your classroom? Do you need additional support from your principal? Coach? The district?

15. What do you think are the greatest benefits to using the program?

16. What do you think are the greatest obstacles to using the program?

17. How do you support students who are struggling with learning the math skills?

18. Do you believe you are implementing the three-part lesson as intended by the publisher? If not, what do you think gets in the way of you implementing it as intended by the publisher?
19. Do you have concerns with any of the three mandatory parts?

20. What changes, if any, have you made to the structure of the three-part lesson?

21. How much technology have you used with the new program? Would you use more if you had better access?

22. Do you believe the district expectations for program use are realistic? If not, why not?
Appendix E – Audit trail

Alexis: I think understand it myself. Understand what they want us to do because it’s completely different than the way I learned. Trying to retrain myself to do what I thought I knew all along.

Jill: I think they’re asking us to do it too quickly. It’s a rush job. Our calendar is ridiculous. We don’t have enough time for a reteach.

Tara: There are some lessons there that I’ve really had to try to figure out myself that I’ve never taught before. Every day there’s something different that pops up and I never have enough time to be ahead of myself.

Kristie: To be honest with you I haven’t gotten to that other kit because it’s more of a time factor. That’s a big piece is the time factor.

Jen: There isn’t time for the in-depth review that I sometimes wish to get them ready for a test.