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Concerns of Elementary School Leaders and Teachers When Implementing a Common Core Aligned Mathematics Program

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ABSTRACT

The purpose of this study is twofold: first, the research is an investigation of the concerns of school leaders and teachers when implementing a Common Core Learning Standards-aligned elementary mathematics curriculum in an age of accountability and reform; second, this research aims to identify the interventions that school leaders employ in response to the concerns of teachers.

This is a mixed methods study using the Concerns-Based Adoption Model (CBAM). Specifically, the Stages of Concern Questionnaire (SoCQ) and the Change Facilitator Stages of Concern Questionnaire (CFSoCQ) were administered three times during the initial year of implementation of a new mathematics program in a small city school district in Central New York State. Qualitative methodology included focus groups with teachers and with school leaders, and semi-structured interviews with each school leader. (N=12 teachers and N=5 school leaders).

Findings from this study indicated that school leaders were unconcerned about the innovation and about becoming better change facilitators. School leaders were concerned about other aspects of their leadership including safety, discipline, parent concerns and staffing. Teachers' *Self* concerns in the quantitative data combined with *Consequence* concerns in the qualitative data suggest that teachers want to feel efficacious and they are concerned about their students' success. Additionally, teachers' concerns were intense around opportunities for collaboration. Interventions employed by principals largely focused on *Informational* and *Management* concerns and, therefore, alignment was low relative to teachers' highest concerns.

CONCERNS OF ELEMENTARY SCHOOL LEADERS AND TEACHERS WHEN IMPLEMENTING A COMMON CORE ALIGNED MATHEMATICS PROGRAM

by

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The participation of the five elementary school principals in the Plymouth Central School District was imperative to this study and they each volunteered without hesitation. For their professional approach to the challenging work of school improvement, I am appreciative. Additionally, this study would not have been possible without the participation of twelve elementary teachers in the district. The educators in PCSD are committed professionals who care deeply about the students they teach. This, we know, is an essential component of all school improvement efforts.

Finally, for all the students and educators that I have had the pleasure of working and learning with for over thirty years, you have changed me.

Dedication

Although I embarked on this educational journey later in life, I did so out of a yearning to continue to learn. The value of education was instilled in me by both of my parents. They each made education central to their lives against many odds. They are both lifelong learners who inspired me toward this pursuit and for that I am truly grateful. Their love and support is unconditional and immeasurable.

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To my mother, aunts, uncle, sister and cousins who were or are teachers, you have made a difference. To all of our nieces and nephews, as part of the future generation of students for which all school improvement efforts are undertaken, may you experience equity, opportunity and challenge in your educational adventures.

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Chapter One

Some schools in the 1980's had televisions in each classroom while today some schools have interactive white boards and handheld tablets. Schools began providing free lunches to students in 1853 (Olver, 2004) and today some schools provide students with free breakfast, lunch and dinner. Teachers were evaluated with a checklist in 1950. Today the teacher evaluation process includes evidence-based observations of practice combined with student achievement results (Race to the Top Act, 2011). Change in schools has been and continues to be a vital and relevant topic. Determining what causes and sustains change in schools today can add to the research base on school reform.

The most important component in any change initiative is people. Identifying how teachers react throughout a change as well as how school leaders guide teachers through a change is at the heart of the challenge of school reform (Hord, Rutherford, Huling-Austin & Hall, 1987). Teachers, the guardians of classroom practice, are likely to resist change unless they are convinced it will benefit their students and they have a role in the process. As such, they rarely see themselves as change agents and prefer not to experiment in their classrooms (Christou, Eliophotou-Menon & Philippou, 2004). Most teachers believe that leading change, including making decisions about which changes should happen in a school, is the responsibility of the school leader (Datnow & Castellano, 2001). As the principal of a school, promoting the change process involves the difficult work of nurturing a culture of collaboration where trying new things is the norm (Chirichello, 2008). Change in schools involves empowering teachers and school leaders to invest in and embrace reform.

People respond in very different ways to the change process. Rogers (2003) and Schlechty (1993) have offered archetypes to explain the unique and predictable approaches that people take when presented with a change. *Trailblazers* identified as venturesome and also called *innovators* by Rogers (2003) represent 2.5% of a given population adopting a change. These people are the first and most willing to adopt an innovation. *Pioneers* known for respect, and also called *early adopters* are willing to take risks but need repeated assurance that this change will be worthwhile. They represent 13.5% of any group. *Settlers* categorized as deliberate, are known as the *early majority* and they represent about 34% of a group. They need to know what the expectation is, how this change will happen and as many details as possible so that they can visualize the change. They need to be persuaded that this journey will make a difference. The *stay-at-homes* are skeptical and known as the *late majority* and they make up 34% of a group. They must have a compelling reason to get on board with the change or have a supreme vision to follow. Schlechty (1993) believes that the *stay-at-homes* are given too much attention in many change processes. Last, the *saboteurs*, who are traditional and known as the *laggards,* represent 16% of a group and they refuse to adopt the innovation while actively trying to convince others to refuse as well. Rogers (2003) characterizes the innovation decision process as the "process through which an individual (or other decision making unit) passes from first knowledge of an innovation, to a decision to adopt or reject, to implementation of the new idea and to confirmation of this decision" (p. 41). Rogers submits that these stages are developmental. Acknowledging that each group will have different concerns and approaches to the innovation will effectively inform leadership efforts.

These archetypes are present in all schools and the skillful school leader differentiates her interventions based on the concerns of each group. The school leader communicates the vision,

supports collaboration, trusts and empowers the teachers, and provides needed resources to implement the change. Additionally, the school leader sets the direction, acknowledges progress and problem solves to support the innovators.

Introduction to the Problem

This dissertation examines the concerns of school leaders and teachers as they implement a new Common Core-aligned elementary mathematics program. Since both groups of people are critical to the successful implementation, examining the concerns of school leaders and teachers in an attempt to better understand what drives their action is central to this study. I begin with a discussion of several salient questions regarding change in schools. Next, I describe ways to innovate in schools and frame this idea within the larger context of schools in New York State. Specifically, I detail innovation attempts within the Plymouth Central School District in Plymouth, New York. The research questions follow and the chapter concludes with the significance and the limitations of the research.

To understand change, we first have to consider what innovations are and the relationship between innovations and schools. We begin with four salient questions regarding change in schools: What is an innovation? Why do schools need innovations? How has policy stimulated innovation? and What are the barriers to sustaining innovation? Answering these questions will provide a foundation for analyzing the change process in schools.

What is an innovation*?* An innovation is something that is new or unusual. Rogers (2003) defines an innovation as any idea or practice that is perceived as new by a user. Rogers (2003) goes on to say that even if the innovation is actually old, if it is perceived as new, it will follow the same implementation process. Innovations in schools are the small and large-scale

changes that are intended to make a positive difference for student learning. Some examples of innovation in schools include technology integration, project based learning and charter schools. Schools innovate as they strive to meet the government mandates for fair and equitable education for all. The terms change, reform, improvement and innovation will be used interchangeably throughout this work.

Why do schools need innovations? The Elementary and Secondary Education Act (1965) requires that all schools provide students with a fair and equitable opportunity to attain proficiency on state academic standards and assessments. In order to provide high-quality education, where all students have access to fair and equal educational opportunities, we must be willing to change and adapt our schools to meet the needs of our communities. Innovation is driven by a commitment to excellence and continuous improvement and it involves questioning and challenging the status quo. Until the opportunity gap is eliminated, innovation is a necessity. Innovation in schools proves that schools are learning organizations striving to keep up with the changing demands of society.

How has policy stimulated innovation? The history of change in schools is closely linked to the course of American history. Mondale and Patton (2001) argue that each historical era was marked by important educational policy. The Space Race in the 1950's gave rise to the National Defense Education Act (NDEA) and an increased focus on mathematics and science. During the Civil Rights Era, another Supreme Court decision, Brown v the Board of Education, stimulated integration of schools. Educational opportunity continued to expand through the 1970's with the passage of Title IX of the Education Amendments of 1972 and the Individuals with Disabilities Education Act of 1975. These policies supported innovations in inclusive practices and educating individuals with disabilities. A Nation at Risk drove innovation in the

1980's and saw the gradual rise of businesses' influence in schools. This era saw the rise of state standards and national standards combined with achievement testing. A widely known educational policy from this era is the Elementary and Secondary Education Act (ESEA) reauthorized in 2002 as No Child Left Behind. This policy mandated annual testing by states in both English Language Arts and mathematics for students in grades 3-8. Additionally, it demanded higher standards for proficiency and increased accountability for schools (No Child Left Behind Act, 2001). NCLB extends into the current era of Race to the Top and the reforms of the teacher and principal evaluation system (Mondale & Patton, 2001). The history of education has been impacted by reform eras where key policies have stimulated innovation.

Change has been stimulated over time in the area of mathematics education and this has been well documented. Dubbed the math wars, changes in the way mathematics was instructed began in the 1960's. Changes in the approach and emphases of mathematics education paralleled major social changes in the country (Schoenfeld, 2003). Wars, the launch of Sputnik, the arms race and the economic situation of the 1980's all impacted changes in mathematics education. Reform mathematics curriculum was rarely sustained (Schoenfeld, 2003). Understanding the factors that sustain innovation in mathematics education can contribute to the field.

What are the barriers to sustaining innovation? Barriers to sustaining innovation in schools emerge when policies do not fully account for the complexities of the people implementing the policy. Policy can impact innovation in schools. Policy can be a way to pose problems for people to solve. Policy can create guidelines and parameters, and people are needed to make decisions and to implement the policy **(**Ball, 1997). Cuban (2012) suggests that an experience gap exists between policymakers and school leaders and teachers.

> In neglecting or ignoring teachers' perspectives, policymakers, intent upon transforming how teachers teach, have a serious credibility problem in mobilizing teachers to support their reform agenda. And without teacher support for reform-driven policies, few significant changes will occur in daily lessons. (Cuban, 2012, p. 117)

Policymakers and schools need to examine levers for change that already exist rather than continue to create policy that yields confusion and chaos (Seashore, 2009). Policy decisions for all social programs need to be considered together rather than in isolation. For example, mental health issues, early childhood programs, nutrition and homelessness are social issues that are deeply connected to schools. Policies that ignore the societal context surrounding schools are destined to exacerbate rather than reduce the achievement gap (Fusarelli, 2011, Jennings, 2012). Although policy can sustain innovation, policy can also be a barrier to sustaining innovation.

Statement of the Problem

This dissertation examines the concerns of school leaders and teachers as they move through the implementation process of a new Common Core-aligned elementary mathematics program. To examine concerns, I rely on Hall, Newlove, George, Rutherford and Hord's (1991) work as they define concerns as "the composite representation of these feelings, preoccupations, thoughts and considerations about a particular issue or task" (p. 5). Concerns materialize in the mental activity composed of questioning, analyzing and re-analyzing, considering alternative actions and reactions, and anticipating consequences (Hall et. al, 1991). When an individual devotes attention to an issue or topic, some level of concern about it is present (George, Hall & Stiegelbauer, 2006). Concern does not have to mean fear or worry. Examining the concerns of

teachers and school leaders as they progress through an innovation helps identify potential areas where interventions may be needed to support the change process in schools.

The structure for large-scale innovation in this research is the Common Core State Standards (CCSS). These standards were developed for mathematics and English Language Arts in 2010 and have since been adopted by 43 states in the United States (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010). The CCSS are aimed at preparing all students for college and career readiness and were designed to create consistency in educational systems across the country. These standards represent an attempt to reduce inequality in education (Schmidt & Burroughs, 2013).

New York State has adopted the Common Core State Standards (CCSS) and renamed them the Common Core Learning Standards (CCLS). Each state was given the flexibility to personalize the standards for their state by adding up to 15% of additional material to the CCSS (Achieve, 2010). In New York State, some examples of these additions in the mathematics CCLS are found in the kindergarten standards for counting and cardinality. The addition reads, "develop an understanding of ordinal numbers to describe the relative position and magnitude of whole numbers" (New York State Common Core Learning Standards for Mathematics, 2012, p.11). In first grade, the measurement and data section saw the addition of standards related to money. The New York State reform agenda (King, 2012), calls for visionary leadership that is identified in part by the adoption and implementation of the CCLS**.** Implementation of the CCLS in a timely and consistent way has taken on a growing sense of urgency as schools prepare to meet the demands of the reform agenda. The emphasis on improving literacy and numeracy skills is being touted as the panacea for improving the educational system in the United States.

Improving and expanding Science, Technology, Engineering, and Mathematics (STEM) programs in order to prepare students for global success in the 21st century is a growing field of emphasis. One component of STEM is to develop a solid foundation of mathematics learning in the early grades. In order to develop this strong foundation, the CCLS for mathematics in New York State promotes problem solving, abstract reasoning and mathematical communication (New York State Education Department, 2012). These concepts are embedded in the six shifts in the teaching of mathematics as prescribed by the New York State Education Department and outlined in Table 1. These shifts represent the essential changes that need to be made in mathematics instruction. They are *focus*, *coherence*, *fluency*, *deep understanding*, *application* and *dual intensity* (New York State Education Department, 2012). In Table 1, the shifts are defined by describing what principals, teachers and students are doing when these shifts occur.

Table 1

Instructional Shifts in Mathematics for the Common Core.

Number	Name	What students, teachers and principals are doing
Shift 1	Focus	Teachers significantly narrow and deepen the scope of how time and energy is spent in the math classroom. They do so in order to focus deeply on only the concepts that are prioritized in the standards.
Shift 2	Coherence	Principals and teachers carefully connect the learning within and across grades so that students can build new understanding onto foundations built in previous years.
Shift 3	Fluency	Students are expected to have speed and accuracy with simple calculations; teacher structure classroom time and /or homework time for students to memorize, through repetition, core functions.
Shift 4	Deep Understanding	Students deeply understand and can operate easily within a math concept before moving on. They learn more than the trick to get the answer right. They learn the math.
Shift 5	Application	Students are expected to use math and to choose the appropriate concept for application even when they are not prompted to do so.
Shift 6	Dual Intensity	Students are practicing and understanding. There is more than a balance between these two things in the classrooms- both are occurring with intensity.

Note. Adapted from "Pedagogical shifts demanded by the Common Core State Standards," Retrieved from www.engageny.org, 2012.

Nationally, the CCSS mathematics work team included many educators, mathematicians, and Department of Education personnel from various states. The work team was chaired by Bill McCullum, mathematics professor at the University of Arizona, who along with Jason Zimba, a professor of physics and mathematics at Bennington College and Phil Daro, director of the American Mathematics Project and the New Standards Project, served as the lead writers of the CCSS for mathematics (O'Neill, 2014). This group was charged with creating mathematics standards that were fewer in number, clearer and deeper. As a result, shift number one*, focus,* encourages teachers to narrow the breadth of topics that they teach and to teach with more depth. An example of shift number one, *focus,* is the reduction in the number of standards at each grade level to promote a greater depth of understanding in a given area. In New York State, the previous mathematics curriculum had ten measurement learning targets in second grade (New York State Education Department, 2005). With the Common Core Learning Standards (CCLS), there are four standards for measurement in second grade. This shift is intended to promote deep learning of mathematics by focusing on fewer concepts.

The major emphases or prioritized topics for deep understanding create a strong foundation of skill and knowledge. *Coherence*, *fluency* and *deep understanding* operationalize within a classroom as connections within and among grade levels, speed and accuracy of calculations, as well as mastery of a topic before moving on. Shift five, *application,* includes utilizing mathematical processes in relevant and everyday problems. This shift is evident when students learn about fractions and then are asked to apply that knowledge in a range of different problems relating to time. *Dual intensity* refers to the process of practice combined with deep understanding (New York State Education Department, 2012). These shifts are rigorous and

comprehensive and they represent a significant change in the approach to teaching mathematics in schools.

As a result of the curricular and instructional shifts in the Common Core, local schools are making decisions to adopt new curriculum to ensure that students are able to meet these rigorous standards. One of the challenges presented by the adoption of a new and more rigorous curriculum is that teachers and students struggle with the pacing, level of difficulty and prior knowledge needed to succeed. The concerns that teachers and leaders in schools have when trying to problem solve around these significant barriers to student learning are central to this study.

Both school leaders and teachers have concerns when implementing a change (Hord & Loucks, 1980). A Wallace Foundation perspective paper about preparing school leaders for the future, notes that the concerns of school leaders are often ignored and most professional development focuses on teacher practice (Mitgang, 2008). In the effort to reform schools, the effort must be made to redesign principal preparation programs. School principals have many concerns related to their own leadership as they plan and lead reform efforts in their schools. As a result, more effective principal preparation programs are needed (Mitgang, 2008). Focusing on principals and change agentry, Rutherford, Hord and Thurber (1984) claim, that the skills that school leaders need to use to support and manage the change process are new skills, and as they are increasingly called upon to use these skills, they have new concerns.

Context of the Study

In this section, I situate this study within the broader New York State Education Department's reform agenda and then I describe the Plymouth Central School District in

Plymouth, New York where the research takes place. Finally, I outline my role in the district as it relates to the study.

New York State reform agenda. In New York State, the Board of Regents has identified and prescribed the following four reform agenda items to stimulate innovation: adopting the Common Core Learning Standards (CCLS) with aligned curriculum and assessments; building instructional data systems that can measure student learning and inform practice; recruiting, retaining and developing effective teachers and leaders; and turning around the lowest performing schools (New York State Education Department, 2012). The goals are synonymous with the federal *Race to the Top* goals and these efforts are aimed at closing the achievement gap and promoting college and career readiness for all children (Race to the Top Act, 2011). A discussion of the first and third reform agenda items is relevant to this study.

Adopting common core learning standards with aligned curriculum and assessments. Forty-three states, the District of Columbia and four territories have adopted the CCSS (Achieve, 2013). Having common learning standards across states is unprecedented. The potential for states to collaborate to design curriculum and assessments now exists. One of the goals of having a common set of standards is equity in educational opportunity across the country (Youngs, 2013). The New York State reform agenda is focused on developing students who are college and career ready. According to *Achieve*, the organization that led the development of the Common Core State Standards (CCSS), being college and career ready means that a high school graduate is prepared to for entry level success in post secondary education or for job training for a chosen career (Achieve, 2013). The ultimate translation of the term *college and career ready* is that upon leaving high school, a student is prepared for a productive life.

Curriculum refers to the means and materials with which students will interact for the purpose of achieving identified educational outcomes (Ebert, Ebert, & Bentley, 2013). An article from the Brookings Institute (2009) claims that historically, policy makers have avoided the development of curricular policy because it was believed that curricular decisions should be reserved for the state and local districts (Whitehurst, 2009). Whitehurst (2009) continues to say that many policy makers are not curriculum experts and therefore establishing policy related to curricula has been rare. The Institute of Education Sciences conducted a comparative effectiveness study of four elementary mathematics programs (Agodini, Harris, Thomas, Murphy & Gallagher, 2010). First grade students in 39 schools were pre-tested and post-tested to determine increases in learning with one of the four programs. The results showed that *Math Expressions* and *Saxon Math* had the highest student growth. Specifically, student's percentile rank was found to be 9 to 12 points higher at the end of the school year after being taught using the more effective curricula (Whitehurst, 2009). According to Whitehurst (2009), the implementation of new curricula can lead to increased student learning. These data validate the efforts of local school districts to adopt effective curricula aligned to the CCLS as a means to increase student learning. Policy is a method that is used to stimulate change in school and curriculum as one of those policy levers is proven to be effective.

In 2011, New York State launched partnerships with *Expeditionary Learning*, *Core Knowledge* and *Common Core Inc*. to develop curricular materials in both English Language Arts and mathematics that could be adopted, adapted, or ignored by local districts. Although not mandated for districts, this level of detail of curriculum guidance put forth by the state has not been seen before (New York State Education Department, 2012). School leaders and teachers are charged with implementing curriculum aligned to the CCLS. English Language Arts and

mathematics curriculum modules offer educators specific lessons, units and assessments to guide them in shifting their practice (New York State Education Department, 2012) These curriculum resources have the potential to be change levers in schools.

Recruiting, retaining and developing effective teachers and leaders. Reforming teacher and principal evaluation processes and procedures is a requirement for states and local districts in order to receive federal funding from the *Race to the Top* program (Race to the Top Act, 2011). The rhetoric of failing schools, led by failing principals and teachers is fodder for the public demand to reform teacher and principal evaluation systems (Ravitch, 2013). In 2012, the New York State legislature passed Education Law 3012-c, annual professional performance review of classroom teachers and building principals. This law established guidelines for how teachers and principals would be evaluated across the state (Annual Professional Performance Review of Classroom Teachers and Building Principals Law, 2011).

The evaluation practices that resulted from New York State Education Law 3012-c include teachers and school leaders receiving a score out of 100 points with a rating of ineffective, developing, effective or highly effective. Using a combination of student achievement and observations of practice arrives at this final score and subsequent rating. The new Annual Professional Performance Review (APPR) process has resulted in innovations in schools with both positive and negative results. For example, utilizing a combination of quality classroom observations and student performance data to evaluate teachers resulted in improved performance during the evaluation time and beyond for mid-career teachers (Taylor & Tyler, 2012). Even though Hattie's (1992) perspective is two decades old, his words still apply to today's APPR in that an evaluation system that provides an increased level of high quality instructional feedback will increase the probability of improved performance (Hattie, 1992).

Using multiple measures of data to evaluate teachers including formative classroom observations along with summative student learning results provides a wider lens from which to judge quality and determine professional development needs (Namaghi, 2010).

The negative consequences of the APPR process include unwillingness for teachers to teach children with difficult behaviors or learning disabilities; a deterioration in collaboration between the teachers and an increase in teachers' stress levels (Baker et al., 2010). In addition to its impact on teachers and instruction, we also see a narrowing of the curriculum and a compulsion to teach to the test (Abbott, 2013). The long-term results of these changes in teacher and principal evaluation are yet unknown, as is the case with many school reform efforts that begin with policy without a clear vision and consideration of the perspectives of the people (Ball, 1997).

Determining the priorities of the reform agenda policies by examining what is best for students is the primary responsibility of school leaders. Once policy priorities are determined, the school leaders must create a plan, develop a strategy and tactics and take action toward implementing innovations (Rutherford et al., 1984). Thus, effective school innovation involves a combination of policy and people.

When we consider school improvement efforts where significant changes are implemented, the purpose of this study emerges. We need to learn about the concerns of school leaders and teachers in an environment of new learning standards and a climate of increased accountability. These data will provide insight on how people solve problems that have been stimulated by policy (Ball, 1997; Cuban, 2012; Seashore, 2009).

Plymouth Central School District. The Plymouth Central School District (PCSD) is a small city school district with approximately 4,500 students and a high needs-to-resources wealth ratio. Free and reduced price lunch students make up 45% of all students in grades K-5. The district has five elementary schools that house students in kindergarten through sixth grade, one junior high school for students in grades seven and eight and a high school for students in grades 9-12. Demographically, 83% of the students are White, 10% of the students are Black or African-American, 3% Hispanic or Latino, 3% Multiracial, and 1% Asian. Approximately 11% are students who are identified with a learning disability (Plymouth Central School District, 2012). [1]

Focus district. The district was identified as a *Focus District* by the New York State Education Department in September of 2012 as a result of the low achievement of students with disabilities and students who are economically disadvantaged. The subgroups were judged on a combined metric of grades 3-8 English Language Arts and mathematics performance for two consecutive years. Additional data that contributed to the *Focus District* designation was Comprehensive English Language Arts Regents Examination performance, Integrated Algebra Regents Examination performance and graduation rate. These data indicated that the district was in the bottom 5% of all districts in the state. This *Focus District* accountability designation is in effect for three school years (New York State Education Department, 2012). As a result of this designation, the district is working to improve by implementing several innovations at the elementary level. Among these innovations are a new student management system, improved

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[1] Plymouth is a pseudonym for the district and inquiries about the real district should be directed to the author at lgeorge7@twcny.rr.com.

inclusive practices, a new English Language Arts curriculum for students in grades three through five and a new mathematics curriculum for students in kindergarten through grade five as well as revised practices and processes for Response to Intervention (RtI).

District initiatives. *Schooltool*, the new student management system for PCSD, was introduced and all teachers received three hours of training on how to use *Schooltool* on the first day of school in September 2013. The student management system is a web based software system where teachers can look up data on each student that they teach including family and parent information, school picture, assessment results and prior discipline incidents. Teachers are required to use the software to take attendance, complete report cards, communicate with parents and report student discipline. School leaders have had to change the way they create schedules, monitor student attendance and academic progress and communicate with parents.

The implementation of a co-teaching model at the elementary level began in 2013 and the district was able to fully include students with disabilities in general education with the only exception being those students that qualify for the New York State Alternate Assessment (NYSAA). This work has been emotionally laden, as well as systemically stressful. The co-teaching instructional delivery model has generated additional concern for teachers and leaders. For example, school leaders were charged with developing inclusive schedules that minimized transitions and included co-planning time for teachers. Teachers have been involved in opening up their classrooms to peers and coaches and many have had to reform their practices to make this initiative work. The co-teaching delivery model provides for collaboration on curriculum implementation in both English Language Arts and mathematics. All of the district initiatives impact the concerns of teachers and school leaders.

Implementation of a new elementary mathematics program was another district initiative. The Plymouth Central School District was in need of a new mathematics program that was aligned with the CCLS and that would promote consistency across all classrooms in the district. Additional criteria in selecting the program were the student resources, suggested strategies for differentiating instruction, common assessments and diagnostic and screening tools. Because the *Everyday Mathematics* program is not well aligned with the new CCLS, the district was poised to adopt a new program. In an effort to adopt a curriculum aligned to the CCLS, a committee of teachers, parents and administrators met to select a program for the district. The district had been using the *Everyday Mathematics* program to teach mathematics for four years. *Everyday Mathematics* did not have a high level of use in the district as a result of teachers' concerns, comfort level, skill and expertise with teaching mathematics conceptually. For example, many teachers learned mathematics using standard algorithms that value memorization of facts for fluency. The conceptual approach in *Everyday Mathematics* values number sense and grouping numbers for fluency. The spiral nature of the *Everyday Mathematics* program made teachers feel uncomfortable because they were moving on without students mastering the skill or concept being taught.

The first administration of New York State Testing Program (NYSTP) assessments aligned to the CCLS was during the 2012-13 school year. These assessments were designed to be rigorous and the goal was to create a new baseline that would provide a marker for future growth. The 2013 NYSTP mathematics assessment scores for the Plymouth Central School District are presented in Table 2. The state education department defines proficiency as achieving a level 3 or a level 4 with level 4 being the highest possible level. These data represent a drop in performance at every grade level ranging from 28% to 48%.

Table 2

PCSD Mathematics Performance 2012-13

Grade	Percent Proficient
3	25 %
4	33 %
5	22 %
6	25 %

Note. PCSD= Plymouth Central School District; *Proficient*= scores at Level 3 or Level 4
Plymouth Central School District, 2013.

Additional district initiatives included the implementation of the CCLS in English Language Arts, year two of the revised teacher and principal evaluation system and the ongoing effort to integrate technology into instructional practice. The culture in the district was saturated with innovation.

Assistant Superintendent for Curriculum and Instruction. I have been the Assistant Superintendent for Curriculum and Instruction in the district for four years. My role is to provide leadership for all educational programming in the areas of curriculum and instruction. My involvement in the adoption of the new elementary mathematics curriculum began with the creation of a small leadership team to preview several mathematics programs. This team included the PCSD's Director of Curriculum, Director of Instruction, an elementary mathematics academic intervention services provider, a middle school mathematics teacher, a high school mathematics teacher and a member of the Board of Education. I did not participate in these review sessions. This team previewed four programs: Pearson's *Digits*, the NYSED CCLS *Mathematics Curriculum Modules*, *My Math* published by McGraw-Hill, and *Primary Mathematics* published by Singapore Math. After reviewing the four programs, the committee selected three to present to a larger teacher committee for the purpose of a closer review and eventual selection of one program. The larger teacher committee consisted of grade level

representatives from grades K-5 from each of the five elementary schools in the district, two special education teachers, two mathematics academic intervention service teachers as well as two parents and two school leaders. The opening session for this large review team offered an opportunity to process the past and current state of mathematics curriculum and instruction in the district. This was followed by an overview of the mathematics curriculum review process and the committee was provided with clarity about their charge. By the end of May 2013, the committee made the consensus decision to select the *My Math* program because it was most closely aligned with the CCLS. The rich and colorful resources for teachers and students, the aligned manipulative kits, the on-line resources and assessments, the strategies for differentiation and response to intervention were among the factors contributing to the selection. On June 11, 2013, the Plymouth Central School District Board of Education approved the recommendation to adopt the *My Math* program K-5. *My Math* is a mathematics program for grades K-5. Teachers in grade 6 are utilizing the middle level companion program entitled *Glencoe Mathematics*.

Implementing a new curriculum in a time of increased scrutiny potentially brings about increased concern and attention. This study conducts an examination of the concerns of leaders and teachers when implementing a new elementary mathematics program. Conducting concerns-based research in this context will enrich the field.

Research Questions

Investigating the concerns that school leaders and teachers have while implementing a CCLS-aligned mathematics curriculum is at the heart of this study. Identifying the predominance of thought relative to *My Math* implementation will shed light on the process of change in schools. Examining these data using the Stages of Concern and the Change Facilitator's Stages

of Concern will contribute to an increased understanding of the ways that teachers and school leaders approach innovation. These data will be considered at the beginning, middle and end of the initial year of implementation. Furthermore, identifying the supports employed by change facilitator's and the connection to teachers expressed concerns. The specific research questions that will be employed to collect this data are:

1.What concerns do teachers and school leaders exhibit during the implementation of the *My Math* innovation?

1a. As reported by the Change Facilitator Stages of Concern (CFSoCQ), focus groups and interviews, what concerns do school leaders exhibit during the *My Math* implementation process?

1b. As reported by the Stages of Concern Questionnaire (SoCQ) and focus groups, what concerns do teachers exhibit during the *My Math* implementation process?

2. What actions or perceptions of support do school leaders and teachers report in the facilitation of the *My Math* program?

2a.What actions or perceptions of support do school leaders report they are taking in the facilitation of the *My Math* implementation process?

2b.What actions or perceptions of support do teachers report that school leaders are taking in the facilitation of the *My Math* implementation process?

Through these questions, I examine the specific concerns that teachers and school leaders have and any potential actions that are connected to their concerns. Identifying the perceived supports that school leaders provide to teachers will help to align the school leaders'

interventions to the identified teacher concerns during all phases of implementation. Interventions can be defined as the variety of possible actions that serve to minimize or eradicate teachers concerns so that they can proceed with innovation implementation (Rutherford et al., 1984). This alignment or misalignment will provide critical information to support future innovation implementation in the district.

Significance of the Study

This study is significant because it identifies the concerns of teachers and school leaders as they move through the first year of the *My Math* program implementation. This study is situated in the larger context of educational reform including new standards, new evaluation systems for teachers and principals and increased accountability for results. The research base on school leaders as change facilitators is limited to two case studies in elementary schools that analyzed principals' change management style (Anderson, 1997). This study adds value to the field through the simultaneous use of the two Concerns-Based Adoption Model (CBAM) questionnaire tools. This study advances collective knowledge by providing data about the actions and perceived supports offered by school leaders to alleviate teachers' concerns when implementing a school wide change.

There are three reasons why this research is significant and adds value to the field. First, analyzing the Stages of Concern of school leaders and teachers simultaneously contributes to the ongoing efforts to provide sustained and targeted professional development. No studies exist that have utilized both the CFSoCQ and the SoCQ in the same study. By examining the concerns that school leaders and teachers have, a targeted design for organizational support can be built. Second, this study is significant because there are few studies that have examined the

implementation of a key component of the *Race to the Top* Program. Third, an analysis of the implementation process of a CCLS mathematics curriculum provides valuable data to policy makers and school leaders. Utilizing a mixed methods approach creates an opportunity to explore the concerns of school leaders and teachers through both anonymous survey items and focus groups that are more public. This methodology increases the validity of the data. Given the current environment of national and state attention on education, new accountability and evaluation systems have increased the concerns of teachers and school leaders. Examining these concerns within the current culture and climate adds value to the voluminous research base on change in schools.

Limitations of the Study

A limitation of this study is that the participants are all employees of one small city school district in Central New York. Although each school is unique, the fact that they are all part of the same system may be limiting because the results cannot be generalized. The lead researcher is an employee of the district central office staff and this relationship to the teachers and the school leaders has the potential to complicate the data collection process. As a result, the lead researcher did not directly supervise or evaluate any of the teacher or the school leader participants; the lead researcher was involved in supporting the school leaders and teachers with resources, feedback and professional development.

The current state of the district includes numerous school reforms and innovations. This may make the data analysis challenging to identify the specific concerns relative to the *My Math* innovation. Without careful focus group questions and interview probes designed to distinguish

concerns, this may be a limitation. These limitations are further detailed in Chapter Three along with adjustments in the research design that help to mitigate these potential challenges.

Terms

- ***Annual Professional Performance Review*** *(APPR)-(NYS Education Law 3012-c)* Teacher and principal evaluation system in New York State where each teacher and principal receives a numerical score from 0 to 100 along with a rating of ineffective, developing, effective or highly effective.
- ***Change Facilitator Stages of Concern*** (CFSoC) A series of phases for categorizing change facilitators concerns
- ***College and Career Readiness-As defined by Achieve-***college and career readiness means that a high school graduate has the knowledge and skills in English and mathematics necessary to qualify for and succeed in entry-level, credit-bearing postsecondary coursework without the need for remediation or put another way, a high school graduate has the English and mathematics knowledge and skills needed to qualify for and succeed in the postsecondary job training and/or education necessary for their chosen career.
- ***Common Core State Standards*** (CCSS)- Set of national standards for both English Language Arts and mathematics that 45 states have agreed to adopt.
- ***Common Core Learning Standards*** (CCLS)-New York State's version of the Common Core State Standards
- ***Concern-***The composite representation of feelings, preoccupations, thoughts and considerations about a particular issue or task (Hall, 1977)
- ***English Language Arts*** *(ELA)*- Reading, writing, listening and speaking instruction

- ***My Math***- The McGraw-Hill Mathematics program that the Plymouth Central School District is implementing beginning in the 2013-14 school year; also known as the innovation.
- ***No Child Left Behind*** *(NCLB)*- The federal legislation that reauthorized the Elementary and Secondary Education Act with requirements for annual testing in reading and mathematics in grades 3-8.
- ***New York State Reform Agenda-*** NYSED Commissioner John King's plan to improve New York state schools. It includes implementation of the CCLS, creating world-class teachers and leaders, developing instructional data systems, turning around the lowest performing schools.
- ***Plymouth Central School District-*** *(PCSD)*- Location of the study
- ***Response to Intervention*** *(RtI)*- This is a tiered approach to instruction where students are given different interventions if they are not showing growth from core instruction.
- ***School leader***- Elementary school principal (K-6 building)
- ***Stages of Concern*** (SoC) A series of phases for categorizing teachers concerns.

Organization of the Dissertation

The second chapter of this dissertation begins with a review of the literature based on change theory. A review of the literature on school leaders as change agents follows with an examination of the numerous studies that have been done using the CBAM in schools. Specifically, an examination of the mixed methods studies that utilized the SoCQ is presented. Finally, the research on curriculum implementation and reform mathematics is reviewed. The

chapter concludes by positioning the CCSS in the United States, in New York State and in the Plymouth Central School District.

Chapter Three details the methodology of the research design. The survey instruments are described in detail. The demographics of the participants are summarized. The focus group structure and semi-structured interview methods are outlined. Finally, the procedures and the analysis process are described for the quantitative survey data and for the qualitative open-ended items, focus group and interview data.

Chapter Four describes the results from the both the qualitative and quantitative data. This chapter also connects the data collected to the research questions. Chapter Five discusses these data, the implications for practice, and suggestions for future research.

Summary

Examining the concerns of both teachers and school leaders at different stages throughout the initial year of innovation implementation help to illuminate the complex construct that is change in schools. Rutherford et al. (1984) argue, “an important dimension of all leadership is the ability to take a reading of the constituency to determine where it is and then to facilitate its movement toward appropriate goals” (p. 44). There have been numerous research studies that have contributed to the knowledge base on the change process in schools. This study is significant because it examines the specific interventions of school leaders that support teachers as they move through a change. Examining the interventions that school leaders use to facilitate an innovation can serve to inform leadership efforts in future reform.

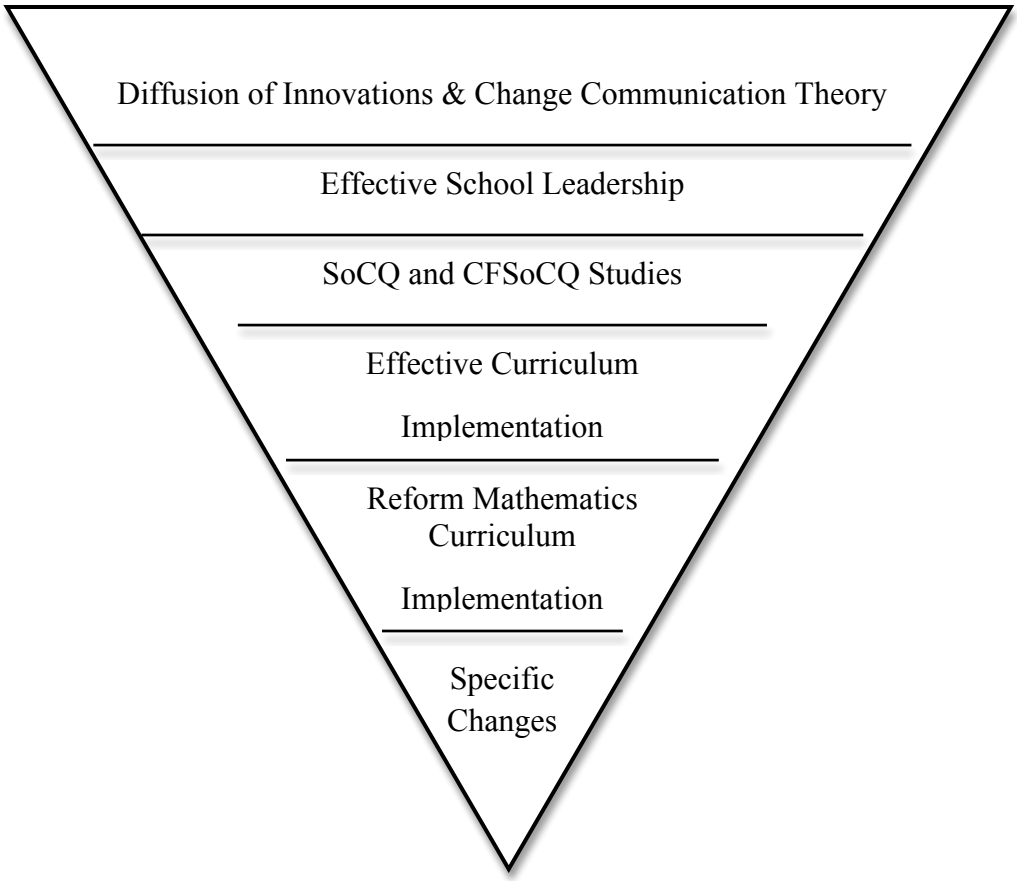
Chapter Two

Literature Review

This review begins with a discussion of change theory. The *Diffusion of Innovations Model* (Rogers, 2003) and the *Change Communication Model* (Ellsworth, 2000) are two prominent theories in the literature on change. A summary of the literature on change facilitators, measuring change using the Concerns-Based Adoption Model (CBAM), and the specific changes that happen in schools follows. I position the research by describing the Common Core State Standards (CCSS) as the change in the nation, the Common Core Learning Standards (CCLS) as the change in New York State and the *My Math* program as the change in the Plymouth Central School District in Plymouth, New York.

This study examines the concerns of teachers and school leaders as they engage with a new curricular innovation, the *My Math* program. As detailed in Figure 1, this review of literature supports the study through an examination of the broader change literature, an examination of the traits of effective change agents, and a review of the literature that have utilized the SoCQ or the CFSoCQ. The literature on effective curriculum implementation including specific examples of reform mathematics program implementation is summarized. We begin with literature surrounding change theory.

Figure 1- Literature Review Organizer



Change Theory

Diffusion of Innovations model. The *Diffusion of Innovations Model* (Rogers, 2003) is a seminal work in the literature on change. This model suggests that specific characteristics of an innovation affect the rate of adoption. Rogers defines the diffusion of innovations as "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among members of a social system" (Rogers, 2003, p. 11). This process is complex and dynamic and a thorough understanding of the model can support any change effort.

Innovations are ideas or practices that are perceived as new by individuals (Rogers, 2003). Analyzing the five characteristics of an innovation contribute to an explanation of the rate of adoption or diffusion of a change throughout a system. These five elements are *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability*. The attribute of *relative advantage* is present if a user believes that the innovation is an improvement or an advantage over the prior state. If relative advantage is low, diffusion will be slow. Cultivating *relative advantage* necessitates a keen diagnosis of stakeholder beliefs and needs. *Compatibility* describes the alignment of the innovation with the adopter's values and needs. If the innovation is compatible with the users current belief systems, the rate of diffusion increases. Rogers (2003) claims that *complexity* of an innovation references change that is difficult to understand and requires new skills. When *complexity* is high, it may take longer to adopt and diffuse the innovation. The characteristic of *trialability* suggests that if a user can try out or pilot an innovation for some time before full implementation, diffusion will occur more quickly. Finally, *observability* is high when others can easily see the results of the innovation. This promotes collegiality and increases diffusion of the innovation (Rogers, 2003). The presence of all of these attributes contributes to an increased rate of diffusion and subsequent adoption of an innovation.

The second component in the *Diffusion of Innovations Model* is communication channels. This involves the means for communication about the innovation from one individual to another. The power of social structures in this change model is compelling. Rogers (2003) references the idea of the "near peer" (p. 19) as central to innovation diffusion. When individuals see others like themselves implementing a change, they have a model and a peer to support their own adoption. Communication channels can be mass media or technology based or they can be individual interpersonal conversations.

Time as the third component in the model is related to the innovation diffusion process. As individuals are making decisions about adopting the innovation, they move through this decision making process in a time ordered sequence. Knowledge, persuasion, decision, implementation and confirmation are the five decision steps in the process. Clearly, the time factor is individualized to the adopter, however the social support that occurs during the persuasion step can be a key factor in speeding up the innovation-decision process. The only exception to this is if the innovation is a mandate. When the innovation is required to be adopted by all users, the persuasion step has a diminished role in the process.

The last component that Rogers (2003) discusses is the social system. The norms or established behavior patterns of the members is one example of the structure among members in a social system that impacts innovation diffusion. The change agent is part of the social system and he attempts to influence others to adopt the innovation. The change agent is charged with facilitating the change that has been determined to be beneficial to the entire system.

Although change agents are in a difficult position between the agency and the client, effective change agents proceed through a sequence of seven roles (Rogers, 2003). The first of these roles begins with the developing the need for change. This role focuses on increasing relative advantage of the innovation for the users. Establishing an information exchange relationship is the second role of effective change agents. This role includes developing a positive and credible rapport with clients by listening and empathizing with their concerns. To diagnose problems and create intent to change in the client are the next two roles in the sequence. These roles include examining why the status quo is not meeting client needs, selecting an innovation and motivating client's interest in the change. To translate intent into action is the fifth role of a change agent. The sixth role is to stabilize adoption and prevent discontinuance.

The last role is to achieve a relationship where users are autonomous change agents (Rogers, 2003). Several studies detail the role of the change agent along with other factors that support innovation diffusion.

Diffusion of innovations studies found that a strong change agent is critical. Specifically, the ability of a change agent to build a sense of user ownership improved diffusion efforts (Smith, 2012). In a study by Frank, Zhao and Borman (2004) focused on the implementation of computer technology in schools, the authors suggest that change agents should pay attention to social capital and teachers' job conditions. Utilizing existing social networks, collaborative structures and peer relationships to cultivate and facilitate an innovation is an intervention that change agents could employ to increase diffusion. Change agents should consider teachers' job conditions including class size, available resources when planning for support or intervention. Considering social networks and job conditions that may impact innovation decisions will increase innovation diffusion (Frank et al., 2004).

In a study of 36 Title I elementary schools, Adams and Jean-Marie (2011) used a mixed methods design to study a leadership diffusion effort based on Roger's theory. They began with the premise that change can occur if leadership is diffused across stakeholder groups. Sharing leadership helps to build capacity and efficacy. The findings from this study showed that sharing leadership and developing a collective responsibility for the reform were effective ways of supporting innovation diffusion (Adams & Jean-Marie, 2011). Effective and varied communication, time and social networks are all factors that support innovation diffusion in various contexts.

Change Communication Model. We now turn to a second foundational model in the research on change. The *Change Communication Model* as conceived by Ellsworth (2000) is a meta-model. Meta-models combine several different models into one larger model. The *Change Communication Model* offers a broad framework for understanding the change process in schools. This model supports the *Diffusion of Innovations Model* in that it includes the change agent and the social system or environment around the innovation. Like the *Diffusion of Innovations Model,* the *Change Communication Model* emphasizes the importance of communication channels. Unlike the *Diffusion of Innovations Model*, the *Change Communication Model* explicitly discusses resistance to the innovation.

The *Change Communication Model* pictured in Figure 2, shows that the change agent sends a message to the intended adopter via a specific medium with a variety of interferences attempting to block or redirect the message. This is why communication regarding a change needs to happen over and over again before the message is heard with clarity. Effective communication systems must differentiate the message of change depending on the stakeholders and what is known about each group that is receiving the message (Ellsworth, 2000). The *Change Communication Model* was developed when Ellsworth (2000) blended the change environment (Ely, 1990), change agents (Fullan & Stiegelbauer, 1991), change process (Havelock & Zlotolow, 1995), resistance to change (Zaltman & Duncan, 1977), and innovation and the intended adopter (Hall & Hord, 1987). This combination provides a comprehensive model for analyzing the change process. Each component of this meta-model is described in the following paragraphs.

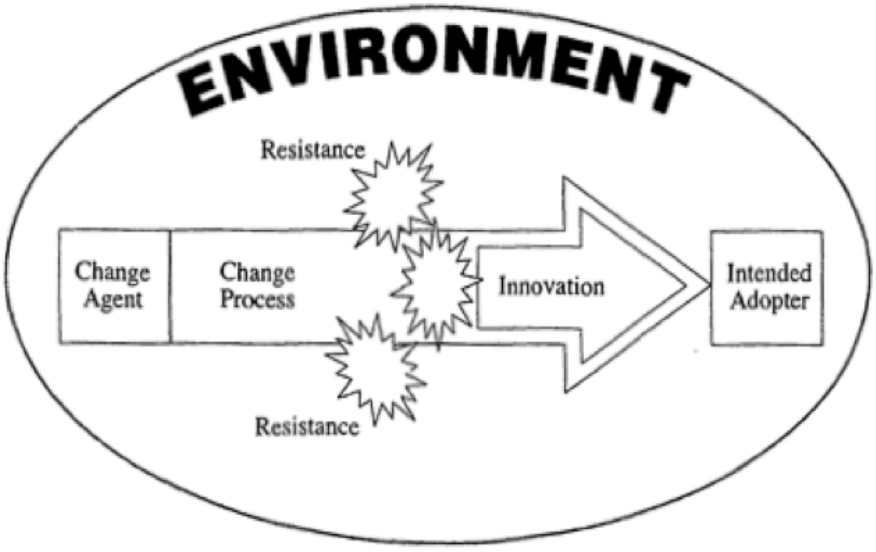


Figure 2- Change Communication Model. Adapted from "Surviving change: a survey of educational change models," by J.B. Ellsworth, 2000, ERIC Clearinghouse on Information and Technology, p. 27.

Change environment. The *Change Environment Model* (Ely, 1990) surrounds the other components of the *Change Communication Model* as shown in Figure 2. These eight components of the change environment have similarities to Roger's (2003) work. Relative advantage is akin to the condition of dissatisfaction with the status quo. Complexity is similar to knowledge and skills exist. The eight conditions of Ely's (1990) change environment are described next in Table 3. The environment or the culture in a school is directly related to the characteristics of an innovation and both impact the implementation process.

Table 3

Eight Conditions of Change Environment

Conditions	Explanation
Dissatisfaction with the status quo	There has to be a better way
Knowledge and skills exist	I can do this or I can learn quickly
Resources are available	I have everything I need to make it work
Time is available	I have time to figure this out, and to adapt my other
Dissatisfaction with the status quo	There has to be a better way
Rewards or incentives exist for participation	I'm going to get something out of this too
Participation is expected and encouraged	This is important and faculty leaders support it
Commitment by those who are involved	Administrators and faculty leaders support it
Leadership is evident	I know who to turn to for encouragement

Note. Adapted from The Change Environment by Ely, 1990, as cited in "Surviving Change: A Survey of Educational Change Models," by Ellsworth, 2000, p. 76.

Change agent. In Figure 2, beginning at the far left, is the change agent. Change agents can be any number of stakeholders in a school community. Fullan and Stieglebauer (1991) identify eight change agents in a school: teachers, principals, students, district administrators, consultants, and the community including the parents, government entities and professional development of teachers. All of these potential change agents can be the driving force in facilitating the implementation of an innovation, however, teachers and school leaders have the lead role in most systemic school reform efforts.

Change process. Continuing to the left in Figure 2, the next component in the *Change Communication Model* (Ellsworth, 2000) is the change process. Havelock and Zlotolow (1995) offer seven stages for planning change and they use an acronym, CREATER to explain their process.

Stage 0: Care - Develop an understanding of the concerns to be addressed.

Stage 1: Relate - Build relationships with all key players and identify barriers.

Stage 2: Examine - Define the problem clearly and develop objectives.

Stage 3: Acquire - Search and find relevant resources.

Stage 4: Try - Find what appears to be the best solution and test the possibility.

Stage 5: Extend - Diffuse the change throughout the system.

Stage 6: Renew - Stabilize and build capacity for continuing the innovation on its own (Havelock & Zlotolow, 1995, as cited in Ellsworth, 2000, p. 113).

Resistance. Figure 2 identifies resistance as the next part of the *Change Communication Model* (Ellsworth, 2000). In *Strategies for Planned Change*, Zaltman and Duncan (1977) identify barriers that may cause resistance to change. These barriers fall into four categories: cultural, social, organizational and psychological. Cultural refers to the traditions and values that are in conflict with the innovation; social refers to group psychology inhibiting change; organizational barriers include threats to power and structure; and psychological barriers are related to an individual's traits and reactions that discourage adoption. Change is multi-faceted and the resistors to change are varied and complex. These resistors slow the diffusion of innovations.

Innovation and the intended adopter. Innovation and the intended adopter are the final components in Figure 2. The *Change Communication Model* (Ellsworth, 2000) uses the work of Hall and Hord (1987) and their Concerns-Based Adoption Model (CBAM) to explain this part of the model. The CBAM is at the heart of this research, and it is described in detail later in the chapter.

The *Change Communication Model* (Ellsworth, 2000) was central to the mixed methods study conducted by Rutschke (2010). Several of Rutschke's (2010) findings should be attended

to by a school or district including: provide training for key staff from the vendor, involve many stakeholders in making the decision to adopt the innovation, provide an opportunity for people to see the change in action, be sure the innovation is appropriate to the needs of the district, monitor user buy-in and confidence and plan professional development accordingly, provide users with time, resources and training and clear leadership around the innovation. Using the *Change Communication Model* as a framework, the findings and recommendations from this study indicate that communicating the change often and in a variety of ways reduces resistance and increases support for adoption of the change. Examining the presence or absence of these findings in the *My Math* implementation process will help to explain the rate and degree of the diffusion of the innovation.

Both the *Diffusion of Innovations Model* (Rogers, 2003) and the *Change Communication Model* (Ellsworth, 2000) support this study by providing conceptual lenses from which to analyze the data, discuss the findings, develop conclusions and discuss implications for further research.

Change Facilitators

Change facilitators are the people who are central to leading the implementation of an innovation but external to the front line use of the innovation. Traditionally, teachers have been the recipients of change and charged with implementing the change but are rarely the facilitators of change. When Hall et al. (1991) developed the Manual for the Use of the CFSoCQ, they defined the generic role of change facilitator as "the diverse set of persons, within and outside of an organization, who have the formal or informal role to aide those involved in learning to use innovations" (p. iii). Although change facilitators tend to be the more formal role of the school

leader, the power of teacher leadership in any reform effort is vital. Many teachers are professionals who do not see themselves as leading the change in their schools when in fact they are and can be central to leading change (Helterbran, 2010). Both teachers and school leaders are key to the change management process. The school leaders are the liaison between the agency that is mandating the change and teachers are the conduit between the school leaders and the students: "The principal is the lynchpin in creating and supporting a school climate in which teacher leadership can flourish" (Helterbran, 2010). The change process in schools is multi-leveled and school leaders and teachers both play significant roles in diffusing an innovation. For the purposes of focusing this literature review, school leaders are considered to be the change facilitators.

In this section, I review the literature base on the skills and dispositions of effective school leaders. Relative to research question number one, I discuss the sparse literature on the concerns of school leaders. In support of research question number two, I review the research relative to the interventions provided by school leaders during the innovation implementation process.

Many different researchers have attempted to study and define instructional leadership, yet a shared definition remains elusive and evolving. The most widely understood definition of instructional leadership is the opposite of managerial leadership because it focuses on teaching and learning in a school. Cuban (1988, as cited in Hallinger & Lee, 2013) claimed “there is a DNA in the principalship that presses occupants towards the political and managerial roles, away from the instructional role” (p. 307). Learning centered leadership is the term that Goldring, Porter, Murphy, Elliot and Cravens (2009) gave to the combination of instructional leadership and transformational leadership. Learning centered leadership is the essence of the current

standards for school leaders or the Interstate School Leaders Licensure Consortium (Interstate School Leaders Licensure Consortium, 2009). Specific examples of these standards include (1) a school administrator is an educational leader who promotes the success of all students by facilitating the development, articulation, implementation, and stewardship of a vision of learning that is shared and supported by the school community and (2) A school administrator is an educational leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional program conducive to student learning and staff professional growth (2009). These standards are widely used across the country for principal evaluation. Instructional leadership must represent a process of leveraging curriculum and instruction to close the achievement gap. For the purposes of this review, the terms leadership for second order change, instructional leadership, and learning centered leadership will be used interchangeably. All terms represent change that is urgent, dramatic and revolutionary.

Skills and dispositions of effective school leaders. The impact of a school leader is second only to the impact of a teacher when examining the factors that affect student learning and achievement in schools. Leadership influences student learning and school leaders make a difference in student achievement; and further they make a difference in struggling or failing schools where students and teachers are most in need (Leithwood, 2004; Marzano, Waters, McNulty, 2005). Leadership matters.

The literature on effective school leadership is extensive. The most comprehensive and most recent works include two meta-analyses. Each meta-analysis generated a list of leadership traits that were found to be pervasive across the literature. The work of Marzano et al. (2005) reviewed 69 studies while Leithwood and Sun (2012) reviewed 79 unpublished studies. This synthesis of unpublished research results is accomplished by a systematic series of meta-

correlations. Including unpublished studies has been supported widely by meta-analysts (Cook, 1993). I acknowledge that these are unpublished studies and I am relying on them based on their broader use.

Marzano et al. (2005) identified 21 attributes of school leaders that are most effective in facilitating school reform with seven being associated with leadership for second order change. Their analysis focused on the concept of second order change that they defined as "…anything but incremental. It involves dramatic departures from the expected, both in defining a given problem and in finding a solution" (Marzano et al., 2005, p. 66). The seven leadership actions and responsibilities of effective school leaders in order of importance based on the impact that they had in each of the studies reviewed are listed in Table 4.

Table 4

Leadership Team Responsibilities and Actions Important to Second-Order Change.

1. Knowledge of Curriculum, Instruction and Assessment
2. Optimizer
3. Intellectual Stimulation
4. Change Agent
5. Monitoring/Evaluating
6. Flexibility
7. Ideals/Beliefs

Note. Adapted from "School leadership that works: from research to results," by R.J. Marzano, T.Waters, B.A. McNulty, 2005, p. 70.

Leithwood and Sun (2012) organized their findings into five main categories of setting direction, developing people, redesigning the organization, improving the instructional program and related practices. They further identified 11 specific leadership traits within these categories as being essential to effective leadership in schools as listed in Table 5.

Table 5

Leadership Traits

Setting Direction
1. Develop a shared vision and building goal consensus
2. Hold high performance expectations
Developing People
3. Provide individualized support
4. Provide intellectual stimulation
5. Model valued behaviors, beliefs and values
Redesigning the Organization
6. Strengthening school culture
7. Building structures to enable collaboration
8. Engaging parents and the wider community
Improving the Instructional Program
9. Focus on instructional development
Related Practices
10. Contingent reward
11. Management by exception

Note. Adapted from "The nature and effects of transformational school leadership: A meta-analytic review of unpublished research" by K. Leithwood & J. Sun, 2012, p.400-401.

In the following sections, I use the intersection of these two lists to describe the traits of effective school leaders as well as for the review of additional relevant literature. Two categories emerge as themes from the convergence of these two lists. The first is the ability of a school leader to foster a culture of continuous improvement. The second theme inherent in the first theme is the nurturing of professional learning.

Fostering a culture of continuous improvement. Fostering a culture of continuous improvement includes developing and modeling a shared vision, shared beliefs, ideals and values; strengthening school culture and holding high performance expectations; monitoring and evaluating; engaging parents and the wider community; providing flexibility and acting as an optimizer. Included in the culture of continuous improvement are those related practices of utilizing a system of contingent rewards and managing by exception. These related practices are

traditional rather than transformational. Leithwood and Sun (2012) identify these related practices as nonleadership and as such these are not discussed further in this review.

*Developing and modeling a shared vision, shared beliefs, ideals and values, and strengthening school culture***.** In a study of the effective practices of middle school principals, inspiring a shared vision was second only to modeling the way and setting an example (Reynolds & O'Dwyer, 2008). Vision building includes the most essential element of school change and that is convincing teachers of the need for the change (Jacobus, 1997). Modeling those same beliefs and ensuring that practices are aligned with shared beliefs is critical. Furthermore, when actions do not reflect agreed upon purposes, goals and understandings, the school leader asks strategic questions that help other stakeholders check for alignment to the shared ideals and beliefs (Marzano et al., 2005). Once the vision is established and buy in has begun, frequent and open dialogue must be ongoing throughout the change with clarity about how decisions will be made when implementing the change (Goosev, 2004; Johnson & Sloan, 1977; Miles & Louis, 1990; Peters, 2012). Gaziel (2007) found that framing of school goals and communicating those goals were the leadership skills that contributed to improved student achievement. This strengthening of the school culture by the creation of a shared vision that is modeled and communicated continually is the foundation of an effective school.

Monitoring and evaluating. Monitoring and evaluating is critical to the work of school reform to determine if the forward movement is on track and aligned with school goals. Monitoring and evaluating also can be used as a way to determine needs and next steps. Monitoring and evaluating includes examining formative and summative assessments and conducting classroom walk-throughs to monitor the innovation (Marzano et al., 2005). In their article, *Leading for Learning*, Chenoweth and Theokas (2012) list monitoring and evaluating

continually as a vital characteristic of school leaders who are successful in schools that have high percentages of minority students combined with high levels of poverty. A culture of continuous improvement exists in these schools. Leaders are present in data meetings and they guide the schools by monitoring goal progress and setting new goals as needed (Chenoweth & Theokas, 2012).

Engaging parents and the wider community. Communication is important to nurture in order to orchestrate real change in a school. Parent and community ties are vital resources for school improvement from enhancing student motivation to resources for classrooms (Bryk, 2010). The school leaders' ability to clearly communicate and to persist with clear and consistent communication throughout the change process is vital. Leading experts on engaging with parents and families suggest that the cultivation of caring relationships with parents can be achieved by welcoming parents to the school community and partnering with them on behalf of their children (Mapp, 2002). Attention to building trusting relationships with parents and families is key to innovation implementation.

Providing flexibility. Flexibility involves a continual adjustment of plans based on progress. The school leader shows flexibility when he/she uses protocols that allow for input regarding the innovation without getting stuck in endless discussion (Marzano et al., 2005). In a research study investigating the flexibility factor and the relationship to student achievement, no relationship was found; however Cain (2010) did find that teachers perceived principals to be more flexible than they perceived themselves to be. The disposition of flexibility allows a change facilitator to effectively cope with barriers and set backs in the process of innovation diffusion.

Acting as an optimizer. Acting as an optimizer is characterized by actions that involve positive comments about the innovation, communication of a belief that this innovation will improve student learning by an ability to identify roadblocks and challenges to the innovation (Marzano et al., 2005). In a review of the literature on the responsibility of optimizer, this disposition might also be identified as being an effective motivator, communicator and encourager. This leadership trait includes an ability to inspire. Miles and Louis (1990) claim that the process of change can be implemented in a textbook fashion but if the will of the teachers to make the change is not engaged or inspired, it is likely to fail. Will is related to efficacy and empowerment. When teachers believe that the change is going to make a difference and that they are empowered to make this happen in a safe and trusting climate, all things are possible. In Figure 3, the components of school leadership, capacity, motivation and commitment are present.

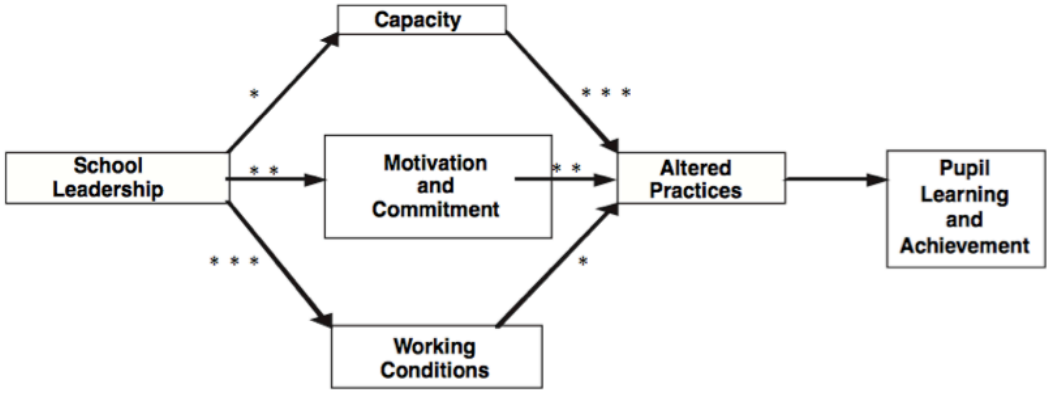


Figure 3- The effects of school leadership on teacher capacity, motivation, commitment and beliefs about working conditions. Adapted from "Seven strong claims about successful school leadership," by K. Leithwood, A. Harris & D. Hopkins, 2008, p. 33. Key: *weak influence; **moderate influence; ***strong influence

The specific actions that school leaders take to support a culture of continuous improvement include developing a shared vision, modeling the beliefs and values that are

espoused, strengthening the culture by maintaining a positive approach and empowering people to participate in school improvement efforts. Monitoring and evaluating, cultivating relationships with parents and the wider community, providing flexibility and acting as an optimizer all contribute to building a culture of continuous improvement in a school. This type of culture supports swift innovation implementation. In the implementation of *My Math*, data will be collected and analyzed to determine the specific leadership traits that school leaders possess and employ to provide support to teachers.

***Supporting professional learning*.** Supporting professional learning is the second theme that emerged from the two meta-analyses of leadership traits. Professional learning is an essential element in a culture of continuous improvement. The leadership traits that support professional learning include knowing curriculum, instruction and assessment; supporting intellectual stimulation; individualizing support; building structures to collaborate; and focusing on instructional development. This theme includes creating a focused, data driven, ongoing, job embedded and comprehensive plan for the professional development of all educators in a school.

In *Schools that Learn* (2000), Senge, Cambron-McCabe and Lucas describe organizational learning as the vision for change and they urge school leaders to create the conditions and norms that support a culture of learning and innovation for all stakeholders. Creating a culture of learning is the responsibility of school leaders who are change agents. Learning for school leaders and teachers is ultimately about improving the overall quality of the behavior they practice within the context of the school. These are the behaviors that support school improvement.

Knowing curriculum, instruction and assessment. Knowledge of curriculum, instruction and assessment is a leadership trait that includes the ability to work individually with staff

members regarding implementation of an innovation; and is evident by attendance at and participation in staff development opportunities regarding the innovation (Marzano et al., 2005). Leithwood et al. (2008) argue that expecting heroic levels of content knowledge or knowledge of curriculum, instruction and assessment is one reason why there is a dearth of school leaders. They claim that supporting educators with capacity building, empowerment and cultivating a sense of efficacy are more important than knowledge of curriculum, instruction and assessment. In contrast to the contention of Leithwood et al. (2008), numerous studies have shown an increase in student achievement as a result of a school leader demonstrating knowledge of best practices in curriculum, instruction and assessment.

In an examination of the leadership skills of elementary principals who were supporting literacy and mathematics reform, the following actions were identified as being effective: being involved in the daily activities of teachers including observing instruction, talking with teachers about data and curriculum materials and identifying time and space for professional development (Burch & Spillane, 2003). Neumerski (2013) examined several research studies that found a relationship between principal instructional leadership and changes in teacher practice. The implementation of the innovations in these studies increased the probability of improvements in student achievement. Evidence of change from the five studies reviewed included student centered teaching, differentiated instruction, improved writing instruction, instructional growth in new teachers and changes in instruction in English Language Arts and mathematics (Goddard, Neumerski, Goddard, Salloum, & Berebitsky, 2010; May and Supovitz, 2010; McGhee and Lew, 2007; Quinn, 2002; Youngs, 2007 as cited in Neumerski, 2013). Knowledge of best practices in curriculum, instruction and assessment by school leaders can increase the probability of improved student achievement.

Guskey and Sparks (2002) describe the importance of an administrator's knowledge of curriculum, instruction and assessment to design effective professional development for teachers. School leaders can impact school improvement in two ways; "the first is in their interactions with teachers, particularly through supervision activities, professional support coaching and evaluation procedures. The second way administrators indirectly influence student learning is through their leadership in forming school policies and in establishing elements of the school's community and culture" (Guskey & Sparks, 2002, p. 3). The primary responsibility of a school leader is to support student learning. Although the school leaders impact on student learning is indirect it is second only to the impact of the classroom teacher.

Individualizing support. A widely practiced model of instructional supervision involves school leaders working individually with staff members to support them. Supervision in schools has evolved over the years. Traditionally, instructional supervision has been a matter of compliance for performance appraisal and it took on a clinical model that focused on the steps of pre-conference, observation and post-conference in relatively the same way for all teachers. This is a prescriptive model characterized by a face-to-face conversation between a teacher and the school leader. Currently, an assumption remains that this is an effective way to improve teaching and learning in a school (Duffy, 2000). In order for clinical supervision to make a difference, time, resources and professional development must be devoted to the process (Tunison, 2001). According to Fritz and Miller (2003), transforming the clinical supervision model to an instructional supervision model that is differentiated is the most effective way to improve teaching and learning. Fritz and Miller (2003) suggest that teachers can and should make decisions about whether their supervision is intensive development, cooperative professional development, self-directed or administrative monitoring. These types of instructional supervision

fall along a continuum beginning with a high level of support and intervention from the school leader and ending with a self-directed and autonomous learning process for the teacher (Fritz & Miller, 2003).

In all of the models of instructional supervision, the professional conversation that exists is at the heart of the process and arguably the most important element. These conversations have the potential to stimulate reflection and build capacity. Kelehear (2010) claims that "having thoughtful, bright teachers and students certainly is a goal worth pursuing and the art of conversation can be a small and important move in that direction" (p. 20). Elements of these effective conversations are: making suggestions, giving feedback, modeling, using inquiry and giving praise. These important aspects of a conversation assist a teacher in feeling supported, becoming motivated and more reflective (Blasé & Blasé, 2000). Individualizing support can develop these capacities in teachers and will foster efficacy and improved practice.

Building collaborative structures. The most widely known structure for collaboration is the *Professional Learning Community* as espoused by Richard and Rebecca DuFour (McLester, 2012). Their premise for teacher collaboration focuses on access to rigorous curriculum for all students. *Communities of practice*, according to Lave and Wenger (1991), are structures that develop in schools that allow educators to learn and problem solve together. *Communities of practice* emerge as a result of teachers' need to cooperate and this collaboration can result in improved practice (Lesser & Stork, 2001; Sergiovanni, 2004).

Building structures to support collaboration such as common planning time, opportunities for peer observation, and focused cross-grade level meetings can promote a culture of continual improvement. Professional learning communities, critical friends, peer coaching, collegial circles

and communities of practice are among the many collaborative structures that exist. These collaborative approaches to school improvement increase teachers' feelings of empowerment and efficacy and they provide social support for problem solving.

Supporting intellectual stimulation. Intellectual stimulation includes the school leader sharing research about the innovation, asking reflective questions about the innovation, and leading discussions around current practices related to the innovation (Marzano et al., 2005). School leaders support for intellectual stimulation can be described as engaging in practices that "challenge the staff's assumptions, stimulate and encourage creativity, and provide information to staff members to help them evaluate their practices, refine them and carry out their tasks more effectively" (Leithwood & Sun, 2012, p. 400). This is leadership for adult learning and it can be described as the ways in which a school leader promotes learning for their staff and for themselves.

School leaders can foster adult learning in schools in two ways. First, by modeling their own learning and being known and seen as the lead learner in the school; and second, by providing time, space, expectations and rewards for professional learning for all educators in the school community. Opfer and Pedder (2011) suggest that the very definition of professional development is trending away from an event and toward a system of complex and differentiated experiences. They also describe teacher learning as being closely connected to the learning of the entire system. Joyce and Showers (2002) showed that only a coaching professional development model supported the implementation of new strategies in the classroom by teachers. Data from this research showed that there is no transfer to practice when theory or demonstrations are presented. The percentage of teachers who are able to transfer new learning into practice after having had an opportunity to practice themselves is 5%. After receiving ongoing coaching, the

percentage increased to 99% (Joyce & Showers, 2002). The organization formerly known as the National Staff Development Council and now called *Learning Forward* created the following definition of professional development: "the term 'professional development' means a comprehensive, sustained, and intensive approach to improving teachers' and principals' effectiveness in raising student achievement" (2008). Additional criteria and indicators for effective professional learning mentioned by *Learning Forward* are that it is site-based and aligned with standards and school goals, it is well facilitated and occurs several times per week (Learning Forward, 2008).

In systems thinking, the conditions for continuous improvement in the organization either promote or limit the rate and degree of professional learning. Some of the very real barriers to effective professional learning include a lack of time and money; guilt that if your personal learning becomes a priority it is at the expense of the children that you serve; an attitude that by admitting I want or need to learn I must be revealing a weakness; and by prior negative professional development experiences that ended up creating additional work, or worse yet had no impact on teacher or student learning (Barth, 2004). To overcome some of these barriers, a paradigm shift is needed. Practicing school leaders that make time and set priorities for adult learning may find that these strategies realize great impact.

Focusing on instructional development. School leaders who are change agents have a relentless focus on the improvement of instruction. This laser-like focus on improving teaching and learning is the essence of instructional leadership and is maintained at all costs in an effective school (Schmoker, 2006). A focus on instructional development was discussed in the sections on knowing curriculum, instruction and assessment as well as individualizing support.

When school leaders focus their work on instructional development, student learning increases (Aste, 2009).

Supporting professional learning in schools requires that school leaders know about best practice in curriculum, instruction and assessment, have individualized conversations, build structures for collaboration, and focus on instructional development. Implementing new standards and curriculum are innovations that require change leadership. Developing a culture of continuous improvement and supporting professional learning will facilitate innovation diffusion with speed and success (Leithwood & Sun, 2012; Marzano et al., 2005).

Concerns of school leaders. In support of the first research question relative to the concerns of school leaders, two articles on the concerns of school leaders are reviewed. Although these articles describe concerns of school leaders neither are specifically focused on concerns while facilitating an innovation implementation.

The fiscal crisis in education has created stress and tension for all stakeholders and in particular school leaders. Ginsburg and Multon (2011) conducted a study involving 93 principals and 100 superintendents from four states. They utilized surveys and follow up interviews to collect the data. "More than 50% of both groups indicated that their health had gotten worse due to budget cuts" (p. 44). The survey data found that with budget cuts, the school leaders had concerns about being able to deal with building challenges, implementing innovations, providing needed services, and maintaining the morale of the faculty and staff (Ginsburg & Multon, 2011). The first three of these four concerns can be identified as *Management* or *Task* concerns while maintaining the morale of the faculty and staff is a *Consequence* concern in the *Impact* phase of the Stages of Concern model (George et al., 2006). Both superintendents and principals noted

concerns about the lack of personal time. These could be identified as Stage 2 *Personal* concerns in the Stages of Concern model.

A second study of the concerns of school leaders was a mixed methods study which involved a national survey of 1137 head teachers in Scotland with a sample of 178 interviews (MacBeath, O'Brien & Gronn, 2012). In terms of *Personal* concerns, participants identified excessive workload, physical health and emotional well being as top concerns. The demanding nature of the job was concerning to 78% of the respondents. Additional concerns were centered on the tension that exists when external demands are placed on a school and a school leader that involve new standards and curriculum, high stakes testing, and teacher and principal evaluation without additional resources accompanying the demand. MacBeath et al. (2012) identify this as unrelenting change and in the Stages of Concern this is both a *Task* concern and an *Impact* concern. School leaders are faced with the challenge of how to get this done and in combination with the *Consequence* concern relative to high stakes reporting on student achievement. Many participants reported that they were "oppressed by the lack of time for themselves and their professional development" (MacBeath et al., 2012, p. 424). As a result of the stated "oppression", the authors frequently use the term *coping* to describe the way that school leaders respond to the many concerns that they are presented with.

Like teachers, school leaders have concerns that can be labeled as *Self*, *Task* and *Impact*. A study of change facilitators in a community college found that just 23% of the department heads were prepared to be effective change facilitators (Fary, 1986). Studying the concerns of school leaders can provide valuable information regarding the change process. The concerns of school leaders ultimately impact their leadership efforts throughout the innovation

implementation. The concerns of change facilitators can provide insight into the specific actions or interventions employed by effective change facilitators.

Change facilitator interventions. As a change agent, the school leader works to facilitate change using targeted and differentiated interventions (Marzano et al., 2005). Identifying problems and communicating the idea that problems are natural; and solving them is part of the change process can help to minimize the temptation to quit when problems arise. This approach can also minimize blame and defensiveness (Miles & Louis, 1990). The school leader can model effective problem solving and problem coping strategies to show teachers that this is the norm in the field of education and in the school. Some of these behaviors might include quick identification, definition and interpretation of a problem. This can be followed by a realization of past problems with a similar pattern that might lead to a possible solution. Another attribute of an effective problem solver is flexibility or being able to generate multiple solutions to a single problem (Leithwood & Stager, 1989). Modeling expert problem solving and supporting teachers in developing their capacity to solve problems can enhance the probability for successful school reform.

In support of research question number two relative to the actions that school leaders take to support change, a summary of the work of Rutherford et al. (1984) follows. This taxonomy of interventions can assist school leaders in identifying the most appropriate intervention to support the innovation. The levels of intervention in this taxonomy include *policy, game plan, strategy, tactic* and *incident*.

A *policy* can be developed that clearly states guidelines for organizational process and usually impacts all people within the scope of the innovation. Policy language may include the

following, “teachers will be provided with in-service training in the use of each new curriculum program during the contractual day” (Rutherford et al., 1984, p. 33). This intervention supports and sustains a culture of innovation implementation over time. With a policy requiring professional development to support innovation implementation, the probability of success increases.

The *game plan* is the second level of intervention and this refers to an overall design for the implementation of the innovation. A *game plan* intervention in action might be, “after the principal provides an initial awareness and information session, teachers will attend three day-long in-service sessions providing training in how to use the objective-referenced math program. These sessions will be scheduled throughout the first year of implementation ” (Rutherford et al., 1984, p. 33). Hord and Loucks (1980) describe six components of an effective *game plan*: a) developing supportive organizational arrangements like new materials or equipment or hiring new staff; b) training in workshops or modeling in classrooms; c) providing consultation and reinforcement through coaching, small group or team problem solving sessions or peer groups; d) monitoring and evaluation which may include feedback after trainings or assessment of concerns about the innovation; e) external communication includes gaining support of the Board of Education or presenting at conferences; f) dissemination includes broadcasting information to encourage others to adopt the innovation (Hord & Loucks, 1980). The *game plan* represents a holistic change strategy that will effectively increase the rate and degree of innovation implementation.

Strategy is the next level in the intervention taxonomy and this is a framework for action. For example, “training sessions will be held each month throughout the course of the change

effort for administrators and teachers" (Rutherford et al., 1984, p. 33). Strategy details what will be done as part of the innovation and may include a Gantt chart or calendar of essential actions.

The next level of intervention is the *tactic*. *Tactics* are actions taken to affect attitudes or the use of the innovation, which may not affect all users. An example of a *tactic* in action is, "several times during the first half of the year the principal and teachers view videotapes of teachers using a new reading program" (Rutherford et al., 1984, p. 33). Tactics allow school leaders to differentiate the actions they take based on specific teachers beliefs and concerns.

The last level is the *incident* intervention. An *incident* is an action or event that only happens once and may be just for some users. An example of an *incident* is when, " the principal gives suggestions to one teacher about how to improve his/her use of the new science lab" (Rutherford et al., 1984, p. 33). Incident interventions allow school leaders to further differentiate and address resistance of the intended adopters.

An additional intervention suggested by Hord and Loucks (1980) is identified as *theme.* They define *theme* as the set of intended or unintended actions that produce an unanticipated result in the innovation implementation. An example of this is when a facilitator is continually absent from the training; the unspoken and possibly unintended message is that this work is not that important. Rutherford's (1984) taxonomy is a useful framework for labeling the types of interventions and supports that school leaders employ during the implementation of an innovation.

The more recent work of Roach, Kratochwill and Frank (2009) complements the work of Rutherford (1984). Rutherford (1984) proposed a leveled framework, while Roach et al. (2009) took into account the complex nature of social change and developed a circular and reciprocal

model. Rutherford (1984) specifically identifies categories of interventions that school leaders employ to support change, Roach et al. (2009) offers six functions that change facilitators attend to in order to create a context supportive of change. Roach et al. (2009) developed a model with six essential functions of change facilitators based on the literature review by Hord (1992). Figure 4 shows that the six essential functions operate reciprocally and surround the notion of creating a context supportive of change. Developing and communicating a shared vision, planning and providing resources, supporting professional learning, checking on progress, and providing continuous assistance are the functions that change facilitators can engage in to support teacher at each stage of concern.

All of these interventions are options for school leaders when differentiating their support as change facilitators. This taxonomy of interventions and the essential strategies that change facilitators can use are examined during the analysis of the *My Math* data to align school leader support with teachers' concerns.

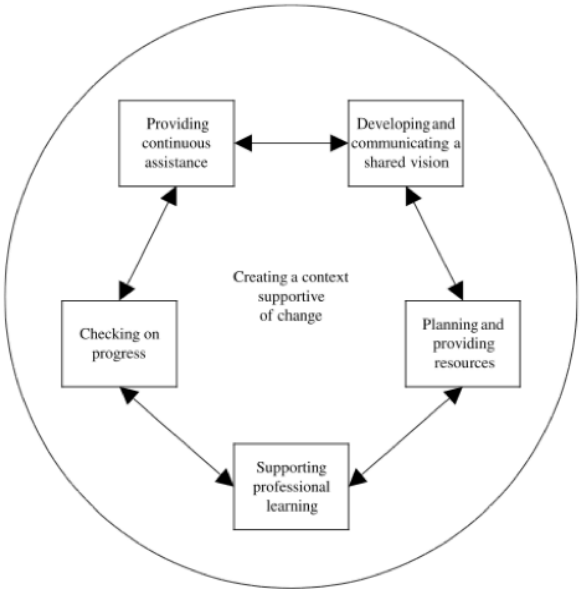


Figure 4- Six Essential Functions of Change Facilitators. Adapted from "School based consultants as change facilitators: Adaptation of the concerns-based adoption model to support the implementation of research-based practices," by A. T. Roach, T. R. Kratochwill, & J. L. Frank,

Measuring Change

In this section, the Concerns-Based Adoption Model (CBAM) components will be described followed by a review of studies that utilized the Stages of Concern Questionnaire (SoCQ). In Ellsworth's *Change Communication Model* (2000), the innovator and intended adopter components of the model are based on the CBAM work of Hall and Hord (1987). This model provides a way to examine and analyze concerns to measure the rate and degree of innovation implementation.

Concerns-based adoption model. Concerns represent a predominance of thought in an area. Concerns are neither positive nor negative; instead they represent that which is capturing one's attention (Hall, Wallace & Dossett, 1973). Fuller (1974) conducted the initial clinical research on the Stages of Concern (SoC) model in the 1970's. Her work identified teachers' concerns about adopting a new innovation as being either non-concerns, concerns about self or concerns about pupils (Fuller, 1974). Fuller's initial conceptualization of the concerns of teachers established the framework for the CBAM. Hall et al. (1973) developed the Concerns-Based Adoption Model (CBAM). The assumptions about educational change that are foundational to the CBAM are: "(1) change is a process, not an event; (2) change is accomplished by individuals; (3) change is a highly personal experience; (4) change involves developmental growth in feelings and skills; and (5) change can be facilitated by interventions directed toward the individuals, innovations, and contexts involved" (Anderson, 1997, p. 333).

The CBAM includes the SoC model and the Levels of Use (LoU) model. The SoC model is a six-stage framework for identifying concerns about a change. These stages happen in a linear progression beginning with the introduction of the change to the completion of the change. The

LoU model, although not utilized in this study, identifies an individual's knowledge, skill and behavior associated with an innovation. This identifies the extent to which the change is being implemented or used. CBAM is the combination of the teacher's feelings or concerns and their subsequent use. Understanding the CBAM can assist school leaders in managing change.

Stages of concern model. The Stages of Concern are *Unconcerned*, *Informational*, *Personal*, *Management*, *Consequence*, *Collaboration* and *Refocusing*. The *Unconcerned* stage is also referred to as the *Awareness* stage. The six stages of concerns are grouped into three categories: The initial stages of *Unconcerned*, *Informational* and *Personal* are labeled as *Self* concerns, and the primary concerns in this stage are related to how this change will affect an individual personally. These are ego-oriented concerns that are predominantly focused on efficacy. The *Management* stage is characterized by *Task* concerns as teachers become more concerned about how the innovation will actually happen. These are concerns that relate to logistics and materials needed to implement the innovation. The final phase is the *Impact* phase and this includes the stages of *Consequences*, *Collaboration* and *Refocusing*. These concerns are centered on the effectiveness of the program and the impact on students (Hall et al., 1987). These center on how the users can learn together how to best impact student outcomes. The complete definitions of each stage are presented in Table 6.

Table 6

Stages of Concern

	Stage	Definition
IMPACT	Stage 6- Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.
IMPACT	Stage 5- Collaboration	The individual focuses on coordinating and cooperating with others regarding the use of the innovation.
IMPACT	Stage 4- Consequence	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence.
TASK	Stage 3- Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources.
SELF	Stage 2- Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation.
SELF	Stage 1- Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it.
SELF	Stage 0- Unconcerned	The individual indicates little concern about or involvement with the innovation.

Note. Adapted from "Measuring implementation in schools: The stages of concerns questionnaire," by A.A. George, G. E. Hall, & S. M. Stiegelbauer, 2006, p.8

Although it is widely accepted that the SoC is a developmental model, the Stages of Concern model is not a hard stage model. Participants will likely have concerns at many different stages throughout the implementation process. The idea is to search for a predominance of concerns and then to examine shifts in the predominance of concerns. Stage 6 Refocusing is not the ultimate goal for all participants; however, moving to the later stages where attention is focused on the impact that the innovation has on students is desirable in terms of the change process. The domains of self, task and impact can provide a lens to examine concerns and the further refinement of the domains to the seven individual stages can serve to effectively inform

practice. The Stages of Concern model is central to this study and is used to code teachers' concerns and to frame the results, interventions and implications for practice.

Change facilitator stages of concern model. The Change Facilitator Stages of Concern (CFSoC) model was developed in 1979 out of a need to identify the concerns of those who were leading the change**.** Among the essential skills of school leaders is the ability to facilitate change. Having a tool for change facilitators to identify their own concerns may better prepare them to lead. Hall et al. (1991) developed the SoC model for the change facilitator. The CFSoC utilizes the same six-stage framework as the SoC model for teachers but specifically describes the stages in relationship to the facilitators of an innovation. The *Self* phase including the concern stages of *Unconcerned*, *Informational* and *Personal* features learning the details of the innovation and then considering the viability of one's own ability to lead the change. In the *Task* concerns phase, the *Management* concerns of the change facilitator revolve around the logistics or how to facilitate change. The final phase of *Impact* concerns involves the *Consequence*, *Collaboration* and *Refocusing* Stages. Improving one's own facilitation skills; coordinating and communicating the change with other initiatives; and concerns about maximizing the benefit of the innovation are central to this phase (Hall et al., 1991). As described in Table 7, concerns at Stages 1 and 6 are focused on the innovation while Stages 2, 3, 4 and 5 are focused on change facilitation.

Table 7

Change Facilitator Stages of Concern

	CF Stage	Definition
IMPACT	Stage 6- Refocusing	Ideas about alternatives to the innovation are a focus.
	Stage 5- Collaboration	Coordinating with other change facilitators and /or administrators to increase one's capacity in facilitating use of the innovation is the focus. Improving coordination and communication for increased effectiveness of the innovation are the focuses.
	Stage 4- Consequence	Attention is on improving one's own style of change facilitation and increasing positive innovation effects.
TASK	Stage 3- Management	The time, logistics, available resources, and energy involved in facilitating others in use of the innovation are the focus.
SELF	Stage 2- Personal	Uncertainty about one's ability and role in facilitating use of the innovation is indicated.
	Stage 1- Informational	There is interest in learning more about the innovation. The concern is not self-oriented or necessarily change facilitation oriented.
	Stage 0- Unconcerned	Change facilitation in relation to the innovation is not an area of intense concern. The person's attention is focused elsewhere.

Note. Adapted from "Measuring change facilitator stages of concern: A manual for use of the CFSoC questionnaire," by Hall et al., 1991, p. 17. CF= Change Facilitator.

The Change Facilitator Stages of Concern model is central to this study and is used to code school leaders' concerns and to frame the results and implications for practice.

Stages of concern questionnaire studies. The CBAM has stood the test of time because it accounts for the individual concerns of the people going through the change process (Loucks, 1977; Myers, Barrick & Samy, 2012). Additionally, it provides for a measurement of the different levels of implementation of an innovation. This differentiated approach to studying the complexities of individual concerns has been used in a variety of studies over the past 40 years.

When using *change in schools* as the search term, I located 4,201 peer-reviewed citations from the last ten years using the ERIC databases EBSCO and PROQUEST. Narrowing the search to studies utilizing the SoCQ, I found 32 studies from education that were completed

within the last 20 years; four of those studies focused on mathematics curriculum concerns with two studies employing mixed methods. Sample sizes of these mixed methods studies ranged from 10 to 812. With only four studies focused on mathematics and only two utilizing a mixed methods approach, a current study of elementary mathematics curriculum implementation concerns will add value to the field.

In the quantitative component of these studies, all but one of the mixed method studies that I reviewed utilized a version of the SoCQ in combination with a variety of qualitative methods. One study utilized case study methodology to examine the implementation of a K-6 science program (Kelly & Staver, 2005). One approach to research design for mixed methods studies is to identify a random sample from those completing the SoCQ to interview in order to validate the quantitative data and allow for participants to elaborate on responses. This approach was used in studies focused on elementary science, project learning, technology integration and American history (Ackerson & Donnelly, 2008; Leung, 2008; Overbaugh & Lu, 2008; Ragland, 2007).

When large sample sizes were part of the research design, the qualitative methodology included a 30-minute phone interview to study changing perspectives in early childhood education or a video focus group of Modern Language teachers (Barnes, 2006; Elliot, 2005). An open-ended survey was another methodology used to examine mentoring of teachers in technology education with a large sample size (Ward, West & Isaak, 2002). Reflective journals, learning logs, classroom observations, post observation interviews, case studies, narratives, interviews, and participant observation are all additional qualitative methodologies that can be effective in measuring teachers concerns during innovation diffusion (Charlambos & Philippou, 2010; Donovan, 2007; Kelly & Staver, 2005; Kriby & LeBude, 1998; Leung, 2008; McFarland,

1998; Overbaugh & Lu 2008; Ragland, 2007; Tunks & Weller, 2009). A mixed methods examination of the concerns of elementary teachers implementing a reform mathematics program can aid in understanding the innovation implementation process.

Some of the CBAM diagnostic tools that have been used to add value to the SoCQ or the CFSoCQ are the open-ended questions, the one-legged interview and the Level of Use interview. In a one-to-one laptop initiative study at the middle level, the SoCQ was administered along with one-legged interviews (Donovan, Hartley and Strudler, 2007). One-legged interviews are a diagnostic tool of the CBAM and can be analyzed and coded as qualitative data (Hall & Hord, 2011). This method is characterized by informal conversations that may begin with, "How's your week been?" (Donovan et al., 2007). Focus groups can be utilized as part of a mixed methods research design to triangulate and corroborate the quantitative data (Kriby & LeBude, 1998). Focus groups provide qualitative data in support of the research questions and they offer participants an opportunity to safely share their concerns and problem solve together.

Integrating technology into classroom practice is a change that was studied repeatedly over the last 20 years (Atkins & Vasu, 2000; Bresnitz, Ross, Hall, Stiegelbauer, 1997; Casey & Rakes, 2002; Gershner & Snider, 2001; Hawkes, Cambre & Lewis, 1999; Hope, 1997; Howland & Mayer, 1999; James & Lamb, 2000; Rakes & Casey, 2002; Ward, West, Isaak, 2002; Yuliang & Huang, 2005). In the majority of these studies, concerns about *Self* and *Task* were found to be highest. The primary recommendation included scaffolded professional development through the initial innovation implementation possibly even up to three to five years. No relationship was identified between age and teachers' concern but rather experience and concern tended to emerge more often across the studies as having a consistent relationship. As teachers became more confident in their craft, their concerns were at the *Impact* stages. In the beginning stages of any

innovation, *Awareness* is the highest stage of concern for most teachers. In mathematics studies, concerns emerged about impact on student learning especially in high stakes testing contexts (Tunks & Weller, 2009). More teachers had concerns about "ways of accomplishing the objectives, following the progress of each student, getting materials together, covering the content in a set amount of time" (Christou et al., 2004, p. 168). Additionally, teacher efficacy has an impact on concerns of teachers and these *Self* concerns are not easily resolved. Teachers are more confident using old methods and familiar curriculum (Charalambous & Philippou, 2010).

I examined and analyzed two mixed methods studies that used the SoCQ to collect concerns data from teachers related to the teaching of mathematics. One of the studies was conducted in Cyprus and the other in the United States. The Cyprus study had a sample size of 167 and used the SoCQ along with teacher logs as qualitative data (Charlambous & Philippou, 2010). This study revealed that teachers with high efficacy had a predominance of *Impact* concerns and teachers with low efficacy had more *Task* concerns. The study conducted in the United States had a sample size of ten and exit interviews were used to corroborate the SoCQ survey data. In this study, interventions to support the innovation included personal contact with a supportive staff member, teacher support systems in monthly meetings, electronic sharing of lesson plans and observations of student success (Tunks & Weller, 2009).

If the innovation is to be adopted by all teachers, the combination of Stages 0 and 1 are appropriate. Although teachers and school leaders could be *Unconcerned* about the innovation, they would likely be aware of the innovation if it were a mandate. Furthermore, in the research by Bailey and Palsha (1992), *Refocusing* did not emerge as a unique stage. According to the factor analysis, the revised 21-item five-stage SoCQ will yield statistically significant results

with internal consistency and validity. They found that three of the five items originally correlated with the *Refocusing* Stage had significance in the *Impact* Stages (Bailey & Palsha, 1992). The concern over adjusting to this five-stage model is in the scoring and data analysis that is associated with the original seven-stage model. In the CBAM study conducted in Cyprus around teachers' concerns over a primary mathematics curriculum innovation, the researchers omitted Stage 0 or the *Awareness* Stage items on the questionnaire because teachers knew about the innovation before the questionnaire was administered (Christou et al., 2004).

I located two studies that utilized the CFSoCQ tool. The first was a dissertation focused on change facilitators at a community college in Nebraska (Fary, 1986). The findings from this study indicated that the concerns of most department heads were *Unconcerned* or *Informational,* meaning they wanted to know more about the innovation. This author concluded that 23% of the department heads had highest concerns at Stages 3, 4, 5 and 6 and would be successful change facilitators. Additionally, one study utilizing the CFSoCQ currently in process was identified. This study is being conducted to examine the concerns of change facilitators involved in implementing the Universal Pre-Kindergarten programs in New York State (Devine, pending). The CBAM model and tools have stood the test of time and are useful tools in assessing an innovation implementation in a school with the people in mind. The scarcity of studies utilizing the CFSoCQ makes this study significant, as I pair the SoCQ and the CFSoCQ to analyze the same innovation from different perspectives. At the core of these studies is an attempt to identify the barriers to school reform. These are the barriers that impede the adoption of an innovation by teachers and school leaders.

Curriculum Implementation & Reform Mathematics

In this chapter thus far, I have reviewed change theories, change facilitators, and measuring change using the CBAM. In the next section, I review the research related to the specific change of implementing a new curriculum followed by findings from studies centered on implementing a reform mathematics curriculum.

Reform-based change can be supported with curriculum materials and professional development (Powell & Anderson, 2002). The goal of providing new materials and professional development is to change teachers' knowledge and beliefs about what and how they are teaching This is especially important with mathematics where a deep understanding of both content and pedagogy is essential for effective teaching and learning (Kajander, 2010).

Curriculum materials are critical for the success of a reform-based innovation. Materials have the potential to shift the instructional approach from a teacher-centered model to one that is student-centered. For example, a reform mathematics curricular unit that uses a constructivist approach includes lessons that focus on problem-based challenges for students. Novice teachers rely heavily on the tools that are provided to them. In the implementation of the Common Core State Standards (CCSS), curricular materials in the form of standards do not tell teachers how to teach, but rather what to teach. States have been charged with the development of aligned curricular materials to support the CCSS. These materials have the potential to play a key role in CCSS implementation success (Schmidt & Burroughs, 2013). In the Stages of Concern (SoC) model, concerns related to accessing needed materials including curriculum are Stage 3 *Management* concerns.

Once new curricular materials have been selected and secured, professional development is essential to sustain reform-based change. One form of professional development can include providing time and space for teachers to collaborate and to develop social networks. In a qualitative study about the influences of curriculum reform on primary mathematics in China; teachers reported that the support they received, the opportunity to collaborate and professional development were positively correlated with reform-oriented instructional practices. These reform practices include problem solving and real life application of mathematics (Li, Ni, Li & Tsoi, 2012). Concerns can be alleviated when teachers have a peer network. These collaborations can aid but rarely sustain an innovation (Coburn, Mata & Choi, 2013; Lloyd, 2008). The goal of reform curriculum materials combined with professional development is to sustain an innovation and this means that teachers' knowledge and beliefs must change.

Ball and Cohen (1996) present teachers' knowledge and beliefs in the form of different domains that teachers operate in when enacting or implementing a curriculum. First, they consider their students and their prior knowledge and how they will learn the new curriculum. Next, the teachers consider themselves as learners and how they will make the curriculum work for themselves by deciding how to best focus and frame the content. Next, they make decisions about how to design instruction including what models to use and which tasks to ask students to engage in. Teachers then monitor their students' ways of learning and talking about their thinking in order to make adjustments that support learning. The broader social and cultural context is the last factor that influences teachers' enactment of curriculum. They consider the ideas of parents, administrators and other professionals when implementing a curriculum (Ball & Cohen, 1996). The domains that Ball and Cohen (1996) describe can be aligned with the SoC as follows: teachers considering themselves as learners aligns with the *Self* Stages; teachers

considering students, parents, administrators and other professionals aligns with the *Impact* Stages (Table 8). Handal (2003) agrees that teachers' beliefs must be considered when implementing a reform mathematics curriculum. If they are ignored "teachers will maintain their hidden agendas in the privacy of their classrooms and the implementation process will result in a self-deceiving public exercise of educational reform and a waste of energy and resources" (Handal, 2003, p. 65-66). Teachers operate in different domains and have varied concerns at different times during an innovation implementation. Recognizing and supporting individual beliefs and concerns can increase the success of the innovation implementation and subsequent student and teacher learning.

Table 8

Comparison of Stages of Concern and Domains of Teachers' Knowledge & Beliefs

Stages	Domains
Self	Teachers consider themselves as learners
Impact	Teachers consider students, parents, administrators and other professionals

Note. Adapted from "Measuring implementation in schools: The stages of concern questionnaire" by George et al. (2006) and "Reform by the book: What is- or might be- the role of curriculum materials in teacher learning and instructional reform?" by D. L. Ball & D. K. Cohen, (1996).

Aligned curriculum materials combined with relevant and focused professional development are key components in changing teachers' knowledge and beliefs. These essential elements support reform-based curriculum implementation.

Curriculum implementation. Using the EBSCO HOST and PROQUEST databases and the search term *curriculum implementation,* I located 1,163 peer-reviewed studies from the last ten years. Next, I present a summary of those studies that focused on effective curriculum implementation from the point of view of teachers. I selected this focus as it aligns with the research questions.

Teachers considered the varying needs of their students when implementing a new curriculum (Albright, Knezevic & Farrell, 2013; Alshammari, 2013; Eastwood & Sadler, 2013). In a survey of 367 teachers of Australian English in Australia, the top three factors that influenced curriculum implementation were the range of student capabilities, the special needs of students, and the aspirations of students (Albright et al., 2013). The *range of student capabilities* was the overwhelming factor for both primary and secondary teachers with 84% and 80% of the teachers responding that this factor influences their curriculum implementation. Second on the list for both primary and secondary school teachers at 67% and 57% respectively were the *special needs of students*. The third factor on the list at 53% for primary and 57% for secondary teachers was *aspirations of students* (Albright et al., 2013, p. 116). The needs of students and the idea of differentiating for individuals are the major factors that influence the implementation of a new curriculum.

Eastwood and Sadler (2013) examined teachers' implementation of a game-based biotechnology curriculum using a case study methodology with three teachers. They expected that teachers would implement the curriculum differently based on their beliefs and perceptions. Their findings indicated similarities among the teachers in adapting the curriculum to fit their teaching styles and meet the varied learning needs of their students.

In a mixed methods investigation of curriculum reform in Kuwait, Alshammari (2013) surveyed 136 teachers about a new science curriculum and found that most teachers believed that the reform curriculum did not help students work together and had no meaning for them as it was a curriculum designed for the United States. Additionally, teachers believed that the content of the lessons was too advanced for the students and therefore the lessons could not be taught in the time allotted. Curriculum implementation may vary from classroom to classroom and is

impacted by teachers' contexts including their personal beliefs and concerns about their own practice and the students they teach. In the SoC model, these factors tend toward the higher levels of concern because they are student based and focused on impact.

Park and Sung (2013) examined the perceptions of elementary teachers about curricular reforms and implementation. In this qualitative approach, semi-structured interviews were conducted with six teachers. Teachers' reasons for resistance to reform curriculum implementation included the lack of professional development, lack of peer support during the implementation, the additional workload and the perceived lack of innovation in the program. Additionally, the lack of adequate resources including staff, materials and space were barriers to the implementation. The researchers concluded that teachers' perceptions and beliefs are critical to innovation success and they recommend two-way training systems: "one should connect the innovation with the realities of the specific school context; the other should provide opportunity to reflect on the meaning of the innovation and its implementation away from the pressures of daily routines" (Park & Sung, 2013, p. 29). This study offers additional support for an examination of teachers' concern throughout an innovation implementation.

Reform mathematics. Using the EBSCO HOST and PROQUEST databases and the search terms *curriculum implementation* and *reform mathematics*, I located 33 peer-reviewed articles from the last ten years. Reform mathematics curriculum involves a different way of teaching mathematics that is conceptual in nature and grounded in constructivist learning theory. Reform curricula usually include instructional guidance for sense-making activities, multiple representations, collaborative learning, and hands-on activities (Vega & Travis, 2011).

In a review of both quantitative and qualitative studies, I found that successful implementation of a reform mathematics curriculum yields changes in classroom practice including small group discussion, increased hands on or manipulative-based activities, high cognitive tasks focused on sense making and problem solving and a variety of assessment types (Koc, Isiksat & Balut, 2007; Li & Ni, 2011; Li, Ni, Li, & Tsoi, 2012; Lloyd, 2008; Moyer, Cai, Wnag & Nie, 2011). Teachers' knowledge and beliefs about teaching and learning are critical in the implementation of reform mathematics practices.

Changes in practice require changes in knowledge and beliefs. After studying more than 400 fifth grade teachers who were implementing a reform mathematics curriculum, Grant and Kline (2001) found that factors of successful implementation began with a teacher's ability to engage with students' ideas. Teachers need to believe that there are a variety of ways to solve a problem and they must be willing to release the "authority for correctness" (Grant & Kline, 2001, p. 696) to the classroom community (Kent, Pligge & Spence, 2003). Teachers learn from their students and they learn to value their informal strategies for problem solving in mathematics (Kent, et al., 2003). An increase in the cognitive demand placed on students is another component of reform mathematics (Li & Ni, 2011; Koc, Isiksat & Balut, 2007; Moyer, Cai, Wnag, Nie, 2011). Change in teacher practice requires change in beliefs. Teachers make decisions based on their lived experiences with mathematics (Drake, 2006). Their personal mathematics stories impact their concerns and subsequent levels of curricular implementation. For shifts in classroom practice to occur and be sustained, teachers' individual knowledge and beliefs must be considered.

Teachers have unique approaches to change and different reactions to change (Cox, 2009; Stickles, 2011). In a qualitative analysis of 10,000 instructional learning logs from teachers

implementing a reform mathematics curriculum, Stickles (2011) developed three caricatures to describe the frequent patterns of behavior displayed by teachers when adapting to a curriculum reform. The *conflicted traditionalist* tries the reform but does not quite believe that it will make a difference. This teacher is a rule follower and requires proof of improvement before cheerleading the innovation. The *growing reformist* is constantly reflecting on their implementation process while seeking to learn more by asking questions and collaborating with others. The *distinguished leader* assesses themselves and their students frequently and adjusts in future lessons (Stickles, 2011). Teachers may stay in one of these three models or they may fluctuate depending on their comfort level with the particular unit they are teaching. Their position in one of these caricatures is based on their experiences, beliefs and concerns. Reform mathematics can be implemented in schools if differentiated support for the teachers is provided based on their concerns.

In an attempt to convince teachers who are *conflicted traditionalists*, research may be provided to them relative to the positive impact of a reform mathematics curriculum on student achievement. In a study of standardized test scores, Vega and Travis (2011) found that some subgroups of students who were taught using a reform based mathematics curricula performed higher than students in the same subgroup who were taught with a traditional curricula. Reform based curricula include more opportunities for students to construct their own learning. Sense-making can be characterized by teacher and student discussions and frequent application opportunities which were found to benefit the achievement of English Language Learners and those students who are economically disadvantaged. In a mixed methods study evaluating the impact of professional development and curricular implementation, high school students who were provided an integrated mathematics curriculum in Algebra I showed achievement gains (Krupa, 2011). Guskey (as cited in Park and Sun, 2013) claims that the actual experience of

implementing a curricular reform and witnessing the evidence of increased student learning can convince intended adopters to proceed with enthusiasm. In an elementary school study, Jong (2010) found that when novice teachers utilized reform mathematics instructional strategies, student achievement increased. Teachers' concern about curriculum implementation was largely focused on the varied needs of students. Positive gains in student achievement can be a powerful force in convincing some teachers to adopt an innovation.

To implement curriculum and specifically a reform mathematics curriculum, examining the current practices, knowledge and beliefs of teachers' is a necessary starting point. It is from this point that professional development can be planned, materials purchased and individualized supports and interventions employed. Most teachers desire homeostasis or relative stability and the pedagogical discomfort that comes with innovation implementation is a disruption to homeostasis (Lloyd, 2008). Supporting teachers by providing time for collaboration and by making sure they have the curricular materials they need, can break down implementation barriers and reduce pedagogical discomfort. Fryholm (2004) sees this discomfort as a positive aspect of the change process and contends that teachers can learn and grow from this discomfort. He further contends that this can lead to increased efficacy that builds capacity for future change (cited in Lloyd, 2008). As school districts develop plans for implementation of the CCLS, considering the pending discomfort of teachers is important. The concerns that teachers have when implementing a new curriculum are complex and varied. Concerns of teachers are examined relative to curricular materials, professional development and teachers' knowledge and beliefs.

National, State and Local Changes

The history of mathematics education in the United States is a turbulent one. In the 1950's and 60's the political fear generated by the Cold War saw the development of something known as "New Math". In the 1970's the mathematics reform movement was known as "back to basics." "Problem solving" was the reform mantra of the 1980's and the standards movement emerged at the end of the 1980's. The tension between fostering fluency and building conceptual understanding and of how and in what order students should acquire these skills has been dubbed the "math wars" in both the United States and China (Cai and Ni, 2011). The reform movement has seen the shift from the simple memorization of facts and the application of algorithms to a conceptual and procedural approach to teaching and learning mathematics.

The lack of consideration on how to prepare teachers and parents for new mathematics standards and curriculum has been a downfall of each reform era. A caution of all educational reform that emerged from the "new math" era was that if teachers are uncomfortable and have not been fully prepared for a reform, they feel incompetent and reject the reform. This can lead teachers to fail to implement the innovation and an ultimately call for change (Shoenfeld, 2003). This continues to be a challenge facing those implementing the CCSS. A shift in practice in the CCSS includes teachers promoting student discussion and construction of knowledge while applying their learning to real world situations (Vegas & Travis, 2011). The change in the approach to teaching mathematics is a challenge for teachers as it is different from traditional ways. Consideration of how to prepare teachers for a reform mathematics approach is essential.

United States. The Common Core State Standards Initiative (CCSSI) began in 2010 as a component of the federal *Race to the Top* (RTTT) Program. A think tank composed of the

nation's governors and the Council of Chief State School Officers (CCSSO), representatives from higher education, national teachers organizations and not for profit organizations, joined forces to create standards in English Language Arts and mathematics that could be adopted by individual states. The goal of this work was to increase the rigor and consistency of teaching and learning across the country. The mission statement of the CCSSI is as follows:

> The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy. (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010)

In developing the CCSS, the committee utilized an international benchmarking process. This process provided a fundamental starting point with a focus on examining the practices of successful rigorous educational systems. The rationale for this work included the fact that American 15 year olds math skills ranked 25th in the world according to the 2009 Programme for International Student Assessment (Fleischman, Hopstock, Pelczar, Shelley, 2010). The United States was losing global competitiveness.

As of September 2013, 43 states, the District of Columbia, and four territories have adopted these standards and are in various stages of implementation. The goal of preparing all students to be college and career ready is at the heart of this work. According to a survey of 33

states conducted by the Center for Educational Progress, the majority agree that these standards represent increased rigor, increased expectations, they will lead to improved student results, will require a new curriculum and will require changes to the current ways of teaching (Kober & Rentner, 2012). Another report summarized year one of the CCSS implementation and the feelings of 33 states regarding the rigor and impact of these new standards. This report found high levels of agreement with positive statements about the rigor and the impact of the CCSS. Data ranged from a high of 32 to a low 29 states that felt this work would make a difference (Kober & Rentner, 2012).

The CCSS in mathematics have an emphasis on *focus*, *coherence* and *rigor*. The concept of *focus* relates to the idea that historically the United States has attempted to cover so many topics that depth of learning was difficult to attain and the norm for learning mathematics became memorization and algorithms. When examining other nations, especially the highly successful Singapore model, fewer topics were covered with increased focus including more practice, problem solving and meaning making that resulted in greater conceptual understanding and greater application of the learning (Ginsburg, Leinwand, Anstrom & Pollock, 2005).

> For years national reports have called for greater focus in U.S. mathematics education. TIMSS and other international studies have concluded that mathematics education in the United States is a mile wide and an inch deep. A mile-wide inch-deep curriculum translates to less time per topic. (K-8, Publishers Criteria, 2013, p. 2)

Similar to the idea of *focus*, *coherence* is about making meaning of mathematics and making connections among separate learning throughout a lesson, a unit, a year and many years.

Coherence can complement focus by creating an overall structure or framework for teaching and learning mathematics content and skills. Finally, the notion of *rigor* is essential in the CCSS for mathematics. To pursue rigor, teachers need to address students' conceptual understanding, fluency and application with equal intensity (K-8 Publishers Criteria for the Common Core State Standards for Mathematics, 2012). The CCSS call for an equal balance of focus, coherence and rigor in the instruction of mathematics. The belief is that this shift in instruction will support increased achievement.

Operationally in schools and classrooms, the focus for teaching and learning in mathematics that will be needed in order to fully implement the CCSS is identified as the CCSS for Mathematical Practice. The implementation of the CCSS represents a shift in the expectations and the instruction of mathematics. By staying true to this framework, we may be able to reduce the income disparity that exists and begin to close the achievement gap. Marilyn Burns (2013), a well known mathematics researcher and educator advocates for the CCSS because she believes that the identification of both standards for practice and standards for content provides a more complete picture of what students should know and be expected to do (Burns, 2013). The developers of the CCSS did identify the eight mathematical practices, found in Table 9, that pervade all content standards.

Table 9

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning

Note. Adapted from www.engageny.org. 2012.

The CCSS represent an earnest attempt to frame mathematics education with common and connected skills and content. The authors of these standards caution schools and teachers against the temptation to break the standards apart and teach them as isolated bits of information because "progressions disappear when standards are torn out of context and taught as isolated events" (K-8, Publishers Criteria, 2013, p. 22). Teachers' beliefs and past practices may provide them with evidence that a different progression is more effective and this is the tension inherent in school change.

Although the CCSS are not without controversy, there is support in the field for a set of mathematics standards and practices that provide *focus*, *coherence* and *rigor* for teachers and students. Additionally, the field is in need of rich and aligned curriculum materials to support teachers' ability to move students to mastery of these new standards. The change in teachers' beliefs and practices can be accelerated with high quality curriculum materials combined with collaborative professional development opportunities (Ball, 1996).

New York State. The Board of Regents of the New York State Education Department adopted the CCSS on July 19, 2010. In October 2010, a workgroup proposed additions to the standards. These additions were put out for public review. Over 800 stakeholders responded to

the on-line survey and further revisions to the standards were made in December 2010. New York State changed the name of the CCSS to the Common Core Learning Standards (CCLS).

New York State secured a *Race to the Top* federal grant in August 2010. All 37 of the BOCES (Board of Cooperative Educational Services) in the state and the five largest city school districts were required to create *Network Teams* that would participate in state sponsored professional development with subsequent turnkey training for teachers in each region of the state (Watt, 2011). This professional development was designed to support full implementation of the standards in the 2013-14 school year.

The implementation of the CCLS is a key component in the state's reform agenda and as such has directed the focus of local districts. Additionally, accountability for student learning of the CCLS has been linked to teacher evaluation and school and district accountability.

In New York State, the Board of Regents has identified and prescribed the following four reform agenda items to stimulate innovation: adopting the Common Core Learning Standards (CCLS) with aligned curriculum and assessments; building instructional data systems that can measure student learning and inform practice; recruiting, retaining and developing effective teachers and leaders; and turning around the lowest performing schools (New York State Education Department, 2012). The goals are synonymous with the federal *Race to the Top* goals and these efforts are aimed at closing the achievement gap and promoting career and college readiness for all children (Race to the Top Act, 2011).

In the CCLS implementation, local districts were given the choice to adopt, adapt or ignore the NYSED provided curriculum modules for mathematics. Huntley (2009) discusses the notion of adopting curriculum versus adapting curriculum. Does allowing for differentiation in

the implementation of a new curriculum based on both student needs and teacher beliefs erode the foundation on which the curriculum was designed? Ben-Peretz (1990) proposed the concept of a curriculum envelope. He suggests that the challenge for teachers is in deciding which aspects of the curriculum are "inside the envelope" (p. 357) or essential and which aspects are "outside the envelope" (p. 357) and can be adapted (as cited in Huntley, 2009). The envelope analogy for prioritizing the implementation of a new curriculum can provide a way for stakeholders to collaborate to determine non-negotiables.

Brown, Pitvorec, Ditto, and Kelso (2009) examined the fidelity of standards based mathematics lessons in first and second grade classrooms. They discuss fidelity between written and enacted curriculum and claim that curriculum developers do not intend for lessons to be teacher proof nor are they designed to be a literal plan for an enacted lesson. Curriculum is intended to support and guide teachers as they design and deliver instruction (Brown et al., 2009). With this perspective, the enactment of opportunity to learn within a lesson becomes the focus of the fidelity measure. The opportunity for students to learn is the essential element inside the envelope.

> However, simply adopting a reform curriculum is not enough to make a difference in the classroom. It is the teachers' implementation of the curriculum that deserves our attention. Students' perceptions and beliefs about mathematics derive from the type of activities that occur in the classroom. The teachers' role in these activities is crucial. Thus, it is important to understand the teachers' struggles and the frustrations they encounter when implementing a new curriculum. (Stickles, 2011, p. 40)

Adopting learning standards has been done before in New York State; however, the adoption of standards that are common across states is unprecedented. In March 2014, the implementation of the CCLS in New York State became the scapegoat for political rhetoric and a bone of contention between state politicians and the teachers' union. As a result of this tension, growing movements of concerned parents refused to allow their children to take state assessments. This has been popularized as the "opt out" movement. A noted education expert, Diane Ravitch, was interviewed for an article in the Washington Post in January 2014. In this piece, she declared the unintended consequences of the CCSS and the aligned assessments.

> In New York State, which gave the Common Core tests last spring, only 30% of students across the state passed the tests. Only 3% of English Language Learners passed. Only 5% of students with disabilities passed. Fewer than 20% of African American and Hispanic students passed. By the time the results were reported in August, the students did not have the same teachers; the teachers saw the scores, but did not get any item analysis. They could not use the test results for diagnostic purposes, to help students. Their only value was to rank students. (Ravitch, 2014, para 30)

Ravitch goes on to claim that the CCSS are creating a test-centered school environment which further sorts and selects children and undermines the democratic values on which a free and public education were founded (Strauss, 2014). The current turmoil around the CCLS in New York State has resulted in an adjustment in accountability and a delay in full implementation. In a February 12, 2014 memo from Ken Wagner, Deputy Commissioner of the New York State Education Department, the details of this delay were laid out. Specifically relating to the state assessments in mathematics in grades 3-8, students who score at a level two

on a 4-point scale will no longer be below proficient but will instead be deemed to have attained a level of proficiency that corresponds to the current requirement to pass a Regents Examination at a score of 65 for graduation purposes. Level two students will be labeled as being on track for passing the Regents Examination required for graduation (K. Wagner, personal communication, February 12, 2014). The ongoing adjustment of expectations and requirements has challenged the implementation of the CCLS and the aligned assessments in New York State. The delayed roll out of CCLS supporting materials and training combined with the required implementation of the APPR, has resulted in a frenetic and underinformed teaching force. The lack of information has also had an impact on the general public as evidenced by the growing "opt out" movement and anger displays at public forums.

Plymouth, New York. In the Plymouth Central School District, the implementation of the CCLS can be characterized as an effort to comply with the commissioner's regulations. On behalf of students who will be sitting down to take assessments that are aligned with the CCLS, the district and teachers feel an obligation to teach to these standards. With the first administration of CCLS aligned mathematics assessments in grades 3-8, mathematics achievement in the Plymouth Central School District dropped. District administration, school leaders and teachers are working together to improve mathematics curriculum and instruction in the district. The implementation of the *My Math* program in grades K-5 is the innovation that was selected to reform mathematics teaching and learning in the district in order to be aligned with the CCLS in New York State and the CCSS in the nation.

My Math is a program that was developed by McGraw Hill Education. In 2013, the national version of *My Math*, aligned to the CCSS, was revised to align with the New York State CCLS. The 2013-14 school year was the first year that the New York State version of the

program was implemented in any school district. *My Math* is a program that was developed for students in grades PK-5. A committee of teachers, parents and school leaders in the Plymouth Central School District made the selection of the *My Math* program. This decision centered on the CCLS alignment, the colorful student friendly consumables, the technology component and the built in resources to support the differentiation of instruction.

The *NYSED Curriculum Modules for Mathematics* and *Primary Mathematics* (*Singapore Mathematics),* were the other two considerations for adoption. At the time of the selection in May 2013, New York State had released a very small number of curriculum modules with a tight timeline for releasing the remainder and this may have resulted in teachers gaining access to materials just a few weeks before they would teach the unit. This did not seem practical in terms of planning for effective teaching and learning. Additionally, the module materials are only provided electronically and so teachers would be required to copy and print student pages as well as teacher pages for each unit. As such, these materials are not colorful or creative and did not appeal to primary teachers. With *Primary Mathematics*, the alignment to the CCLS for the intermediate grades was limited and to align the topics and lessons within the curriculum would require hours of crosswalk work. This was not desirable or efficient. Although the *NYSED Curriculum Modules* provide some instructional support and extension suggestions, *Primary Mathematics* does not overtly suggest ways to differentiate the lessons. These were additional reasons why these two programs were not chosen. The committee selected the *My Math* program unanimously because it was all-inclusive and fully aligned. It was adopted by the Board of Education in June 2013.

Summary

Examining the concerns of both teachers and school leaders helps to measure the innovation implementation process in schools. Examining the support that is provided to teachers by school leaders as they are involved in a change will determine the effectiveness of interventions and measure the efforts of the change facilitators. Specifically, measuring the impact that change facilitators have on the implementation of a CCLS-aligned mathematics program is central to this study. This work is significant as it is intended to advance the collective knowledge around the actions and perceived actions of support offered by school leaders. Data about how school leaders address the concerns that teachers exhibit while implementing a school-wide curricular change will add value to the field.

Change theory offers a conceptual model for understanding the diffusion of innovations. Change facilitators offer supports and interventions to teachers who are on the frontline of the change in classrooms. Identifying the concerns of teachers and school leaders offers insight into the decisions that are made throughout the implementation process. When examining the change of implementing a reform mathematics curriculum, consideration of curricular materials, professional development and teachers' knowledge and beliefs is in order (Powell & Anderson 2002). The CBAM takes into account the concerns of teachers and school leaders regarding materials, training and support and beliefs about the impact on student learning. Data about materials, training and impact can be combined to develop a change strategy that will increase the probability of success of the innovation.

Reform-based curriculum implementation in mathematics has been less than successful since the math wars began. Barriers to this reform are varied but largely have to do with the

individual teacher's knowledge and beliefs. Studies have examined the concerns of teachers when implementing new programs across various disciplines and many have utilized the SoCQ to do this research.

There is a gap in the literature relative to analyzing the concerns of school leaders as change facilitators. Although the SoCQ and the CFSoCQ have been in existence for decades, there is a dearth of research that examines the actions and interventions of school leaders with regard to the concerns of teachers. My research questions examine the concerns of school leaders during a change as well as the support that school leaders provide to teachers during a change. Because the field is rich with data about the concerns of teachers, adding the concerns of school leaders serves to integrate the essential change agents in most school reform efforts.

Chapter Three details the methods associated with this research on the concerns that teachers and school leaders have when implementing a reform curriculum. Furthermore, Chapter Three includes the sample demographics, research design, data collection tools, analysis procedures, and the limitations of the study.

Chapter Three

Methodology

In this study, I utilized a mixed methods research design to examine the concerns of teachers and school leaders as they implemented an innovation. Additionally, I investigated the actions of school leaders as they facilitated change in their elementary schools. These schools were involved in implementing an elementary mathematics program aligned to the Common Core Learning Standards (CCLS) in grades K-5. The *My Math* program was the innovation that was being implemented and it is referenced as such throughout the research. This chapter outlines the research design including the questions, sample demographics, instruments, analysis, procedures and limitations of the study.

This study was conducted in a small city school district in central New York State. The district, like all other districts in New York State, was charged with determining the course of action toward implementing the CCLS. The level of use of the former elementary mathematics program, *Everyday Mathematics*, was low and the new Superintendent in the district strongly encouraged the movement to an alternate program. Former local curriculum documents were rendered useless as the major emphases at each grade level shifted in the CCLS. The urgency of this work did not support the gradual unwrapping of the standards to develop unique local curriculum documents and instead the pressure to locate aligned materials to guide instruction was intense.

I undertook a dual role as investigator in the study and as the Assistant Superintendent for Curriculum and Instruction in the district. My position as Assistant Superintendent includes supervising all educational programs including English Language Learners, Homeschooling and Universal Prekindergarten programs. Along with the district Curriculum Council, I plan for and

organize professional development in the district. Additionally, leadership in the district for ongoing curriculum planning and textbook and program purchases comes from my office. I support and supervise school leaders and other district administrators in the building level implementation of the Common Core Learning Standards. I meet monthly with the elementary school principals to support their leadership and encourage reflective practices.

During the 2013-14 school year, I removed myself from the evaluations of the elementary school leaders in order to maximize the opportunity for open and honest interviews with each school leader. I undertook caution to minimize my social location in the district so as not to over determine the data. I sought opportunities within the research context to illuminate the change experience in the district. The methodology of researching change in a district from a district level position had distinct advantages including previously established trusting relationships and an understanding of past practices and current culture. These advantages served to inform qualitative questioning.

Upon the adoption of the *My Math* program, a representative from McGraw-Hill attended one of the elementary principals' meetings to overview the program components. Following that meeting, a list of expectations for the phase in of *My Math* was collaboratively developed (Appendix A). These district expectations for phase-in of the program components were communicated to all teachers implementing the *My Math* program.

District-wide professional development prior to beginning implementation included one half-day for training from McGraw-Hill and one day to preview materials and generate grade level pacing calendars. Additionally, in March, district-wide Collegial Circles were initiated and facilitated by teacher leaders. These Collegial Circles met in March and in May of 2014. Like

other districts in New York State, the absence of a phase-in plan for CCLS implementation contributed to a fragmented approach to the innovation process. For example, adopting a curricular program without an opportunity to pilot. Given this local context, a closer look at the way that *My Math* unfolds as a curricular innovation is of value.

Statement of the Problem

The problem lies in understanding what people in schools are concerned about as they implement an innovation. The purpose of this study was to examine the concerns of teachers and change facilitators during the initial year of implementation of a K-5 mathematics program. Concerns, as defined by Fuller (1974), are neither good nor bad. High concerns represent a predominance of thought or attention in a particular area. Examining the concerns of teachers and school leaders and the subsequent actions taken provides insight into the organizational support that may assist the school leader. The interventions that most benefit teachers as they move through the innovation implementation are identified. Given the focus on accountability for schools in New York State and across the country, the urgency for reform is growing. Identifying the specific concerns that people in schools have when confronted with a change can provide valuable information about the potential success or failure of school reform. These data serve to inform future professional development designs and district efforts to support professional learning.

Methodology Overview

In this study, I utilized a mixed methods approach to researching the concerns exhibited by school leaders and teachers. The goal of quantitative methods is to formulate conclusions that are valid and reliable and can be generalized across a large population sample with accuracy

(Creswell, 2003). Qualitative researchers, on the other hand, are focused on the interpretive science and they value the stories of people as essential to understanding the world (Creswell, 2003). Creswell (2003) suggests that mixed methods is justified when “a researcher may want to both generalize the findings to a population and develop a detailed view of the meaning of a phenomenon or concept for an individual” (p. 22). Furthermore, Hanson, Plano Clark, Petska, Creswell and Creswell (2005) argue "using both forms of data, for example, allows researchers to simultaneously generalize results from a sample to a population and to gain a deeper understanding of the phenomenon of interest" (p. 224). For this study, I expanded and enriched the quantitative data with the qualitative narratives. I used both quantitative and qualitative methods and I employed the sequential explanatory strategy. Creswell (2003) describes the sequential explanatory strategy as the most straightforward of the mixed methods procedures. This strategy has clear separate stages that make it easy to implement and report. Integration of data in this approach occurs in the interpretation phase of the study.

The social nature of my research questions aligns with qualitative methodology, yet managing data collection at various times throughout the innovation implementation merited quantitative methods. Concerns are unique and personal and employing a single research method would have limited the valid generalizations from which findings could be identified. For example, concerns about *Self* may be too personal to share. This could be especially true if concerns relate to perceived inadequacies. As a result, a private survey may be a better method than an interview or a focus group. Qualitative methodologies like focus groups can help to illuminate the concerns of a larger group. Additionally, sometimes focus groups provide time and space for participants to solve their own problems. Ultimately, a mixed methods design can minimize methodological limitations.

Research Questions

Two research questions and four sub-questions guided my study. These questions lent themselves to a mixed methods design.

1- What concerns are exhibited by teachers and school leaders during the implementation of the *My Math* innovation?

1a. As reported by the Change Facilitator Stages of Concern (CFSoCQ), focus groups and interviews, what concerns do school leaders exhibit during the *My Math* implementation process?

1b. As reported by the Stages of Concern Questionnaire (SoCQ) and focus groups, what concerns do teachers exhibit during the *My Math* implementation process?

2- What actions or perceptions of support do school leaders and teachers report in the facilitation of the *My Math* program?

2a.What actions or perceptions of support do school leaders report they are taking in the facilitation of the *My Math* implementation process?

2b.What actions or perceptions of support do teachers report that school leaders are taking in the facilitation of the *My Math* implementation process?

These two research questions framed this study. Identifying the concerns of the school leaders as change facilitators provided a deeper understanding of their skills and dispositions. This information is needed for future support and professional development for school leaders. Identifying the concerns of teachers also served to inform future innovation efforts. Through research question number two, I sought to identify the specific actions taken by the school

leaders when facilitating the implementing an innovation. These data assisted in highlighting successful leadership practices. Aligning the Stages of Concerns data from the teachers with the supports and interventions provided by the school leaders has the potential to clarify the change process.

Based on prior research that has been completed using the CBAM model, there are several predictions that can be made about concerns data. I anticipate that concerns vary over time. As school leaders and teachers work to solve the problems they are confronted with, their concerns change. Second, the level of experience in the position has an influence on the Stages of Concerns. If a school leader or a teacher has a level of self-efficacy upon beginning the innovation implementation they may skip over the initial *Personal* and *Management* concerns relatively quickly. Last, beginning stage concerns must be addressed before an individual can move on to other concerns (George et al., 2006). To address the two research questions, I aimed to collect data that informed the change process.

Sample

The sample for this research included five elementary school leaders and twelve elementary teachers. This represented 100% of the elementary school leaders and just fewer than 10% of the elementary teachers in the Plymouth Central School District. The low number of teacher volunteers may be representative of teacher stress relative to another new mathematics program, a new evaluation system as well as new standards in English Language Arts.

This research involved human subjects and so I filed an expedited application with the Institutional Review Board (IRB). The application was approved in August 2013 and an IRB number (13-209) was assigned to this study. The initial recruitment for participants was done via

email to all teachers in grades K-5 and all elementary school principals in the Plymouth Central School District. An email was sent from me with information indicating that if a participant wished to volunteer s/he would be directed to contact Dr. Benjamin Dotger, my advisor and Associate Professor of Teaching and Leadership, at Syracuse University. To avoid undue stress or harm on any human subject as a result of my position in the district, Dr. Dotger conducted all future communication with participants. This included securing consent forms, conducting focus groups and all email correspondence regarding access to the questionnaires (Appendix B). I conducted the semi-structured interviews with the five school leaders in March. As I was not the evaluator for these principals during this school year and I was meeting monthly with them throughout the school year, this construct for collecting additional qualitative data was optimal and was approved in an IRB amendment. This design served to minimize coercion and subsequent stress or harm to any subject who volunteered for this study as per federal code Title 45 Part 46- *Protection of Human Subjects*. I collected demographic data via the completed survey that came to me electronically and anonymously.

The school leaders in this sample were the principals of five K-6 elementary schools in the Plymouth Central School District in Plymouth, New York. Total student enrollment averaged around 500 children in each of the five schools. Three of the five schools were Title I School Wide Program schools, which means that they qualified for supplemental federal funding because they had an overall free and reduced price lunch population of 40% or more. I created pseudonyms for each school leader. I gathered the data in Table 10 via electronic surveys completed by each participant anonymously. The two female school leaders were both former kindergarten teachers and both had the most longevity as teachers at 16 and 15 years. Principal Rob Gore was formerly an assistant principal in one of the middle schools in the district and

before that he was an alternative education teacher. Rob Gore came to education as a second career. Before becoming a school leader, Bill Monk was a professional learning coach at the Board of Cooperative Education Services (BOCES) and before that he was a literacy coach in the district and a sixth grade teacher. The final school leader, Craig Mann, was an assistant principal at the high school in the district and prior to that he was an Athletic Director in another district. His teaching background was in physical education.

As noted in Table 10, the number of teachers implementing the innovation in each school varied from 19 to 27. This number includes classroom teachers and Academic Intervention Services teachers for mathematics. Special Education teachers were involved in co-teaching *My Math,* which increased the total number of teachers implementing the innovation by three to five in each school.

Table 10

Demographics of School Leaders

Participant pseudonym	Years as the principal	Years as a school leader	Years as a teacher	Teachers	Mathematics teachers
Rob Gore	1	7	7	48	27
Bill Monk	Less than 1	3	4	50	24
Cheryl Link	11	11	16	43	20
Rachel White	Less than 1	1	15	40	21
Craig Mann	1	8	10	40	19

The 12 teachers who volunteered to participate in the survey represented four of the five elementary schools in the district. I gathered the data for Table 11 anonymously via electronic surveys. Seven of the teachers had between 11 and 20 years of experience, five had between 5 and 10 years of experience and one had between 21 and 30 years of experience. Because of the

anonymity of the participants as per the IRB and the research design, more extensive data on these participants were not collected.

Table 11

Demographics of Teachers

Participant Identification Number	Grade	Number of years teaching
1	Fourth	11-20
2	Kindergarten	5-10
3	Third	11-20
4	First	11-20
5	Kindergarten	5-10
6	Third	5-10
7	Third	11-20
8	Kindergarten	5-10
9	Third	11-20
10	First	5-10
11	Kindergarten	21-30
12	Second	11-20

Measures

Both quantitative and qualitative measures were employed in this study. The quantitative instruments that were employed were the Change Facilitators Stages of Concern Questionnaire (CFSoCQ) with the school leaders and the Stages of Concern Questionnaire (SoCQ) with the teachers (Appendix C & D). The tools are very similar in the way that they assess concerns about an innovation implementation, with the distinction that the teachers are users of the innovation and the school leaders are the change facilitators (Hall et al., 1991). The SoCQ was designed to be a diagnostic questionnaire for people who are adopting an innovation and it is not meant to be evaluative. If data reveal more or less of one stage of concern, this is not a positive or a negative indication. The developers of the instrument contend that concerns are neither good nor bad; they

just are (George et al., 2006). Qualitative measures include open-ended items on the questionnaires, focus groups and semi-structured individual interviews. Several open-ended items were part of each administration of the CFSoCQ and the SoCQ survey tools although they varied slightly throughout the school year (Appendix E & F). Focus groups were utilized with the school leaders and the teachers. I conducted semi-structured interviews with each school leader. These qualitative measures assisted in collecting specific information about the concerns identified on the questionnaires. Integration of these data was key to the success of the mixed methods approach.

Quantitative measures. I used the Change Facilitators Stages of Concern Survey (CFSoCQ) with the school leaders. This instrument was developed as an extension of the SoCQ, as principals and other leaders began to be seen as essential players in the change process. The authors of this instrument identify two main purposes of the tool. The first is that by identifying the concerns of change facilitators, a better understanding of their actions in the implementation of an innovation is possible. Second, by identifying concerns of facilitators, districts are better able to assist them in developing their capacity to lead (Hall et al., 1991). The CFSoCQ measures concerns about the role of a change facilitator rather than about the innovation itself.

The questionnaire consists of 35 statements and participants are asked to rate themselves on a scale from zero to seven as to their current level of concern. Response choices range from zero or *irrelevant* to seven or *very true of me now* (Appendix C). A high concern would have a score of seven and zero represents a low concern. There are seven stages represented on the survey: *awareness or unconcerned, informational, personal, management, consequence, collaboration* and *refocusing.* Five statements on the survey represent each of the seven stages and they are scattered throughout the survey rather than clustered by stage. High scores on stage

zero or the *Unconcerned* Stage indicates that the innovation is not a high concern and likely the attention of the participant is focused elsewhere. Stage 1 *Informational* concerns are high when the change facilitator's concern is related to needing to know more about the innovation and its implementation. High *Personal* concerns at Stage 2 indicate a lack of confidence in facilitating the innovation as well as a lack of confidence in the organizational support provided. The third stage of concern or *Management* focuses on the time, logistics and resources that are needed for innovation implementation. Stage 4, the *Consequence* Stage, is characterized by concerns about increasing the positive effects of the innovation by improving one's own change facilitation skills. Stage 5, the *Collaboration* Stage, finds change facilitators' concerns about increasing their own capacity by collaborating with others. The last stage of *Refocusing* is seen when a change facilitator has had experience with the innovation and their concerns lie in looking for other ways to maximize impact (Hall et al., 1991). The instrument was designed as a developmental scale for measuring concerns of change facilitators.

The reliability and validity of the CFSoCQ was established in 1981 when 589 surveys were administered and subsequently analyzed. The means, standard deviations and alpha coefficients for each of the stage scales are presented in Table 12. After 1981, another 750 CFSoCQ were administered and scored and the results produced essentially identical statistics (Hall et al., 1991).

Table 12

Means, Standard Deviations and Alpha Coefficients for the CFSoCQ

Stage	0	1	2	3	4	5	6
Means	11.99	16.91	13.04	17.90	25.88	25.86	9.07
SDs	5.94	9.49	6.32	7.30	6.34	6.99	6.52
Alphas	.61	.85	.62	.72	.70	.77	.81

Note. N=589, Means, Standard Deviations and Alpha Coefficients for the CFSoCQ. Adapted from "Measuring Change Facilitator Stages of Concern: A Manual for Use of the CFSoC Questionnaire," by G. E. Hall, B. W. Newlove, A. A. George, W. L. Rutherford, & S. M. Hord, S. M., p. 26. Copyright 1991 by the Concerns Based Systems International.

The Stages of Concern Questionnaire (SoCQ) was originally developed in 1974 and consists of 35 items that require a Likert scale response. Response choices range from zero to seven representing *irrelevant* to *very true of me now* (Appendix C). A high concern would have a score of seven and zero represents a low concern. Teachers' concerns can then be clustered into seven different stages. The stages of concern are *Unconcerned*, *Informational*, *Personal, Management, Consequence, Collaboration* and *Refocusing*. High scores on Stage 0 or *Unconcerned* indicates that the innovation is not a high concern and likely the attention of the participant is focused elsewhere. Stage 1 *Informational* concerns are high when the participant's concern is related to needing to know more about the innovation and its implementation. High *Personal* concerns at Stage 2 indicate an uncertainty about being able to meet the demands of the innovation. The third stage of concern or *Management* focuses on the efficiency issues like time, logistics and resources needed for innovation implementation. Stage 4, the *Consequence* Stage, is characterized by concerns about the innovation for students and student learning. Stage 5, the *Collaboration* Stage, includes teachers' concerns about collaborating with others. The last stage of *Refocusing* is seen when a participant has ideas about other innovations that may work better (George et al., 2006).

The seven stages of concerns for both the CFSoCQ and the SoCQ are grouped into three categories or phases. These categories are helpful in identifying where the predominance of concern lies. The initial stages of *Unconcerned*, *Informational* and *Personal* concerns are labeled as *Self* concerns. The primary focus of *Self* concerns is on how this change will affect me personally. The CFSoCQ *Self* concerns are concerns about one's role as a change facilitator. The *Management* Stage is the *Task* concerns phase. In this phase, teachers become concerned about how the innovation will actually happen. The CFSoCQ *Task* concerns are centered on the "how to" of change facilitation. The final phase are the *Impact* concerns and they include the stages of *Consequence, Collaboration* and *Refocusing* and these concerns are centered on the effectiveness of the program and the impact on students. The CFSoCQ *Impact* concerns include concerns about improving one's own facilitation skills and increasing the benefit of the innovation to users (George et al., 2006; Hall et al., 1991).

The validity of the SoCQ was tested using correlation matrices and factor analysis. A simplex pattern was found on each scale indicating that the items can be arranged on a scale from most similar to least similar. This means that the items will be most similar to those in close proximity on the scale and least like those farthest away. This validated the scales on the pilot SoCQ as being a valid measure of a stage of concern (George et al., 2006). The reliability of the instrument was determined by examining the coefficients of internal consistency for each stage scale. "These coefficients reflect the degree of reliability among items on a scale in terms of overlapping variance" (George et al., 2006, p. 20). Table 13 below identifies the studies that were done, sample size and the coefficients of reliability for each stage scale in each study.

Table 13

Coefficients of Internal Reliability for Different Stages of Concern Questionnaires

		Stage Scales						
Authors	N	0	1	2	3	4	5	6
Hall, George & Rutherford, 1979	830	.64	.78	.83	.75	.76	.82	.71
Van den Berg & Vandenberghe, 1981	1585	.77	.89	.86	.80	.84	.80	.76/.73*
Kolb, 1983	718	.75	.87	.72	.84	.79	.81	.82
Barucky, 1984	614	.60	.74	.81	.79	.81	.79	.72
Jordan-Marsh, 1985	214	.50	.78	.77	.82	.77	.81	.65
Martin, 1989	388	.78	.78	.73	.65	.71/.78*	.83	.76
Hall, Newlove, George, Rutherford & Hord, 1989	750	.63	.86	.65	.73	.74	.79	.81

* In two studies, authors have proposed two subscales in place of the original SoC scale

Note. Coefficients of Internal Reliability for Different Stages of Concern Questionnaires. "Measuring Implementation in Schools: The Stages of Concern Questionnaire," by A.A. George, G. E. Hall & S. M. Stiegelbauer, p. 18. Copyright 2006 by the Concerns Based Systems, International.

For this study, I utilized an electronic survey format for the CFSoCQ and the SoCQ managed by SEDL. Formerly known as the Southwest Educational Development Laboratory, SEDL is a not-for-profit organization that supports education research, dissemination and development. They hold the copyright for the SoCQ and CFSoCQ and have created an electronic platform to administer the survey and report the results. This electronic instrument collected data on all seven Stages of Concern. These quantitative measures provided a baseline for the qualitative data inquiry.

Qualitative measures. I employed open-ended survey items, focus groups and semi-structured interviews as the qualitative methods in this study. Open-ended items were part of each survey. Dr. Benjamin Dotger engaged school leaders and teachers in focus groups of approximately 45 to 60 minutes in length in December and March. I conducted individual semi-

structured interviews in March lasting between 45 and 60 minutes. All focus group meetings and individual interviews were recorded and transcribed. Both the focus group and the interview methodology provided me an opportunity for further elaboration of the concerns captured from the surveys. Focus groups allowed participants to share in the meaning making of the experience. They validated their feelings and articulated the experience in a co-constructionist way (Kitzinger, 1995). For example, when teachers shared feelings of being overwhelmed with the materials in the new program they were able to validate those feelings in focus groups when others concurred. Focus group methodology allowed teachers to share their frustrations and problem solve together. Interviews with each school leader provided a unique lens to view and understand their actions with regard to leading the implementation of *My Math* in their school. Focus group items for school leaders and teachers as well as interview questions for school leaders were aligned to the Stages of Concern and the Change Facilitator Stages of Concern (Appendices F, G & H).

The individual interview measure accommodated the school leaders who may have been reluctant to share their concerns or their actions within their peer group. I was not the lead evaluator for any of the elementary principals in order to minimize the potential for an individual interview with me to be coercive. Additionally, I met monthly with all school leaders in individual meetings and therefore the setting for this method had a familiar feel.

The data collected from the surveys and the focus group informed the school leader interview items. The goal of this measure was to invite school leaders to elaborate on their concerns and the interventions that they used in response to teachers' concerns throughout the innovation implementation. The goal of the broader group of qualitative methods was to provide clarification and elaboration of the quantitative data from the questionnaires.

Limitations

The methodological limitations of this study that are most salient are the integration of quantitative and qualitative data, the limitations of survey data, and the small sample size. The challenge of utilizing a mixed methods approach is in the mixing of the data. Integration of qualitative and quantitative data that maximize research findings is the gist of the mixed methods approach: "This can raise a number of challenges for the novice researcher for without considering some form of integration, mixed methods may be viewed as two separate and discrete qualitative and quantitative research projects" (Greenwood & Terry, 2012, p. 102). Additionally, Greenwood and Terry (2012) propose that the key to an integrated research process is to plan for integration in all stages of the process and ensure that the findings are integrated. In order to mitigate this limitation, data integration and linkages were made between each quantitative and qualitative data set that served to inform the next measure by the use of overlapping items.

Second, one of the drawbacks of administering a survey or questionnaire is that you cannot always discern the true meaning of the responses when using an instrument like a Likert scale. In *Measuring Implementation in Schools*: *The Stages of Concern Questionnaire,* George et al. (2006) suggest, "interpretations must be treated as hypotheses to be confirmed by the respondent, with their confirmation or rejection used to adjust or adapt the hypotheses ” (p. 31). Harris and Brown (2010) offer additional caution in using survey data when measuring a complex construct like concerns. Smith (2006) states that the results from quantitative and qualitative measures should be considered not so much as confirmatory or divergent, but rather as complementary (as cited in Harris & Brown, 2010). In order to accommodate for this limitation, qualitative measures were incorporated to enhance the value of the survey data.

Additionally, opportunities for both teachers and school leaders to support their survey responses with open-ended item responses were part of the design. Specifically, open-ended items for teacher participants to complete in the fall were *additional comments*, *please describe what you perceive to be the greatest benefit of the innovation*, and *please describe any significant barriers to your participation in the innovation*. Open-ended items were modified for each sample group during subsequent administrations in an attempt to support the questionnaire data.

All of these cross-sectional qualitative data pieces helped to enhance the meaning and utility of the survey data. Additionally, I transformed some of the survey items into questions when meeting with focus groups and when interviewing school leaders. For example, teachers were asked to respond on the questionnaire to the item measuring Stage 1- I have a very limited knowledge about *My Math*. In an attempt to further identify specific Stage 1 concerns, during focus groups, teachers were asked to comment on -Are there aspects of *My Math* that you would like to know more about? Are there aspects of *My Math*, where you feel like you know what you need to know? The alignment of items provided opportunities for elaboration on survey items that merit more explanation to be fully understood.

The samples in this study served as a limitation because both samples were small and all participants in the research were employees of the same city school district. This study was further limited by the fact that I worked in the district and my position as Assistant Superintendent for Curriculum and Instruction may have been a limitation. The internal sampling of all of the elementary school leaders allowed for a detailed examination of one setting (Bogdan & Biklen, 2007).

Self-reporting issues also plague questionnaires and interviews. The self-reporting issues in this study posed a potential limitation and I consider this in the discussion of results.

> Studies have found that people can simultaneously hold conflicting conceptions and beliefs (Marton & Pong, 2005; Pajares, 1992), which may cause them to respond in seemingly contradictory or inconsistent ways. Oei and Zwart (1986) suggested that participants actually respond differently to questionnaire and interview prompts, claiming that face-to-face interviews trigger strong affective responses while questionnaires permit a wide range of responses, of, perhaps, a more cognitively dispassionate nature. (Harris & Brown, 2010, p. 2)

Among the six recommendations from Harris and Brown (2010) to increase the probability that the questionnaire and focus group data align are ensure items are highly structured, separate data collection by short periods of time and present the object of interest in a concrete way. In response to these suggestions, I ensured that the survey items and the focus group prompts were similar in nature. The data collection process began with the administration of the first survey at the end of September followed by focus groups at the beginning of December. In the second round, the survey was administered at the end of January and focus group meetings were held in March. The last survey was administered at the end of May. This timeline separated the data collection by only a short period of time. The object of interest or the focus of the research questions was presented in a concrete way with clear and specific focus group questions to the change facilitators. These questions directly asked school leaders about how they were facilitating the implementation of *My Math* and what their concerns were around

this part of their work. Likewise, the teachers were asked directly how the school leader was facilitating the implementation of *My Math* and what concerns they had around this part of the work.

Analysis

Quantitative data. I calculated raw and percentile score data from the CFSoCQ for the cohort of five school leaders and for individual school leaders. Raw scores were calculated based on the responses to the 35-item CFSoCQ. Each item is set up with a 7-point Likert scale response option. The percentile scores are calculated via a conversion chart established by the authors of the CFSoCQ and they originate from the raw score data on each stage (Appendix I). The CFSoCQ percentiles are based on the original administrations of the survey to 589 participants in 1981 (Hall et al., 1991). In the CFSoCQ, Stages one and six are focused on the actual innovation, which is the *My Math* program. Stage zero and Stages two through five are focused on the change facilitator role (Hall et al., 1991). This varies from the SoCQ where each stage is focused on the innovation itself. Data from the CFSoCQs were reviewed as line graphs with different colors representing the different administrations of the survey.

The relative intensity of each stage of concern provided me with an indication as to whether or not that stage was of high concern or low concern for the cohort of school leaders at a particular point in the school year. I used these percentiles in conjunction with the qualitative data to support research question 1a. This question centers on identifying the concerns of school leaders during the implementation of *My Math.*

I collected raw score data on each of the seven stages of concern from the SoCQ during each of the three administrations of the survey. The SoCQ responses generated raw scores from

individual responses on the Likert scale 35-item survey. Once a raw score was calculated, it was converted to a percentile using the chart in the SoCQ manual (Appendix K). "The (SoCQ) percentiles are based on the responses of 830 individuals who completed the 35-item questionnaire in the fall of 1974" (George et al., 2006, p. 26). The SoCQ usually notes a progression through the seven stages as aligning with the progression of the innovation implementation (George et al., 2006). This supported the prediction that early stage concerns should lessen from fall to spring.

I analyzed the raw score and percentile data at the cohort and individual teacher level. These data were displayed in a profile graph or a line graph indicating the level of concern at different stages for the individual or cohort. Several administrations of the survey can be shown on one graph and this allowed the researcher to examine high stage concerns, low stage concerns and changes in concerns over time.

Similar to the CFSoCQ, these percentiles were used in conjunction with the qualitative data to support research question 1b. This question centered on identifying the concerns of teachers during the implementation of *My Math.*

Qualitative data. An initial review of open-ended item data, focus group data, and semi-structured interview data was completed and notes were taken. Descriptive codes were developed that aligned with the seven Stages of Concern for teachers and the seven Change Facilitator Stages of Concern for school leaders (Appendix L). These data were in support of research question number one or the identification of concerns. Additional codes for interventions were developed to support research question number two. A cluster of data from the responses to the question about how school leaders supported teachers during the innovation

implementation required additional codes. Although these data represented change facilitator *Management* concerns, identifying the specific types of interventions employed was necessary to support the second research question. This question focused on the perceptions of support or actions taken by principals for innovation implementation.

Open-ended items. During each administration of the CFSoCQ and the SoCQ, several open–ended items followed the 35-item 7-point Likert scale questionnaire. These open-ended items varied with each administration based on data collected and on the change literature. The qualitative data from each item were reviewed and coded according to the Stages of Concern and Change Facilitator Stages of Concern coding matrix (Appendix L). These data supported a description of the specific concerns faced by teachers and school leaders and the interventions employed by school leaders.

Focus groups. Dr. Benjamin Dotger recorded the qualitative data from two teacher focus groups and from the one school leader focus group. These data were then transcribed and after an analysis of the transcription, I took notes and developed an initial coding scheme. The SoC and CFSoC models lend themselves to a concise and aligned structure for developing codes. Each stage in the Stages of Concern or Change Facilitator Stages of Concern model was a different code. For example, I used the code INFO to identify data indicating a teacher wanting to know more about the innovation or concerns at Stage 1. I utilized MGMT to code data relative to a teacher's comment about managing the innovation or concerns at Stage 3, and COL as a code for data that revealed a teacher's interest in working with others to implement the innovation or concerns at Stage 5. For the school leader data, codes were similar in that CFINFO was used for data indicating that the change facilitator wanted more information about the innovation or concerns at Stage 1 and CFCOL indicated that a school leader wanted to work with others to

improve her facilitation skills or concerns at Stage 5. Additional codes were created relative to parent concerns as voiced by teachers and school leaders and they were identified as PAR and CFPAR.

Semi-structured interviews. I recorded the interview data from each school leader. These data were transcribed and I coded them and the qualitative data from the focus groups and open-ended responses according to the SoC and CFSoC coding scheme. I mined data in this analysis that provided elaboration on the specific concerns of teachers and school leaders. For example, if the quantitative data revealed teachers' high *Management* or Stage 3 concerns in September, do those concerns still exist in December and if not what has changed? If the *Management* concerns remained, what specifically were those concerns? These data supported research question number one by identifying the concerns of teachers and school leaders. Additionally, interview items asked school leaders about the actions taken to support the implementation of *My Math*. These data supported research question number two.

Data linkages and triangulation are both terms used in mixed methods that can be useful in explaining the ways that quantitative and qualitative methods are mixed or integrated. Both concepts provide additional strength to utilizing a mixed methods approach to social research. Miles and Huberman (1994) describe data linkages and contend that the linkages between the quantitative data in a survey and the qualitative data from a focus group can be made in order to confirm, corroborate, analyze, and elaborate on data to provide a richer picture. Furthermore, new lines of inquiry may have emerged when data were linked. The data linkages with my topic were a central component of the analysis. I examined these data for possible linkages through the creation of a concerns matrix that presents the SoC and CFSoC models compared to the quantitative and qualitative data. If the highest concern of the teachers on the questionnaire is

Collaboration, does qualitative data from the teachers show the same result? These linkages facilitated the identification of specific findings that may inform current and future efforts around innovation implementation in schools.

Procedures

This section identifies the data collection schedule for the research study. A description of the analysis follows the schedule. Data were collected consistently through the 2013-14 school year as specified in Table 14. This was the initial year of the *My Math* implementation. By continuing the data collection process throughout the entire school year, I anticipated that the Stages of Concern would vary. The survey data were used in conjunction with qualitative data to generate findings. Additionally, through these data, I identified perceptions and actions of support provided to teachers by school leaders in an attempt to facilitate innovation implementation.

Table 14

Data Collection Schedule

Month/Year	**Participant Group**	**Data Collection Method**
September 2013	School Leaders	CFSoCQ
September 2013	Teachers	SoCQ
December 2013	School Leaders	Focus Group
December 2013	Teachers	Focus Group
January 2014	School Leaders	CFSoCQ
January 2014	Teachers	SoCQ
March 2014	School Leaders	Semi-Structured Interviews
March 2014	Teachers	Focus Group
May 2014	School Leaders	CFSoCQ
May 2014	Teacher	SoCQ

Note. CFSoCQ=Change Facilitator Stages of Concern Questionnaire, SoCQ= Stages of Concern Questionnaire

The surveys were administered electronically for school leaders and teachers and an email was sent to them with the link to the survey and the required password. During each

administration of the survey, several subgroup data items were asked at the beginning of the survey and open-ended items were asked following the questionnaire. The survey window was approximately one month per administration. After the initial survey completion, I sent out another recruitment letter to teachers because one elementary school had no teacher representation in the study. Two additional teachers were added to the study in January; however neither was from the missing school.

In December, focus groups of teachers and school leaders were conducted. Dr. Benjamin Dotger from Syracuse University facilitated both focus group meetings. The questions aimed to collect data on the specific concerns of each group at a given point in the school year.

For the school leaders and teachers, questionnaires were administered in September, January and May of the 2013-14 school year. The data collection schedule provided for the collection of data on the stages of concerns of change facilitators and teachers at three different points during the initial year of implementation of the innovation. Data from the surveys were analyzed by examining the cohort and individual stage scores of principals and teachers during the beginning, middle and end of the initial year of implementation of *My Math*.

Summary

Historically, the merits of a mixed methods research design have been rigorously debated. Critics remain vocal as to the cautions of a mixed methods research study. Some claim that when methods are mixed, a serious threat to validity is created (Morse, 2003). The potential concerns of any mixed methods research project center around alignment. The alignment of theory, methods and findings are essential in designing a research project that adds value to the field. Because this research focuses on a sociological topic involving people where change is

complex and nuanced, the continual probing of individuals to collect data on behaviors and perceptions was the challenge. By incorporating some open-ended items and by overlapping survey and focus group items, the usefulness of the findings was increased.

This research focused on the concerns of school leaders as change agents in schools. I collected and analyzed evidence of the interventions employed by school leaders while facilitating change in their schools. This information could prove to be valuable to the school improvement process.

Chapter Four

Results

I undertook this study to examine the concerns that school leaders and teachers exhibit when implementing a new elementary mathematics program. I was particularly interested in the supports offered by school leaders in light of the concerns exhibited by teachers. The methodology I employed included questionnaires, open-ended items, focus groups and semi-structured interviews. These data contribute to an understanding of the concerns that school leaders and teachers have at different points in the implementation process. Specifically, two research questions and four sub-questions directed the data collection. This chapter revisits the research questions and reports these data.

Research Questions

1-What concerns are exhibited by teachers and school leaders during the implementation of the *My Math* innovation?

1a. As reported by the Change Facilitator Stages of Concern (CFSoCQ), focus groups and interviews, what concerns do school leaders exhibit during the *My Math* implementation process?

1b. As reported by the Stages of Concern Questionnaire (SoCQ) and focus groups, what concerns do teachers exhibit during the *My Math* implementation process?

2-What actions or perceptions of support do school leaders and teachers report in the facilitation of the *My Math* program?

2a. What actions or perceptions of support do school leaders report they are taking in the facilitation of the *My Math* implementation process?

2b. What actions or perceptions of support do teachers report that school leaders are taking in the facilitation of the *My Math* implementation process?

In this chapter, data are presented for school leaders and for teachers in order of the research questions. School leader data are presented relative to the Change Facilitator Stages of Concern and teacher data are presented relative to the Stages of Concern. As described in Chapter Two, both of these models have seven distinct stages. In both models the stages are grouped into three developmental phases. Stages 0, 1 and 2 are identified as the *Self* concerns, Stage 3 concerns are the *Task* concerns and Stages 4, 5, and 6 are the *Impact* concerns. *Self* concerns focus on a need to understand the innovation and user adequacy. *Task* concerns focus on the nuts and bolts of implementation, including materials and pacing. *Impact* concerns center on how students are responding to the innovation, collaboration with other users, and a consideration of alternatives. Concerns typically move from being about self to managing the task and finally to impact.

Data from school leaders are presented first with the quantitative data reported in support of research question 1a. This question focuses on identifying the concerns of school leaders. The school leader data summary includes patterns and trends from the CFSoCQ fall, winter and spring collection periods. Data are reported for both the cohort and for individual school leaders. A summary of the qualitative data from the school leaders' open-ended item responses, focus group discussion and semi-structured interviews are presented next. These data are arranged according to school leaders' concerns, teachers' concerns and the interventions that school

leaders provided to teachers. These categories support research questions 1a, 1b and 2a respectively. A statement summarizing the outliers in these data complete the section.

Teacher data are presented following the same structure. These data are discussed relative to the two research questions. Unlike the school leader data, the teacher data includes results supporting research question 2b or the perceptions of support from school leaders as described by teachers. The chapter concludes with a summary.

School Leaders' Quantitative Results

Change facilitator stages of concern questionnaire. The quantitative data presented in this section were collected from three administrations of the Change Facilitator Stages of Concern Questionnaire (CFSoCQ). The CFSoCQ is a 35-item survey instrument that uses a 7-point Likert scale. The CFSoCQ was administered in the fall, winter and spring of the 2013-14 school year. This was the initial year of implementation of *My Math* in the Plymouth Central School District. Five elementary school leaders in the district were the participants in each administration of the survey.

In the Change Facilitator Stages of Concern model, Stage 1 *Informational* and Stage 6 *Refocusing* concerns are about the innovation itself. All of the other stages in the model are focused on concerns relative to the change facilitation role. This distinguishes the CFSoC from the SoC where all stage concerns are relative to the innovation and the user of the innovation. The reader should keep this distinction in mind when reviewing the school leader results.

Five items on the 35-item CFSoCQ are aligned with each of the seven Stages of Concern constituting seven separate stage scales (Appendix M). Raw scores for individual school leaders and for the cohort were calculated. Mean percentile scores for each stage were determined using

a conversion chart (Appendix J). With a sample size of five, descriptive statistics are presented. Highest and second highest stage scores as well as lowest stage scores are reported.

School leader cohort data. This section reports the data that are aligned with research question 1a, *as reported by the CFSoCQ, what concerns do school leaders exhibit during the My Math implementation process?* The cohort data from the three administrations of the CFSoCQ are presented in a profile graph (Figure 5) displaying the mean stage scores in fall, winter and spring.

According to Figure 5, findings showed *Unconcerned* stage scores were highest and *Consequence* concerns were lowest in each administration of the CFSoCQ. The highest stage score for the cohort during all administrations of the CFSoCQ was Stage 0 *Unconcerned*. The highest *Unconcerned* score for the cohort was 94% and it occurred during the spring data collection period. The second highest stage score across all three administrations was at Stage 2 *Informational* and this was highest in the fall at 64%. The lowest score in all three administration of the CFSoCQ was Stage 4 *Consequence* with the lowest score of 3% coming during the winter.

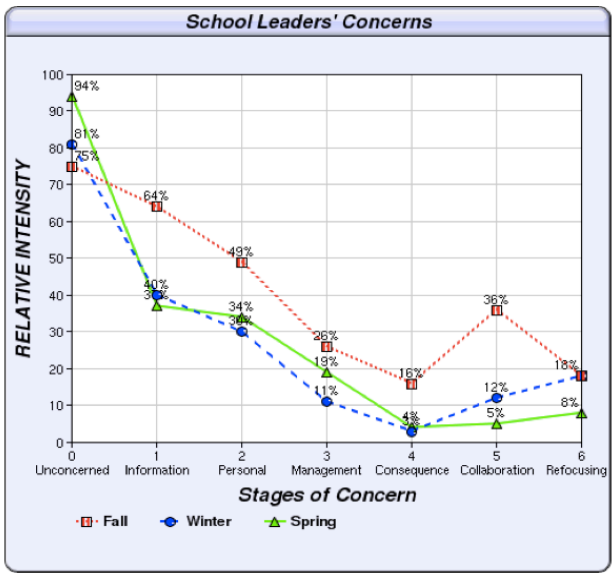


Figure 5- School Leaders' Stages of Concern Profile Graph

In an effort to shed light on the change process over time as experienced by groups and individuals, these data are reported next in terms of percentile change over the school year. A difference of ten or more percentile points is usually considered significant. This degree of significance has been identified with a sample size as small as 16 (Hall et al., 1991). Table 15 shows that the *Unconcerned* Stage scores increased by 19 percentile points over the school year. The second highest stage for the cohort was Stage 1 *Informational.* These scores decreased over the school year by 34 percentile points. This represents the largest overall decline. The lowest score was at the *Consequence* Stage with a decline of 12 percentile points. Additional noteworthy data from Table 15 are stage declines of greater than 10 percentile points at Stage 5 *Collaboration* and Stage 2 *Personal*. With the exception of the *Unconcerned* Stage, all other stage scores declined over the course of the school year.

Table 15

School Leader Cohort- Change in Mean Percentile Stage Scores

Collection Period/Stage	0	1	2	3	4	5	6
Fall	75%	64%	49%	26%	16%	36%	18%
Spring	94%	30%	30%	19%	4%	5%	8%
Change	19%	-34%	-19%	-7%	-12%	-31%	-10%

Note. Change= Spring subtracted from Fall

School leader individual data. In reporting the data for individual school leaders, frequency tables of highest, second highest and lowest stage scores from each of the survey administrations were generated (Hall et al., 1991). These data were extracted from Appendix O or the School Leader Individual and Mean Percentile Data chart. These individual data are reported according to the number of school leaders in each stage and as a percent of the cohort. They identify whether or not the cohort scores accurately represent each unique school leader. These data address research question 1a relative to the concerns of school leaders.

Examining the frequency of highest concerns is beneficial to the researcher to check the individual high scores. Relying solely on the mean percentile of the cohort as shown in Figure 5 might be misleading. As displayed in Table 16, these data had one tie for the highest stage score in the fall. A tie is indicated when scores fall within one to two points of each other (Hall et al., 1991). During the spring, 100% of the school leaders had their highest stage score at Stage 0. Over the school year, peak scores from 12 of the possible 16 scores were at Stage 0 representing 75% of the concerns. *Unconcerned* Stage concerns are present when school leaders' do not have intense concerns about their role as a change facilitator as their attention is on other things.

Table 16

Frequency of Highest Concerns Stage for School Leaders

Fall	0	1	2	3	4	5	6	Total
School Leaders	3	2	0	0	0	1	0	5*
School Leaders (%)	50%	*33%	0	0	0	*17%	0	100%
Winter	0	1	2	3	4	5	6	Total
School Leaders	4	0	0	0	0	1	0	5
School Leaders (%)	80%	0	0	0	0	20%	0	100%
Spring	0	1	2	3	4	5	6	Total
School Leader	5	0	0	0	0	0	0	5
School Leaders (%)	100%	0	0	0	0	0	0	100%
Total Scores	12	2	0	0	0	2	0	16

Note. *= Tie, N=5

Reporting the second highest stage of concern allows for a deeper analysis of the data and provides another lens through which to consider the stage model. Adjacent stages typically have similar scores (Hall et al., 1991). Table 17 shows that the *Self* Stages, were predominantly second highest among the five individual school leaders. These data saw four ties resulting in 19 possible scores. Nine of the possible 19 scores representing 47 % were at Stage 1 *Informational*. Four of the possible 19 scores were at Stage 2 *Personal* Concerns and two were at Stage 0. Over

the course of the year, 15 of the 19 possible second highest scores representing 79% of the concerns were at the *Self* Stages. *Self* concerns are indicated when school leaders' have their attention on other things, want to learn more about the innovation and are thinking about their adequacy as a change facilitator.

Table 17

Frequency of Second Highest Concerns Stage for School Leaders

Fall	0	1	2	3	4	5	6	Total
School Leaders	1	2	1	0	1	1	0	*6
School Leaders (%)	16.75%	33%	*16.75%	0	*16.75%	16.75%	0	100%
Winter	0	1	2	3	4	5	6	Total
School Leaders	1	3	2	0	0	1	1	*8
School Leaders (%)	*12.5%	*37.5%	*25%	0	0	*12.5%	12.5%	100%
Spring	0	1	2	3	4	5	6	Total
School Leader	0	4	1	0	0	0	0	5
School Leaders (%)	0	80%	20%	0	0	0	0	100%
Total Scores	2	9	4	0	1	2	1	19

*Note. *= Ties, N=5*

Lowest stage scores are presented in a frequency table in order to check the cohort data for distinct subgroups. Lowest stage scores for the cohort over the school year were at Stage 4 *Consequence* concerns. Table 18 shows a total of 11 ties resulting in 26 possible lowest scores. Ten of the 26 possible scores were at Stage 4 *Consequence*. *Refocusing* concerns had eight lowest scores. Six lowest scores were at Stage 5 *Collaboration*. The *Impact* Stages had the overall lowest concerns with 24 of the 26 possible scores representing 92% of the concerns. Low *Impact* Stage scores indicate that school leaders' were not concerned about becoming better change facilitators or about collaborating with other change facilitators to improve their skills. Additionally, they did not have ideas about alternatives to the innovation.

Table 18

Frequency of Lowest Concerns Stage for School Leaders

Fall	0	1	2	3	4	5	6	Total
School Leaders	1	0	0	0	2	1	4	*8
School Leaders (%)	*12.5%	0	0	0	*25%	*12.5%	*50%	100%
Winter	0	1	2	3	4	5	6	Total
School Leaders	0	0	0	1	4	2	2	*9
School Leaders (%)	0	0	0	*11.1%	*44.5%	*22.2%	*22.2%	100%
Spring	0	1	2	3	4	5	6	Total
School Leader	0	0	0	0	4	3	2	*9
School Leaders (%)	0	0	0	0	*44.5%	*33.3%	*22.2%	100%
Total Scores	1	0	0	1	10	6	8	26

Note. *=Ties, N=5

Further analysis of individual school leader quantitative data reveals some distinctions. In the fall, Rachel White had a *Collaboration* stage score of 67%. Rachel White was in her first year as a principal. This was also her first time being evaluated using the new APPR. Her highest concerns in winter were at *Unconcerned* Stage 0 and her second highest stage score was at the other end of the model or Stage 6 *Refocusing*. *Refocusing* concerns are intense when the change facilitator is considering a more powerful alternative to the innovation. Rachel White, formerly a professional learning coach at BOCES (Board of Cooperative Educational Services), worked with two other school districts to examine the NYSED curriculum modules for mathematics. This experience provided her with a high level of awareness of another option. Stage 6 did not remain as a peak score for Principal White during the spring administration indicating a reduction in her *Refocusing* concerns.

The second principal to vary from the cohort was Principal Cheryl Link with the most distinct scores in the cohort. Cheryl Link was the principal with the most experience in the sample. Her peak stage concerns and her lowest concerns were situated at opposite ends of the

model during the fall. Cheryl Link had a non-conforming profile with high scores of 34% and 36% at Stages 1 and 5 respectively. These scores suggest that she wanted more information about the innovation and she wanted to learn with her colleagues about how to manage this change effectively. Her total concern scores were low; perhaps as a result of her experience both as a school leader and as a teacher.

In summary, quantitative data collected from the three administrations of the CFSoCQ identified the mean percentile of the five school leaders' scores to be at *Unconcerned* Stage 0. Adjacent Stage 1 *Informational* concerns were second highest for the cohort although the *Self* concerns were second highest scores for the majority of the individual school leaders. The lowest mean percentile scores for the cohort were at Stage 4 *Consequence* while the *Impact* Stages were the lowest for the individual school leaders. Qualitative data are reported next to elaborate on these results.

School Leaders' Qualitative Results

The social nature of schools lends itself to research involving qualitative methods because the dynamic relationships among people in schools are central to change. In this study, the qualitative results serve to support and elaborate on the quantitative data. Open-ended item responses from fall, winter and spring administrations of the CFSoCQ, focus group data from December 2013, and semi-structured interviews from March 2014 are the three qualitative data sets reported in this section. These data are summarized and categorized into school leaders' concerns, teachers' concerns and school leaders' interventions. These categories are aligned with research questions 1a, 1b and 2a, respectively.

Open-ended items. The open-ended items on the CFSoCQ varied with the three administrations of the questionnaire (Appendix E). Relative to research question 1a that aims to identify the concerns of school leaders, the open-ended items were coded using the change facilitator concern codes (Appendix K). These codes were developed in accordance with the CFSoC model. For example, CFPER represents Change Facilitator Stage 2 *Personal* concerns. Data from the open-ended item responses are reported next.

School leaders' concerns. In the fall, school leaders were asked about benefits and barriers to *My Math* implementation. The narrative comments from school leaders included "The implementation of *My Math* is progressing well.", and "*My Math* is a consistent and aligned program". Two school leaders referenced the demands of running a school as taking priority over the implementation of *My Math*. These represent *Unconcerned* change facilitator concerns. Overall, school leaders' narratives in the fall indicated satisfaction with the program itself. One school leader noted, "There has not really been time to dig into it yet". Wanting more information about the innovation is an *Informational* change facilitator concern. Another school leader expressed a concern about not having a mathematics coach to support teachers. This comment indicates a change facilitator Stage 2 *Personal* concern as it reveals feelings of uncertainty about one's role in facilitating the change. On the seven-stage model for change facilitator concerns, the first three stages of the model are grouped together and labeled *Self* concerns. These data from the fall open-ended responses of school leaders can be labeled as change facilitator *Self* concerns.

During the winter administration, narrative comments included, "No major concerns have been reported.", "This roll out went okay- teachers are invested and really like the program.", and "The implementation has been smooth and has demanded very little from me". School

leaders shared that they have other demands on their time associated with running the building. These *Unconcerned* thoughts indicate that facilitating this change is not of high concern at this time.

Additional comments from the spring data collection period on the open-ended items indicated a predominance of *Unconcerned* comments. Among these were "The implementation is going well.", and "The teachers are satisfied". One principal suggested that a coordinator for *My Math* be hired to support the implementation. This represents a *Personal* concern because it represents feelings of inadequacy as a change facilitator.

Teachers' concerns. In the winter, school leaders were asked to comment on the concerns expressed by teachers to support research question 1b. Two school leaders stated that teachers were happy with the program. One school leader described teachers' *Management* concerns and specifically noted difficulties with the overwhelming amount of material, making copies, and the sequencing or pacing of the program. Additional teachers' concerns noted by school leaders were related to outcomes, rigor and true alignment to the CCLS. These represent teachers' *Consequence* concerns. Teachers want to be sure that this program will benefit their students. In the winter, teachers' concerns were predominantly at the *Management* and *Consequence* Stages as reported by school leaders.

In the spring, the school leaders were asked again about the concerns expressed by teachers and three of the five school leaders stated that no concerns were brought to their attention. One leader mentioned teachers' *Management* concerns regarding adjustment of the student workbooks. Another narrative referenced teachers' *Consequence* concerns about, "Supplementing instruction for students who do not meet the benchmarks", and "How to support

families in learning math differently". Teachers' concerns at this time of year were at the *Unconcerned*, *Management and Consequence* stages as reported by school leaders.

School leaders' interventions. In support of research question number 2a, open-ended items in the winter and spring asked school leaders to describe the supports that they provided to help with the implementation of *My Math*. These responses were coded as change facilitator *Management* concerns (CFMG). These actions were labeled as management concerns because they focused on how to facilitate change. Narrative responses centered on providing time for teachers (CFMGTI) and material supports (CFMGMAT). References to time were discussed in relation to having time during faculty meetings, grade level meetings and co-planning sessions to work on *My Math*. Time with BOCES trainers, technology staff developers and instructional coaches was also mentioned as part of the intervention labeled time. Material supports referred to the exchange of student workbooks midway through the school year as a result of publisher changes. One school leader shared that she provided professional development (CFMGPD) to teachers in a faculty meeting on sprints and bar modeling. This was done in order to address concerns about rigor. These data represent school leader interventions as reported by the school leaders.

Focus group. In December, Dr. Benjamin Dotger from Syracuse University facilitated a focus group meeting with the five elementary school leaders. Transcriptions from the focus groups were coded and concern strands were identified. These data are presented according to school leader concerns, teacher concerns and school leader interventions.

School leaders' concerns. The narratives from the five school leaders included a predominance of *Unconcerned* thoughts. School leaders noted a lack of concern because teachers

were happy. “No smoke, no fire,” remarked one school leader. *Informational* concerns were shared relative to wanting to know more and what to look for. *Personal* concerns that emerged from these data were how to hold teachers accountable and how to supervise *My Math* effectively were. One school leader expressed concerns relative to the NYSED focus review process. Because these concerns centered on the adequacy of the change facilitator role, they are labeled as Stage 2 *Personal* concerns. Additionally, a majority of the school leaders exhibited *Task* or Stage 3 *Management* concerns around the “how-to" of helping parents to understand the structure and approach of *My Math* to assist their child(ren) at home. The school leaders concerns’ can be identified as *Self* and *Task* concerns.

Although other priorities were mentioned during the focus group meeting and in the interviews, all school leaders identified their observations of classroom practice as being somewhere on their list of priorities. Qualitative data revealed that observing English Language Arts was unanimously a higher priority than observing mathematics; however, an attempt to observe mathematics lessons was made by all school leaders. Qualitative comments from two principals who made evaluating *My Math* lessons a priority indicated that these classroom observations provided them with valuable insight into teachers’ concerns. Principal Craig Mann noted “I think what’s become eye-opening to me is really the lessons, especially when I’m seeing it at first and second grade and actually delivered. I came to see how much time it takes.” Principal Monk noted his learning from formal observations of *My Math* lessons:

> So I can very clearly see in many of the *My Math* lessons that have been observed in formal observation that there is…they go over the learning target. Some of the teachers use the lesson introduction videos. Many of them are all using the

> computer pieces of it where they display it on the projectors, so the problems that they're working on, they display them on the whiteboard. So, I get the flow of the learning target, the displays, the videos, the guided practice, the independent practice. (Principal Bill Monk)

One school leader shared that instruction was the number one priority.

> The highest priorities in my building, I would say just instruction, plain and simple. Getting kids in the seats and making sure that instruction is delivered smoothly and that's it. There are some things that will distract a leader but in my building it's not overpowering and that's not the theme for me on a daily basis. (Principal Rob Gore)

Finally, Principal Link noted that the APPR process for formal observations allowed her to identify successful practices and highlight them for future sharing. "Well, if I find something particularly interesting and think it's going to be helpful to other teachers, I ask the teachers if they'll share that with their colleagues at staff meetings." Observing lessons prompted school leaders to consider interventions to address teachers' concerns.

Teachers' concerns. When school leaders were asked about teachers' concerns, they noted the frustration with technology as the primary concern. This concern represents teachers' *Task* or *Management* concerns. School leaders stated that the lack of rigor in the assessments was the main *Consequence* concern shared by teachers. The concerns of teachers as reported by school leaders in December centered on managing the program and making sure that *My Math* was working for students. These teacher concerns represent *Management* concerns for the change facilitators as the school leaders attempt to facilitate the use of an innovation by users.

School leaders' interventions. In support of research question 2a, school leaders identified the supports that they provided for the implementation of *My Math.* Among these were arranging for teachers to get materials, exchanging workbooks midyear, and getting access to the online portion of *My Math.* Additional interventions included providing time at faculty meetings and grade level meetings and conducting check-ins with teachers. Supporting professional development by encouraging attendance at workshops and organizing meetings with BOCES coaches were further interventions that were mentioned. Collecting evidence of implementation through classroom visits and evaluations were supports shared by school leaders. Providing information to and training for parents were the final supports identified by school leaders. These interventions represent change facilitator *Task* concerns. In Chapter Five, further discussion is provided relative to the alignment of these interventions with concerns exhibited by teachers.

Semi-structured interviews. In March of 2014, I conducted individual interviews with the five elementary school leaders. They were asked about their own concerns, the concerns of teachers and the actions of support that they provided for the facilitation of the *My Math* program. Each interview lasted between forty-five and sixty minutes. Interview data were transcribed and coded using the change facilitator concern codes (Appendix K). These data are presented here according to school leaders' concerns, teachers' concerns and school leaders' interventions.

School leaders' concerns. Relative to research question 1a, patterns were noted regarding school leaders' concerns as change facilitators. Two school leaders related their concerns as *Unconcerned* due to the fact that teachers had not exhibited concerns. Their narratives included, "It (*My Math*) has been a smooth transition for the staff which has not made it a high priority for me.", and "Anything that makes things easy for the teachers, if it's good, it

makes it easy for me". Three school leaders noted that because teachers had a high level of buy-in, teachers' concerns tended to be low. School leaders' concerns included daily priorities relative to student behavior, safety, positive climate and staffing. All school leaders mentioned instruction in their discussion of daily priorities; however, English Language Arts was unanimously a higher priority than mathematics. One school leader commented that because *My Math* is a CCLS-aligned program, concerns are generally low. All school leaders expressed low *Collaboration* concerns commenting that they hadn't collaborated with each other; and they didn't feel the urgency to collaborate since teachers' concerns were minimal. The predominance of concern for school leaders during March of 2014 was at the *Unconcerned* Stage.

Teachers' concerns. The concerns that teachers exhibited as noted by school leaders during the interviews were largely *Task* or *Management* concerns. These task concerns were related to materials and pacing. Teachers' *Consequence* concerns were also present in the narrative. Comments about needing to supplement *My Math* with additional fluency activities, consistent data analysis, and the development of more rigorous assessments were all coded as *Consequence* concerns. Overall, school leaders reported teachers' concerns as *Management* and *Consequence* concerns.

School leaders' interventions. Relative to research question number 2a and the supports that school leaders provided, school leaders felt that the teachers' concerns were not impeding effective implementation of *My Math*. This minimized the need for school leaders to intervene. According to one school leader's narrative, "I have no indication that there is anyone who has not bought into the program". All school leaders mentioned that they were involved in collecting evidence of the implementation of *My Math* in their schools. Three of the five leaders assigned the assistant principal to periodically collect evidence. They mentioned observing the *My Math*

books, the technology resources, and videos being used in the classrooms, teachers presenting multiple methods for solving a problem, and students involved in small group activities. Additional interventions shared by school leaders focused on providing time for collaboration and professional development opportunities. These interventions can be identified as change facilitator *Task* concerns.

Outlier. An examination of outliers in these data is inconsequential due to the sample size. As a result, the quantitative non-conformers are summarized and the qualitative data examined for distinct narrative comments.

The CFSoCQ data in Figure 4 identified the highest stage score for the cohort as Stage 0 *Unconcerned* and the second highest as Stage 1 *Informational.* Together, with Stage *2 Personal* concerns, these stages represent the *Self* concerns. School leaders with peak scores at the *Impact* Stages on opposite ends of the model are identified as non-conformers. As shown in Table 19, Principal Bill Monk had the second highest scores at Stage 5 *Collaboration.* Principal Rachel White also had concerns at the other end of the model at Stage 6 *Refocusing*. Principal Cheryl Link had the highest stage scores tied at Stage 1 and Stage 5. These intense concerns at Stages 5 and 6 represent *Impact* concerns and do not conform to the highest scores of the cohort at the *Self* Stages. During the spring administration of the CFSoCQ, Cheryl Link conformed to the cohort with highest scores at the Stage 0 *Unconcerned*; however, this score was 14 % while the other four school leaders had peak scores of 99%, 99%, 98% and 48%. Appendix O shows the School Leader Individual and Mean Percentile Data for each school leader at each stage and high peak scores are bolded, second highest scores are green, and lowest scores are blue.

Table 19

Non-Conforming Peak Score Stages of School Leaders

School Leader	Fall	Winter
Bill Monk	Stage 0 & 5- Peak	Stage 0 & 2/5-Peak
Cheryl Link	Stage 1 & 5- Peak Stage 0 & 6- Lowest	Stage 0/1/2 & 5-Peak
Rachel White	__	Stage 0 & 6- Peak

Lowest concerns for the cohort of school leaders were at Stage 4 *Consequence*. Non-conforming scores are at the *Self* Stages. The only non-conformer in these data was Cheryl Link. She had high Stage 4 *Consequence* scores in the fall and lowest concerns tied at Stage 0 and Stage 6. These low scores are at opposite ends of the stage model.

Based on these non-conforming data, an examination of individual items from Principal Cheryl Link is warranted. As a reminder, participants were asked to read each statement and respond with a score from 0 to 7 on the CFSoCQ. These scores represent the following sentiments: 0 is *irrelevant*, 1 is *not true of me now*, 2, 3 or 4 are *somewhat true of me now*, and finally 5, 6 or 7 indicate *very true of me now*. A clear Q-sort is indicated when item responses in one stage of concern are mostly high with scores of 5, 6 or 7 or mostly low with scores of 1-4 (George et al., 2006). A Q-sort allows for a disaggregation of individual items and is helpful in identifying the strength of the stage score. As shown in Table 20, in the individual item data for Cheryl Link no clear Q-sort was evident in the fall. In the fall, Principal Link showed consistent items scores on Stages 0, 3, 5, and 6 scales. On Stages 1, 2 and 4 in the fall, Principal Link's *Informational* Stage item scores ranged from 0 to 4 and *Consequence* Stage item scores ranged from 3 to 7.

Table 20

Fall CFSoCQ Item Raw Scores for Cheryl Link

Stage	0	1	2	3	4	5	6
	0	3	0	1	3	5	0
	0	4	1	1	3	5	0
	0	2	3	0	7	5	0
	1	0	1	0	5	4	1
	0	1	0	1	3	4	0
Totals	1	10	5	3	21	23	1
Percentile	1	34	12	2	13	36	1

Note. CFSoCQ= Change Facilitator Stages of Concern Questionnaire

More specifically, Principal Link marked item #18 as a 7 or *very true of me now*. This item asks participants to rate their level of concern on the statement; *I would like to excite those directly involved with My Math.* During the winter and spring data collection periods, the Q-sort (George et al., 2006) for Principal Link was clear. The interview data for Cheryl Link is presented next. Expressed Stage 4 *Consequence* concerns were related to learning more in order to better diagnosis need in her building to improve her change facilitation skills. Her narrative detailed, "What else can I do to support what is missing in *My Math*?" and "I plan to attend some of the *My Math* collegial circles that are coming up to hear what teachers' concerns are". Other expressed concerns from the interview were at Stage 0 *Unconcerned*. Cheryl Link stated that she had not heard any parent or student concerns, and that teachers had a high level of buy-in and minimal concerns because they had selected the program and it was the best fit. She expressed low Stage 5 *Collaboration* concerns and indicated that if teachers were more concerned, school leaders would have more of a reason to collaborate around change facilitation.

Other distinct comments in the qualitative data represented *Refocusing* concerns. One school leader believed that *Singapore Mathematics* was still a better choice. Another school

leader stated on an open-ended item in the fall, "I believe that *My Math* is a quality first step in aligning instruction, but hope the district will revisit Singapore Math or a similar approach to teaching math". These *Refocusing* concerns represent a minor part of the qualitative results. Principal Rob Gore, the leader of the school with the second highest poverty rate, had high concerns about *My Math* instruction that were revealed during the interview. In contrast to those data, the quantitative data gathered from Principal Gore conformed to the cohort with high Stage 0 scores during each administration of the CFSoCQ.

The qualitative and quantitative data collected from the five school leader participants indicate a predominance of concern at the *Self* stages. The majority of the expressed concerns were at the *Unconcerned* stage representing concerns about other things. For example, school leaders had their attention on priorities of student discipline, safety, staffing and parent concerns. School leaders did discuss their work with observing mathematics instruction for teacher evaluations as a Stage 3 *Management* concern. Of least concern and subsequently the area of lowest attention from school leaders were the Stage 4 *Consequence* concerns. This means that school leaders had little attention focused on collaborating with others relative to facilitating the change and low concerns about how to improve their change facilitation skills.

Teachers' Quantitative Results

The previous section presented both the quantitative and qualitative data collected from the five school leaders. A discussion of the data collected from the twelve teachers is contained in this section beginning with the quantitative data collected from the three administrations of the Stages of Concern Questionnaire.

Stages of Concern Questionnaire. The data presented in this section were collected from the SoCQ, a 35-item Likert scale survey tool. The questionnaire was administered during the fall, winter and spring of the 2013-14 school year. This was the initial year of implementation of *My Math* in the Plymouth Central School District. Between nine and eleven of the twelve elementary school teacher participants completed each administration of the survey. These teachers represented four elementary schools in the district. Demographic data were limited to the grade taught and number of years of experience teaching. Participants were teachers of kindergarten through fourth grade and their experience spanned from three to 30 years.

The SoCQ is designed to measure concerns at a given point in time. Five items on the 35-item survey are aligned with each of the seven Stages of Concern resulting in seven separate scales (Appendix N). Each scale represents one of the stages in the model. Raw scores for the cohort of teachers were calculated. Mean percentile scores for each stage were determined using a conversion chart (Appendix K). The small sample size of twelve warrants a reporting of descriptive statistics. A summary of highest, second highest and lowest stage scores for the cohort and for individual teachers is reported next.

Teacher cohort data. This section presents the data that are aligned with research question 1b, as reported by the SoCQ, *what concerns do teachers exhibit during the My Math implementation process?* The cohort data from the three administrations of the SoCQ yields a profile graph (Figure 5). This graph displays the mean score at each stage for the cohort in the fall, winter and spring.

The highest stage score for the teacher cohort during all three administrations of the SoCQ was the *Unconcerned* Stage as shown in Figure 5. The 55% peak *Unconcerned* score for

the cohort happened during the fall data collection period. Other stages that had intense concern scores at some point during the year were Stage 1 *Informational*, Stage 2 *Personal* and Stage 5 *Collaboration*. Second highest scores for the cohort were also at the *Unconcerned*, *Informational*, *Personal* or *Collaboration* Stages. The lowest stage scores for the teacher cohort for all three data collection periods according to Figure 6 were at Stage 4 *Consequence*.

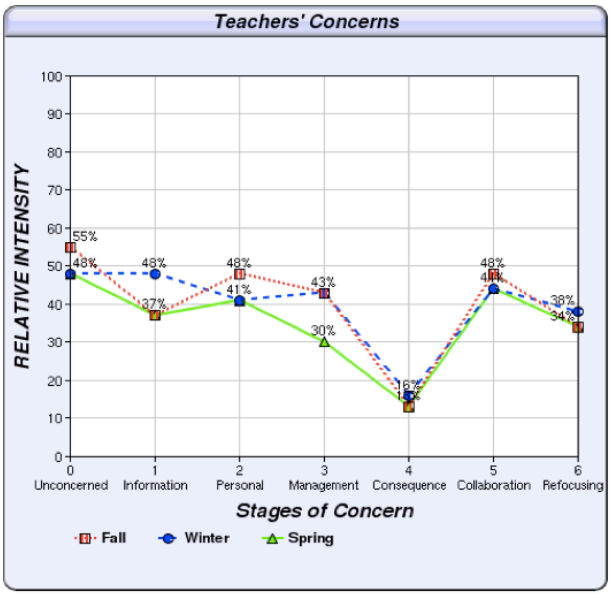


Figure 6- Teachers' Stages of Concern Profile Graph

Examining the change in concerns over time is a way to understand the change process. Table 21 reports the data from the teacher cohort in terms of the change in mean percentile over the course of the school year. As stated in the reporting of the school leader data, a difference of ten or more percentile points is usually considered significant. This significance has been noted with sample sizes as small as 16 (Hall et al., 1991). Teacher cohort concerns either had no change or saw a small decrease over the school year. Stage 3 *Management* concerns were the exception. These data showed a significant decrease from fall to spring of 13%.

Table 21

Change in Mean Percentile Stage Scores of Teachers

Collection Period/Stage	0	1	2	3	4	5	6
Fall	55%	37%	48%	43%	13%	48%	34%
Spring	48%	37%	41%	30%	13%	44%	34%
Change	-7%	0	-7%	-13%	0	-4%	0

Note. Change= Spring subtracted from Fall

A post analysis to identify associations between *Self* and *Consequence* Stage concerns led to a closer examination of the SoCQ items. Five specific items on the SoCQ measured *Consequence* concerns. Item 24 asks teachers to rate their concern relative to the statement, *I would like to excite my students about their part in My Math.* This item had a total of 17 ratings of 5, 6, or 7 indicating *very true of me now* out of a potential 30 scores across the three administrations of the instrument. This indicates that teachers want to motivate students to learn. This is confirmed in the narrative with many comments from teachers about student satisfaction and "having fun" with the program. Item 11 or *I am concerned about how My Math affects students* had three high scores in the fall, five in winter and three in spring for a total of 11 high scores. Items 24 and 11 on the Stage 4 scale had the highest total number of high scores with 28 out of a possible 60. Stage 4 as a whole received the second highest number of high scores behind Stage 5 Collaboration. Although *Consequence* concerns for the cohort of teachers was low throughout the year, the individual item high data skewed high.

Teacher's individual data. An examination of individual teacher's highest, second highest and lowest concerns are presented next in a series of frequency tables. These data were extracted from Appendix P or the Teacher Individual and Mean Percentile Data chart. Reporting these data identify whether or not the cohort scores accurately represent each teacher participant.

A summary of relevant data from each table will be reported to allow for a closer review of distinct scores within the sample. These data support research question 1b or the concerns of teachers.

The *Frequency of Highest Concerns* table allows us to check individual high scores as opposed to relying on the mean of the cohort. These individual data are reported in Table 22 according to the number of teachers with highest concerns in each stage and the percent of the cohort represented. According to Table 22, none of the three administrations of the SoCQ saw a majority of the individual teachers having their most intense concerns at *Unconcerned* Stage 0. Highest scores had two ties resulting in a total of 33 possible scores over the school year. Over the course of the year, 13 of 33 possible scores or 39% of all highest concerns were at Stage 0. When combining Stages 1 and 2 with Stage 0, the *Self* Stages had 21 of the 33 highest scores or 64% of all highest concerns. Five highest scores came at Stage 5 *Collaboration*. Overall, the highest scores for the teachers were at the *Self* Stages. *Self* concerns are indicated when teachers have their attention on other things, want to learn more about the innovation and are thinking about their adequacy to meet the demands of the innovation.

Table 22

Frequency of Highest Concerns Stage for Teachers

Fall Administration	0	1	2	3	4	5	6	Total
Teachers	5	2	0	2	0	2	1	*12
Teachers (%)	*41.7%	16.7%	0	16.7%	0	*16.6%	8.3%	*100%
Winter Administration	0	1	2	3	4	5	6	Total
Teachers	4	2	1	1	1	1	1	11
Teachers (%)	36%	18%	9%	9%	9%	9%	9%	100%
Spring Administration	0	1	2	3	4	5	6	Total
Teachers	4	3	0	0	0	1	1	9
Teachers (%)	40%	30%	0	0	0	20%	10%	100%
Total Scores	13	7	1	3	1	5	3	33

Note. *=Ties, Fall N=10, Winter N=11, Spring N=9,

Reporting the second highest scores across the three administrations of the SoCQ provides for a deeper examination of intense concerns. With three ties, there are 34 possible second highest scores displayed in Table 23. Ten teachers had Stage 5 *Collaboration* concerns as their second highest stage score at some point during the year. This represents 29% of the second highest concerns. Nine scores were at Stage 2 *Personal* concerns representing 26% of the second highest concerns. The frequency of second highest scores for teachers reported in Table 23 did not identify any one stage as having a predominance of concern. Teachers' second highest concerns varied across the stages throughout the school year.

Table 23

Frequency of Second Highest Concerns Stage for Teachers

Fall Administration	0	1	2	3	4	5	6	Total
Teachers	0	0	5	2	0	3	0	10
Teachers (%)	0%	0	50%	20%	0	30%	0	100%
Winter Administration	0	1	2	3	4	5	6	Total
Teachers	1	5	1	2	0	4	0	*13
Teachers (%)	8%	*38%	*8%	38%	0	*8%	0	100%
Spring Administration	0	1	2	3	4	5	6	Total
Teachers	1	0	3	1	1	3	2	*11
Teachers (%)	9%	0%	*27.3%	9%	9%	27.3%	*18.2%	100%
Total Scores	2	5	9	5	1	10	2	34

Note. *=Ties, Fall N=10, Winter N=11, Spring N=9

The lowest stage scores for the teacher cohort are presented in a frequency table in order to check the data for distinct subgroups. Lowest stage scores are reported in Table 24 according to the number of teachers in each stage and by the percent of the teachers represented. With eight ties yielding 39 possible lowest scores, 24 of those scores were at *Consequence* Stage 4. This represents 62% of the lowest concerns. Four individual lowest scores were at Stage 6 *Refocusing*. Stage 4 *Consequence* concerns clearly dominated individual teacher's lowest stage scores. Low *Consequence* stage scores indicate teachers' attention is not focused on the innovation's impact on students.

Table 24

Frequency of Lowest Concerns Stage for Teachers

Fall Administration	0	1	2	3	4	5	6	Total
Teachers (N=10)	1	0	0	1	8	1	3	*14
Teachers (%)	*7.20	0	0	*7.20%	*57.20%	*7.20%	*21.20%	100%
Winter Administration	0	1	2	3	4	5	6	Total
Teachers (N=11)	1	0	2	0	8	1	0	11
Teachers (%)	8%	0	17%	0	67%	8%	0	100%
Spring Administration	0	1	2	3	4	5	6	Total
Teachers (N=9)	1	1	1	1	8	0	1	*13
Teachers (%)	*7.7	7.7%	*7.7%	7.7%	*61.5%	0	*7.7%	100%
Total Scores	3	1	3	2	24	2	4	39

Note.*=Ties, Fall N=10, Winter N=11, Spring N=9.

Quantitative data collected from the three administrations of the SoCQ identified the teachers' highest concerns as a cohort at Stage 0 *Unconcerned*. The lowest stage of concern across the cohort was Stage 4 *Consequence*. After examining the frequency tables, 39% of the teachers had their highest score at Stage 0 *Unconcerned*. Second highest concerns were spread throughout the stages. The lack of a clear predominance of highest concerns warrants an examination of individual item data. Reporting these data supports further exploration of teachers' concerns.

Teacher's individual item data. Individual item scores on the SoCQ are presented in this section in an additional attempt to identify the intense concerns of teachers. The items are arranged by stage scale and Table 25 reports the number of times that an item was rated with scores of five, six or seven indicating v*ery true of me now* over the course of the school year. These data show a clear distinction among the stages with items on the Stage 5 *Collaboration* scale receiving 58 high concern ratings. Specific item data from the *Collaboration* scale indicate that item 27 and 29 had the most intense concern scores. Item 27 states-*I would like to*

coordinate my effort with others to maximize My Math's effects and it had 21 scores of 5, 6, or 7 or *very true of me now* out of a possible 31 across three administrations of the instrument. Closely related to that item, item 29, with 20 high scores out of a possible 31, asked teachers to rate their concern on- *I would like to know what other faculty are doing with My Math.* The Stage 4 *Consequence* scale was second with the total number of intense concern scores at 40. Stage 6 *Refocusing* concern scores were third indicating the predominance of concerns for the teachers at the *Impact* Stages. The high scores on these items support the connections between *Self*, *Collaboration* and *Consequence* concerns. Teachers want to learn with and from each other to improve their adequacy and their students' learning.

Table 25

Teachers' Individual Item High Scores by Concerns Scale

Stage	0		1		2		3		4		5		6	
	3	1	**6**	1	**7**	3	**4**	6	**1**	3	**5**	9	**2**	5
	12	12	**14**	6	**13**	8	**8**	2	**11**	11	**10**	13	**9**	2
	21	2	**15**	8	**17**	2	**16**	2	**19**	3	**18**	4	**20**	4
	23	2	**26**	5	**28**	7	**25**	5	**24**	17	**27**	21	**22**	7
	30	1	**35**	2	**33**	3	**34**	2	**32**	6	**29**	20	**31**	1
Total		18		22		23		17		40		58		2

Note. Bold = Item Number, Normal=Number of high scores (5, 6, or 7)

An examination of individual teacher data sheds more light on *Collaboration* concerns. A third grade teacher's two highest stages were *Management* and *Collaboration*. This teacher had between 11 and 20 years of experience. This teacher was concerned about managing the *My Math* materials and collaborating with other teachers to do so. Another third grade teacher with between 5 and 10 years of experience had highest concerns at the *Refocusing* Stage in all three administrations of the SoCQ. This teacher's second highest stage in all three administrations of the questionnaire was *Collaboration*. This teacher believed that *My Math* could be changed to be even better or there is a program that is better than *My Math* that should be explored. These two

examples indicate that teachers may differ in their concern stage intensity but the idea that they have a predominance of thought about collaboration with others is pervasive.

The divergence of Stage 4 concerns in these data is analyzed through the examination of individual teacher data. Teacher participants whose SoCQ data did not show lowest concerns at Stage 4 are discussed next. The number of years of teaching experience are shared relative to each teacher discussed as experience level has shown to be a significant factor in determining concerns (George et al., 2006). In the spring, a fourth grade teacher with between 11 and 20 years of experience, showed intense *Collaboration* and *Consequence* concerns. These are adjacent stage concerns yet nonconforming to the cohort. The second individual teacher was a kindergarten teacher with between 21 and 30 years of experience who had highest areas of concern in the winter at the *Consequence* and *Informational* Stages. This teacher wanted to know how *My Math* impacts student learning and she wanted to know more about *My Math*. These two experienced teachers' *Consequence* concerns are supported in the teacher focus group narratives.

In summary, the highest mean percentile for the teacher cohort was at Stage 0 *Unconcerned* and the second highest concerns were identified at *Personal* Stage 2 concerns and Stage 5 *Collaboration* concerns. A disaggregation of these data confirms an intensity of concerns on individual items related to *Collaboration* on the Stage 5 scale. Lowest concerns from the teacher participants in the quantitative data from the SoCQ were at Stage 4 *Consequence*. Qualitative data collected from the teachers are reported in the next section as a way to further support the research questions.

Teachers' Qualitative Results

In this study, the qualitative data serve to support and elaborate on the quantitative data. Open-ended items from fall, winter and spring administrations of the SoCQ, and focus group data from December 2013 and March 2014 are the qualitative data sets presented in this section. These data are summarized and reported by collection method and according to teachers' concerns and the actions of support provided by school leaders.

Open-ended items. The open-ended items on the SoCQ varied with each administration of the questionnaire. In the fall, teachers were invited to respond to what they considered to be the benefits and barriers of the *My Math* innovation. The concerns that teachers expressed fell into the *Management and Consequences* Stages. Example of *Task* (Management) concerns were that teachers had difficulty locating chapter tests, the on-line access was not always available, it took too much time to get students logged in, and there was no time to learn how to assign students. *Consequence* concerns were related to differentiation, CCLS alignment, sequencing and student skill deficits, the order that the material is presented in, and needed student independent work.

During the winter, teachers were asked again about the benefits, barriers, and how students and parents were responding to the innovation. Teachers' concerns spanned the Stages of Concern. One teacher's *Personal* concern represented in the narrative was, "Sometimes it takes me a while to figure out what the lesson is teaching the kids. For instance, using facts to ten to teach addition or subtraction. They need to know the operation in one step before you add three more steps to get the answer. So I skip that part. I know that others in the district are skipping chapters". One teacher's *Management* concern included, "It is too much work to

research and teach and change and critique so much new information at this time". Teachers also expressed frustration with the on-line portion of *My Math*. A *Consequence* concern shared in the winter was about not having enough supplemental material for students who are below level. One teacher expressed a *Refocusing* concern "I would like the opportunity to view the *Triumphs* program". *Personal, Management, Consequen*ce and *Refocusing* concerns were part of the winter narrative for teachers.

In the spring, open-ended survey items asked about benefits and barriers to *My Math*. Two additional items were added including a question about the supports provided by principals and whether or not teachers' beliefs about teaching mathematics had changed. These data revealed teachers' *Management* concerns around technology access and video clips that were not loading, the overwhelming amount of materials, including manipulatives, tests that are not user-friendly, and the time needed to learn a new program. *Consequence* concerns focused on supplementing the program due to the lack of rigor and depth and again supplementing specifically for students below level. *Management* and *Consequence* concerns were dominant in the spring data set.

Relative to research question number 2b and the perceptions of support provided by the school leaders, an open-ended item in the spring asked teachers to describe the resources, structures or supports that their principal used to help them implement *My Math.* Teachers noted that principals arranged for supplies and materials, provided time for co-planning, informed them about summer professional development, scheduled *Academic Intervention Services* teachers to support classroom teachers, discussed *My Math* at grade level and team meetings, taught instructional strategies at faculty meetings, encouraged workshop attendance, and shared district information.

Focus groups. Dr. Benjamin Dotger from Syracuse University conducted focus groups with teachers in December and March. The number of teachers from the sample of twelve teachers that participated varied across the two groups ranging from six to nine teachers. Teachers were asked questions aimed at discerning their specific concern at that point in the implementation process. Transcriptions of the focus groups were coded using the concern codes. Coded strands that emerged identified intense Stage 3 *Management* concerns (MGMT) and Stage 4 *Consequence* concerns (CON). Teachers detailed actions of support or interventions that school leaders provided to support the implementation of *My Math*. Several parent concerns were also discussed (PAR).

Relative to research question number one, *Task* concerns dominated both focus group meetings. In December, prioritizing the materials and pacing were concerns mentioned by teachers along with managing the technology component of the program. One teacher noted, "Way too much for me to look through in my paid amount of hours". Technology concerns included needing mounted projectors and the difficulty of navigating through the online assessments. These concerns were related to managing the change in practice. In March, *Management* concerns emerged around prioritizing and pacing. One teacher noted, "There is so much information that you don't get through it all, but you realize what works and what doesn't.", and " I've switched things up a bit, the order, not the chapters, just the order of the lessons". Technology related concerns continued in March with noteworthy comments about the technology being down and the subsequent difficulty in delivering the lesson. A teacher remarked, "…that's (technology) been a big issue that we've pulled a lesson up to do it and the server is down".

Consequence concerns were the second most frequently discussed concerns in both focus groups. Several teachers stated, “We’re behind.”, and followed that with a comment about having to skip around in the book because of what students need. In December one teacher’s narrative included, “We started with multiplication and we are at the end of like five chapters of multiplication and we’re not seeing the fluency. They (students) they haven’t internalized it.”, and “My concern is that there’s not enough depth, focus on depth of mastery and knowledge and the foundation is not there”. Teachers also mentioned their concerns about needing to supplement the program for students who struggle with mathematics. Specifically, “If they’re not getting it, I’m not going to go on to the next lesson. We’re going to review and, you know, do more hands-on or just delve into it a little bit better”. These data suggest that the *My Math* program provides an opportunity for teachers to deepen student understanding. These combined concerns indicate a concern about *Self* in terms of presenting the program with fidelity and *Consequence* concerns relative to student learning.

In a slight variation on this idea, one teacher expressed her *Consequence* concerns by indicating that *My Math* provides a variety of ways to teach mathematics because not all students learn in the same way. “So the way that this [*My Math*] is teaching kids in different ways has been very good because being an inclusive classroom, I feel that I’m meeting more of the needs of my students with the depth that this program goes into”. Additionally, students are being taught several different ways to multiply which is likely to contribute to a greater understanding and a deeper knowledge.

Other teachers noted *Consequence* concerns relative to the coherence of the *My Math* program. Frustration was noted from one teacher relative to students not mastering a skill, “I’m at the beginning of intermediate grade and the fluency…we started with multiplication and we

are at the end of…there's like five chapters of multiplication and we're not seeing the fluency". A positive comment was noted relative to preparing students for the next grade, "I'd like to see the students ready to move on to the next grade level, where they should be at for what they're going to have come September. So, at least they're getting it and we are seeing the grades going up. And we're practicing our math and we're doing much better, so hopefully it's coming".

Finally, a *Consequence* concern emerged about the increased rigor of *My Math*, "But I really see a lot of power in introducing a topic that's more difficult for the children to wrap their heads around as early as you can and then keep revisiting, keep practicing." Additional *Consequence* concerns from teachers included a need to supplement *My Math* to provide more rigor, and the need to develop assessments that are better aligned with the New York State Testing Program. Although the quantitative data did not support intense *Consequence* concerns, the narrative reveals the intensity of concern about the impacts of *My Math* on student learning throughout the school year.

In an attempt to further explore teachers' Stage 5 *Collaboration* concerns, a review of the relevant narrative data follows. The December focus group transcripts included *Collaboration* concerns from teachers. "I think it would be beneficial just to even discuss the matter with your own grade level and, you know, the grade level above and below" and "What do you see as weaknesses, and, you know, I think that's always beneficial. I mean, I would love to be able to meet with the grade level, the same grade level, of another building and find out." From the March focus group, a teacher commented, "I think it's always beneficial when we're given time to meet district-wide with teachers from other buildings." Teachers know that they can learn from each other and they value their time together.

One teacher suggested an expansion of the *Collaboration* concerns by suggesting that a structure already exists in the district for collaborating relative to English Language Arts and that might be used for mathematics as well. "We do data days for ELA and I'm sitting here thinking I would love to do a data day for some of the math that would say, you know, how are the kids doing…or compare from room to room, or classroom to classroom, or school to school". Teachers expressed an interest in sharing ideas with other teachers but also in examining student data together.

Finally, a teacher commented that collaboration could be available on a small scale if the district or each building had a *My Math* lead that could provide expertise and suggestions to teachers as needed. A teacher noted, "Or even a 'go to' person. I mean, there's not anybody that received…even if they…like in the past there was somebody like maybe your AIS [Academic Intervention Services] teacher who you could go to to ask questions". This person could serve teachers as a resource and a sounding board for questions and concerns about the innovation implementation thus supporting *Collaboration* concerns.

Collegial Circles for *My Math* were initiated at the district level in March. Teachers from the same grade level across the district came together for a half-day to share concerns and problem solve relative to *My Math* implementation. Comments following these meetings include, "But that's what was nice about the *Collegial Circle* is we kind of said, ok, we all need to be on the same page, especially being a transient district and kids are moving around". Another teacher noted, "I didn't realize until we got into the *Collegial Circle* meeting that the technology piece is as important as it is because we haven't had specific follow up in that area". These narrative comments provide additional examples of teachers' *Collaboration* concerns.

During the focus group meetings, one teacher shared an idea that, "Each grade level could attend a meeting facilitated by someone in that grade level in a half-day session all devoted to *My Math".* Another teacher shared, *"*It's always helpful…I think it's always beneficial when we're given time to meet district-wide with teachers from other buildings". The overlap and interconnectedness of these data indicate the complex nature of concerns.

Stage 1 *Informational* concerns were revealed in teachers' narrative responses when asked if there was more information about *My Math* that they needed to know. In December, an additional concern of teachers included the overwhelming amount of resources and little professional development or training provided on how to determine which resources to use when. Teachers' informational concerns included, "I think it would have been good when it (*My Math*) was first introduced to see a model of it taught". Teachers commented that they were no**t** clear on the expectations of the program or even how to use the teacher manuals. One teacher noted, "There's not enough training and there's not enough follow up.", "It's (*My Math*) thrown at you without adequate training". In March, *Informational* concerns emerged as teachers wanted to know more about the layout of the chapters over the year. These concerns transitioned into *Consequence* concerns with a focus on vertical articulation. "I want to make sure, being in the lower grades, that I'm presenting things appropriately and using the correct language". Teachers' concerns changed over the course of the school year.

Teachers expressed parent concerns in both December and March. They received complaints from parents about the approach. Teachers reported the following: "They don't like it; the parents don't like it; they don't know it." and "They feel like they're unable to help their students with their homework; they don't understand the way that the concept or skill is being presented". One teacher shared a parent concern relative to the approach as, "We have had the

most parent complaints about doing double-digit addition, dividing the one number into, let's say it's twenty-three plus nine, and they want you to take some from nine and make the twenty-three twenty…I'm telling you, …I must have gotten ten notes that day". Another parent stated, "How in the world are you teaching these kids? We've never done it this way". Parent complaints are another example of a combined concern. These comments from teachers represent *Personal* concerns as they negotiate the conflict with parents and *Consequence* concerns as teachers work to enlist parents as partners in supporting student achievement. Communicating and negotiating with parents represents teachers' *Personal* concern as their sense of efficacy may be brought into question. Additionally, parent concerns about the program may prompt teachers to delay or avoid implementation. The effort to partner with parents to support student learning is an example of *Consequence* concerns.

In summary, qualitative data from the teacher sample reviewed in this section indicate a predominance of concern at Stages 3 and 4. These *Management* and *Consequence* concerns are predominant throughout the school year. Teachers' attention was focused on the logistics and routines of the innovation as well as on student learning progress and outcomes.

Outliers. The small sample size of this data set makes an examination of outliers inconsequential. A summary of the non-conforming quantitative data is presented and distinct qualitative outliers from the narrative are discussed. The highest and second highest concerns in the quantitative data for the teacher cohort were non-conforming in that they were not in adjacent stages. Stage 0 *Unconcerned* and Stage 5 *Collaboration* were the two highest stage scores for the teachers. Lowest stage scores for the teacher cohort were in Stage 4 *Consequence* concerns. Table 26 shows that in the spring the second highest stage score from teacher #1 was in Stage 4, which is the opposite of the cohort. Other distinct scores came from teacher #3 in the winter with

highest Stage 3 *Management* scores and teacher #8 where Stage 6 *Refocusing* was one of the highest scores in the spring. Appendix P shows the Teacher Individual and Mean Percentile Data for each school leader at each stage and high peak scores are bolded, second highest scores are green, and lowest scores are blue.

Table 26

Non-Conforming Peak Score Stages of Teachers

Teacher	Winter	Spring
#1	---	Stage 5 & 4-Peak
#3	Stage 3 & 5-Peak	---
#8	---	Stages 1, 2, & 6-Peak

In an examination of the qualitative data for distinct comments, one teacher commented that she hopes the district does not stay with *My Math* next year. Another teacher noted that *My Math* should be more of a resource and not a curriculum. Finally, a comment was made relative to supplementing *My Math* with the New York State Education Department mathematics modules. These teachers' *Refocusing* concerns were in the minority. These *Personal* comments represent concerns focused on efficacy. For example, a distinct comment from one teacher:

> Hopefully this innovation will give some insight into the concerns of introducing a new math program when we have so much going on. Our students seem to be so far behind for any math program that I am overwhelmed with the thought of catching them up. Allowing me to express my concerns validates what I feel. I wonder if this would be the same for the students and their families…if asking them to give some feedback on the program…maybe they will feel more vested in the program. I would also be interested in how other staff members responded.

Another teacher commented, “I really did not need any support from my principal”.

On the open-ended responses in the winter, teachers were asked how students were responding to *My Math*, one teacher commented, “The majority is struggling and confused”. Most teacher comments on this item included, "Students are doing fine, seem to enjoy it, showing growth, and data implies students are doing well". These comments support the notion that teachers’ concerns are varied and change over time.

In summary, the quantitative data revealed highest concerns across the *Self* stages as well as at Stage 5 *Collaboration*. This indicates that teachers want more information about *My Math*, have concerns about their efficacy and want to work with each other around *My Math* implementation. Qualitative data indicate that teachers have concerns centered on Stage 3 Management as well as Stage 4 Consequence. Teachers are concerned about the logistics of program implementation including materials, technology and pacing. Additionally, they are concerned about student learning and expressed those concerns with comments about rigor, enrichment and scaffolding for students who are approaching level. Additional *Consequence* concerns emerged relative to fluency and assessment.

Qualitative and quantitative data collected from the teacher participants do not converge. Quantitative data revealed high concerns at the *Unconcerned*, *Personal* and *Collaboration* Stages. Qualitative data showed an intensity of concern at Stage 3 *Management* and Stage 4 *Consequence*. In a distinct contrast, quantitative data indicated the area of lowest attention from teachers as Stage 4 *Consequence*. The qualitative data skewed high toward *Impact* and the quantitative data skewed high toward *Self*. Item 19 or *I am concerned about evaluating my impact on students* received a high score from just one teacher in each administration of the

SoCQ. This item could serve as the bridge to *Personal* concerns as it is related to teacher impact on student learning. Surprisingly, this item was not rated highly by teachers. This tension is discussed further in Chapter Five.

Summary

Data collected from school leaders and teachers indicate high *Self* concerns and some *Task* concerns. High *Unconcerned* stage scores for school leaders suggest that implementing curriculum is not a high priority. High *Self* concerns for teachers suggest that efficacy is an issue for teachers and they were interested in supporting those thoughts by working with others to implement *My Math.* Relative to *Task* concerns, the school leaders noted some attention on managing the change facilitator role by supporting teachers with attendance at professional development, providing materials and technology and supplemental materials. Teachers' *Task* concerns emerged as predominantly focused on accessing the technology components of *My Math*. Lowest concerns for both sample populations throughout the school year were at Stage 4 or *Consequence* Concerns with the exception of the qualitative data collected from the teachers. For school leaders, this meant that they had little concern about improving their change facilitator skills. For teachers, this meant that they were not concerned about student learning outcomes. Again the exception to these lowest concerns were the frequent comments by teachers during focus group meetings that suggested that they were highly concerned about how students were performing with the *My Math* program.

Concerns emerged at each stage in both models with the various methodology employed. Concerns are neither good nor bad. These data were reported where a predominance of thought in a certain area was evident. Examining the shifts in the predominance of concern over time in

order to inform interventions and supports is central to this study. Identifying the Change Facilitator Stage of Concern for school leaders and the Stage of Concern for teachers helps to identify whether *Self*, *Task* or *Impact* concerns are present at the beginning, middle and end of the implementation of an innovation. These data inform the type of supports needed for the effective diffusion of an innovation and subsequent school improvement.

Chapter Five of this dissertation discusses the findings and implications for the data reported in this chapter. These data are presented in Chapter Five through the lens of the change theories summarized in Chapter Two. Additionally, the final chapter addresses the implications of this study on school leaders' actions of support for future change efforts.

Chapter Five

Discussion and Implications

Change is the new norm in schools. Schools in New York State and across the country are mandated to implement new curriculum to meet the Common Core State Standards (CCSS). New assessments are being administered to gauge student proficiency on these learning standards. Additionally, new evaluation systems for teachers and principals are being implemented. These complex changes stress schools. I undertook this study to provide insight on how change is managed by school leaders and teachers in a climate of continuous systemic reform and accountability.

Overview of Study

The 2013-14 school year was the initial year of implementation of a K-5 elementary mathematics program aligned to the Common Core Learning Standards (CCLS). This study was designed to collect data from school leaders and teachers in the Plymouth Central School District in Plymouth, New York as they implemented the *My Math* program. Quantitative and qualitative data collected yielded insights into participants' concerns throughout the initial year of implementation.

The Stages of Concern and the Change Facilitator Stages of Concern are the models used throughout this research. The two research questions focused on the concerns of school leaders and teachers and the interventions provided by school leaders to support the change process. An examination of the data collected sheds light on the myriad of concerns associated with school

reform strategies. Determining the relationship between concerns and the interventions utilized during the innovation implementation is at the core of this study.

Chapter Four presented the data for school leaders by summarizing the quantitative and qualitative data in response to each research question. The same structure was used to report the teacher data. This chapter discusses the results from the school leaders followed by a discussion of the results from the teachers. The mixed methods research design of this study facilitates connections among the data sets. As a result, areas where the quantitative and qualitative data converge and diverge are discussed.

This chapter goes on to present the implications for practice relative to year two of the implementation of *My Math* followed by a discussion of the implications for future innovation efforts in the Plymouth Central School District. Next, the implications for practice beyond the PCSD relative to the NYS Education Department's Regents' reform agenda and the implementation of the CCSS across the nation are addressed. Finally, the significance, limitations and future research recommendations are outlined.

Change theory. The review of literature in Chapter Two summarized two seminal change theories. Both the *Diffusion of Innovations Model* (Rogers, 2003) and the *Change Communication Model* (Ellsworth, 2000) are used in this chapter as conceptual lenses from which to discuss the results and implications. A synopsis of the main aspects of these two models is presented again. The *Diffusion of Innovations Model* (Rogers, 2003) has four components. The diffusion of innovations is "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among members of a social system" (Rogers, 2003, p.11). The *Change Communication Model* adds to Rogers' diffusion ideas and offers a description of the

resistance that can slow down innovation implementation. Change agentry, a part of both models, is addressed relative to the discussion of school leader data. Components of both theories are integrated into the discussion throughout the chapter.

Concerns theory and context. Theoretically, concerns are developmental and as a result it is likely that concerns at the start of an innovation are predominantly at the lower (Stages 0, 1 and 2) or *Self* stages. As implementation progresses, concerns become more *Task* (Stage 3) oriented and by the end of the initial implementation period, concerns move into the *Impact* phase (Stages 4, 5, and 6). This is the general pattern for the intensity of concerns; however, exceptions are possible (George et al., 2006). Experience is another factor that can influence concerns. Novice teachers tend to have general concerns at the lower stages, while more experienced teachers tend to have peak concerns at the *Impact* stages (George et al., 2006). During innovation implementation, all teachers are considered to be novice relative to the innovation.

A prediction can be made that the participants in this study are similar to other groups of school leaders and teachers and that both groups have an abundance of concerns. For example, school leaders and teachers charged with implementing the CCLS in English Language Arts and mathematics have many concerns about how to do this. Concerns are generated when school leaders as change facilitators are arranging for professional development and identifying other ways of supporting teachers in implementing new CCLS-aligned programs (Wiener, 2013). Additional concerns emerge because teachers are being asked to teach new curricula in new ways. In particular, the CCLS sets forth a goal of teaching mathematics using a conceptual approach. This is likely not the way that teachers themselves learned mathematics and as a result

an intensity of concerns is predictable (Handal & Herrington, 2003). Concerns of school leaders and teachers vary over time and with each new innovation.

An additional contextual consideration for this study includes the *Race to the Top* teacher and principal evaluation process (S. 844 (112th): Race to the Top Act of 2011). This new evaluation process began in PCSD during the 2012-13 school year. The Annual Professional Performance Review (APPR) process results in a 100 point score for each teacher and principal. The final score includes a 20-point component that represents student growth in English Language Arts and mathematics relative to the CCLS. Connecting student achievement with teacher and principal evaluation ratings is unprecedented. There is an increased probability that the mandates of the CCLS, the conceptual approach to teaching mathematics and the changes in the evaluation system will generate concerns for school leaders and teachers. Examining the specific concerns from each sample group and the actions of support provided to teachers by school leaders given the context described above are central to this study. The next section presents the quantitative and qualitative data collected from the school leaders, followed by a discussion of the general trends that emerged from these data. The section concludes with a discussion Roger's *Diffusion of Innovations* theory (Rogers, 2003). The teacher data are presented following the same structure.

School Leaders' Data Summary

I collected the school leader data from three administrations of the CFSoCQ during the 2013-14 school year. I gathered qualitative data through several open-ended items on each administration of the questionnaire. Additionally, qualitative data were collected from a focus

group with the school leaders in December 2013 and individual interviews with school leaders in March 2014.

School leaders' quantitative data. As the reader will recall**,** relative to research question 1a, data from the CFSoCQ were presented in Chapter Four in a cohort profile graph. A brief reiteration of these results is provided here in support of this discussion point. The highest and second highest concerns of school leaders were at *Unconcerned* Stage 0 and *Informational* Stage 1 respectively. Specifically, during each administration of the CFSoCQ, the cohort mean percentile score at Stage 0 increased from 75% in the fall to 81% in the winter to a high score of 94% in the spring. The highest possible score is a 99%. Lowest concerns for the school leader cohort were at Stage 4 *Consequence* with scores of 16%, 3% and 4% in fall, winter and spring respectively. The mean percentiles are presented again as a reminder of the intensity and lack of intensity of these high and low concern scores over the year.

Individual school leader quantitative data. Chapter Four identified the highest concerns of individual school leaders at the *Unconcerned* Stage (75%), the second highest at the *Self* Stages (79%) and the lowest concerns at the *Impact* Stages (92%). Two school leaders exhibited different or additional concerns at some point during the school year. It is important to reiterate that the Change Facilitator Stages of Concern is not a hard stage model. The CFSoCQ authors emphasize that high and low stage scores are not absolute and should be considered relative to an individual or group score (Hall et al., 1991). The quantitative data from the school leader sample adhere to a typical change facilitator profile. Concerns about other aspects of school leadership are given the most attention while concerns about becoming a better change facilitator are minimal. The qualitative data are discussed in the next section.

School leaders' qualitative data. The qualitative data reported in Chapter Four confirmed the intensity of concerns at *Unconcerned* Stage 0. Open-ended items, the focus group and individual interviews all confirmed the predominance of concerns at Stage 0. In the next section, a discussion of the specific *Unconcerned* data is detailed. School leaders were most concerned about these other things and had lower concerns about *My Math*. Individual qualitative data is discussed to further support this claim.

Individual school leader qualitative data. Three of the school leader participants were novice elementary school principals and it is not surprising that they had other priorities. Novice principals tend to prioritize the completion of technical and managerial tasks. These include budgeting, scheduling, state requirements and mandated teacher evaluations (Daresh, 2007). Although *Personal* and *Management* concerns dominated the novice school leaders' thoughts and attention, these concerns were largely unrelated to the innovation or to their role as change facilitators. As a result, these concerns were labeled *Unconcerned*. Concerns about the positive effects of the innovation or improving one's change facilitation skills were infrequently noted in the qualitative data confirming low Stage 4 Change Facilitator concerns. Of the two experienced school leaders in the sample, one conformed to the cohort in terms of identifying daily priorities such as discipline and parent concerns before mentioning instruction. The other principal's narrative relative to daily priorities identified that he was the only principal to comment that instruction was his number one daily priority.

School Leaders' Data Discussion

I explore two discussion points that emerged from the school leader data in this section. First, I discuss the predictable result that school leaders have concerns other than *My Math*.

School leaders and especially novice school leaders have their attention on issues related to the management of the school (Hallinger & Lee, 2013). The second point is the notion that although school leaders were unconcerned about *My Math*, completion of the APPR for teacher evaluation was the primary purpose for attention on *My Math*.

Concerns about other things profile. Quantitative data collected in this study represent the most readily identified concerns profile of change facilitators. This profile is labeled *Concerns About Other Things* and *Wanting to Know More About This Innovation* (Hall et al., 1991). A profile interpretation of these data allows for insight on the intensity and diversity of concerns at different points in the year. Because the sample size is small, the profile interpretation of the cohort offers a good representation of the data. Competing demands to *My Math* are of intense concern in this profile. This profile is characterized by peak concerns at Stages 0 and 1 and lowest stage scores at the *Impact* Stages. According to the CFSoCQ manual, the presence of some Stage 5 *Collaboration* concerns may be seen as well (Hall et al., 1991). Typically, change facilitators need to connect and collaborate with others. Although Stage 5 is not adjacent to Stage 0, finding some intensity of concern at Stage 5 with this profile is considered to be a typical result. The results from this study conform to this profile. Concerns are developmental and beginning school leaders, like beginning teachers, are in survival mode. Survival mode is often dominated by *Personal* and *Management* concerns.

Qualitative data from this study support the notion that school leaders have concerns about other aspects of their leadership. These data indicated that the highest daily priorities for school leaders were not *My Math.* School leaders shared that they have concern for student safety in their buildings. Examples of the other daily concerns of school leaders related to managing the building were student discipline, staffing, parent concerns and school climate. School leaders

were most concerned about these other things and had lower concerns about *My Math* or about becoming a better change facilitator.

Annual professional performance review. The second point of discussion focuses on the APPR process for teacher evaluation. The APPR process increased school leaders' attention on *My Math*. The new structure for teacher evaluation increased school leaders' attention on observing classroom instruction. Education law 3012-c called for a revised APPR for teacher and principal evaluation in New York State beginning in the 2012-13 school year (http://www.regents.nysed.gov/meetings/2011Meetings/May2011/511bra4.pdf). The motivation to observe instruction is based on the fact that the failure to complete the required observations as part of the APPR could result in a grievance being filed against the district by the teachers' union. Completing classroom observations as part of the APPR was a matter of contractual compliance in the district and as such could be considered a managerial task of high priority for all school leaders. As a result, observing *My Math* instruction became part of the daily priorities of all school leaders and increased attention on *My Math*. During these classroom observations, school leaders looked for evidence that teachers were utilizing the *My Math* program. Race to the Top policy mandates for the revised APPR implementation resulted in increased concern about the *My Math* innovation.

The school leaders found valuable learning and insight into teachers' concerns relative to the attention that they gave to *My Math* via the APPR process. The section on school leaders' interventions delves into additional actions of support that change facilitators employed during the school year to support innovation implementation and diffusion.

Teachers' Data Summary

The teacher data were collected from three administrations of the SoCQ in the fall, winter and spring of the 2013-14 school year. Qualitative data were collected through open-ended items on each administration of the SoCQ. Additional qualitative data were gathered from two focus group meetings conducted with subsets of the teacher sample in December 2013 and March 2014.

Teachers' quantitative data. As the reader will recall**,** relative to research question 1b or teachers' concerns, cohort data from the SoCQ were examined in Chapter Four in a profile graph. To set the stage for this discussion, a brief reiteration of those results are provided. The highest concerns of teachers were at *the Self* stages or Stages 0, 1 and 2. Specifically, during each administration of the SoCQ, the mean percentile score of the cohort for Stages 0, 1 and 2 ranged from 48% to 55%. These data adhere to the typical developmental nature of the Stages of Concern model. In the beginning of an innovation implementation process, *Self* concerns tend to dominate.

Teachers' qualitative data. In contrast to the SoCQ data, Chapter Four qualitative data sets reported the *Management* and *Consequence* Stages of Concern as most intense for teachers. Open-ended items and the focus group results confirmed the predominance of concerns at Stages 3 and 4. Data from the March focus group and the spring open-ended items indicated an intensity of *Management* concerns. These included comments about the predictable daily schedule of *My Math,* the slow pacing of the program, and the on-line resources. Additional *Management* concerns that emerged in these data included comments about the *My Math* web site being down, tests not being reader-friendly, and trouble with video clips. Data gathered from the school

leaders indicated that teachers had an intensity of *Management* concerns, and specifically mentioned the pacing calendar and accessing the technology components of *My Math*.

For the teacher cohort, it is not surprising that the intensity of *Management* concerns diminished over time. As users become more familiar with the innovation, *Management* concerns are lowered (George et al., 2006). In the SoCQ data, four teachers had high *Management* concerns in the fall, three had high *Management* concerns in the winter and one had high *Management* concerns in the spring. In the qualitative data collected in March and May, teachers commented that they felt comfortable with the routine of the program. Aside from *Self* and *Management* concerns that were intense at different times during the school year, *Consequence* and *Collaboration* concerns were evident throughout the school year and are the focus for the discussion that follows.

Teachers' Data Discussion

Qualitative and quantitative data from this study diverge and converge relative to *Consequence* and *Collaboratio*n concerns respectively. *Consequence* concerns skewed high in the qualitative data set throughout the school year. The SoCQ data contradicts these results and reveals that the lowest concerns for the teacher cohort were at Stage 4 *Consequence* during all three administrations of the questionnaire. This divergence of data is the first point of discussion in this section. The second discussion point is the convergence of Stage 5 *Collaboration* concerns in both the quantitative and qualitative data sets.

Consequence concerns. Quantitative data from the SoCQ suggest that teachers were not concerned about student outcomes with *My Math*. When high *Consequence* concerns are evident, the user focuses on the impact of the innovation on student learning. Qualitative data, on the

other hand, reveal high *Impact* stages, while the actual quantitative scores are low for the same *Impact* stages. This discrepancy highlights the interconnectedness of the stages in the SoC model. As teachers are concerned about their own efficacy with the program they are simultaneously concerned about student achievement with the new program. These *Consequence* concerns may include the relevance of the innovation for students; the evaluation of student outcomes; and the changes needed to improve student outcomes. Although low *Consequence* concerns are typical in the initial year of implementation of an innovation (George et al., 2006), the fact that the qualitative data was rich with *Consequence* concerns merits further examination. In other mixed methods studies using the SoCQ, the qualitative data confirmed the survey data. In the few studies that resulted in a divergence of data, these data were either disregarded (Charalambous & Philippou, 2010) or reconceptualized (Ackerson & Donnelly, 2008).

Data from the open-ended items and the two focus groups reveal various examples of teachers' intense *Consequence* concerns. Consequence concerns are revealed when teachers indicate a concern for the impact of the innovation on student learning. Some of the teachers noted positive *Consequence* concerns as evidenced by student growth from pre-test to post-test and one teacher commented that *My Math* teaches students in more depth than previous programs. A prediction about the relationship between high *Self* concerns and high *Consequence* concerns might be that teachers' *Personal* concerns about their adequacy may be related to how students are performing. This prediction is based on the implementation of the revised APPR process. The impact that teachers have on student achievement is central to the shift in the evaluation process. Teachers are provided with either a state growth score or a student learning objective score as a component of their 100-point final score. These scores are determined by how much each student in a teacher's class grows that year in mathematics and in English

Language Arts. Because teachers' evaluations and student learning are tied together in the APPR, a prediction can be made that teacher *Self* and *Consequence* concerns are also connected.

Issues related to self-reporting of data may be relevant in this study. One methodological study suggested that participants actually respond differently to questionnaire and interview prompts. They noted that interviews or focus groups trigger strong affective responses while questionnaires permit a wide range of responses (Oei & Zwart, 1986, as cited in Harris & Brown, 2010, p.2). The dissonance in these data may be a result of the methodology. Reconciliation of these diverging data may be arrived at by a reconception of the relationship between *Self* and *Consequence* concerns (Pluye, Grad, Levine, & Belinda, 2009). Teachers may have responded more honestly to the survey indicating high *Self* concerns while in the focus group meetings these *Self* concerns may be more easily shared publicly as concerns related to student achievement also labeled as *Consequence* concerns. Although the quantitative data did not support intense *Consequence* concerns, the narrative reveals the intensity of concern about the impacts of *My Math* on student learning throughout the school year. Teachers' *Consequence* concerns may include the relevance of the innovation for students; the evaluation of student outcomes; and the changes needed to improve student outcomes. These concerns could also be labeled as *Self* concerns when considering the teacher evaluation process with the student achievement component.

Collaboration concerns. The second data discussion point centers on the fact that the quantitative and qualitative data converged to indicate an intensity of *Collaboration* concerns from teachers. National attention on teacher collaboration and professional learning communities might contribute to the *Collaboration* concerns. (Dufour, Dufour, Lopez & Muhammed, 2006; Lave & Wenger, 1991; Sergiovanni, 2004). During the 2013-14 school year, one PCSD initiative

was an effort to improve inclusive practices. These efforts included the implementation of a co-teaching delivery model with additional planning time for co-teachers. The emphasis on collaboration in the PCSD as a result of this special education service delivery model may also have influenced these results.

The second highest score for the teacher cohort was *Collaboration* Stage 5, followed closely by *Informational* and *Personal* concerns. Stage 5 *Collaboration* scores for the cohort were at 48%, 44% and 44%. These scores represent a divergence from the typical developmental stage progression in the SoC model. *Collaboration* concerns are typically seen later in the implementation process. These data suggest that teachers wanted to know more about the innovation, were concerned about how it would impact them, and wanted to work with others on the innovation. Given the context of teachers' concerns discussed earlier, teachers may believe that reaching out to colleagues for support in implementing the innovation would reduce their *Self* concerns. Collaborative approaches to school improvement can increase teachers' feelings of efficacy.

Diffusion of Innovations. The *Diffusion of Innovations* theory claims that every innovation has five elements that support its diffusion. These five elements are *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability* (Rogers, 2003*)*. Each element works together to support the diffusion of an innovation throughout a system.

In PCSD, a new mathematics program was an agreed upon necessity by a majority of stakeholders and as such, the *relative advantage* of this innovation was high. Dissatisfaction with status quo or the *Everyday Math* program was prevalent. The majority of school leaders and teachers perceived *My Math* to be a better mathematics program than *Everyday Math*.

Additionally, this program was aligned to the CCLS, a requirement in the state reform agenda. Data from this study that supported high *relative advantage* included teachers' *Informational* concerns at the beginning of the innovation implementation. This suggests that teachers wanted to know how to utilize the program. *Collaboration* concerns were intense among teachers as well indicating that they wanted to work with others to implement the program. The fact that the state assessments were testing proficiency of the CCLS was another incentive for adopting the CCLS-aligned *My Math* program and this supported the intensity of *Consequence* concerns. Overall, *relative advantage* for this innovation was high and this facilitated diffusion.

Another innovation component is *compatibility*. Specifically, *compatibility* with previously introduced ideas is relevant to this study (Rogers, 2003). Low *Self* concerns in the teachers' narratives may have been a result of teachers being part of the recent implementation of the *Everyday Mathematics* program in the district. Teachers' beliefs that they could implement a new program, based on the fact that they had done so before very recently with the *Everyday Mathematics* program that came before *My Math*, contributed to high *compatibility*.

Closely related to the element of *compatibility* is *complexity*. *My Math* had high *complexity* for teachers who learned mathematics in a traditional algorithm-centered approach. With *My Math*, teachers were being asked to teach mathematics using a conceptual approach. It is likely that many teachers were not taught to think conceptually about mathematics as students and so *complexity* was high (Handal & Herrington, 2003). Learning is built upon prior knowledge and when new knowledge is not compatible with previous knowledge, discomfort and disequilibrium are likely (Cook, 2009). The *My Math* lessons are presented in a way that may feel counterintuitive to a teacher and as a result the potential for diminished fidelity is high. One teacher noted, "There are a lot of manipulatives that I have failed to use because they just

create chaos, we're not even going to get the manipulatives out." Another teacher commented, "We're skipping a lot because of what our students need but also based on what we think is best". These narrative comments from teachers indicate that fidelity of implementation of *My Math* may be in jeopardy. Qualitative data also reveal high *complexity*, "I had to read it over and over.", "What are they trying to do here?", and "I didn't skip it, but I didn't like it". Likewise, *complexity* was high for parents as these data illustrate, "How in the world are you teaching these kids?", "We've never done it this way.", and "Why can't they just add rather than so many different new steps"? Parents feel like they're unable to help their students with their homework because they don't understand the way that the concept or skill is being presented. *Complexity* of the *My Math* innovation was high because the approach was difficult to understand. As the year progressed, teachers *Management* concerns decreased as they became more familiar with the approach and therefore *complexity* began to lessen.

The final two innovation components are *trialability* and *observability.* Both were low in the *My Math* innovation implementation. *Trialability* suggests that users experiment or pilot a program before adopting it. No pilot opportunity was available because the *My Math*- NYS version was a brand new CCLS-aligned program. Adopting the first version of any program is not optimal as errors are inevitable. This weakened teacher and school leader confidence in the alignment. Data from this study includes intense *Collaboration* concerns from teachers and the suggestion that they would like to talk to someone who has taught this program before.

Another diffusion element is *observability* and this is present when positive results of the innovation are visible to all users. *Observability* was low in this study because student achievement results were not regularly published in the district. The intensity of teachers'

Consequence concerns among the qualitative data may have been eased with more regular access to data on how students were doing.

Both *trialability* and *observability* contributed little in the way of support for the diffusion of *My Math*. When innovations are mandated as the CCLS mathematics was, some of the diffusion elements may not be present. Having an opportunity to pilot the program and examine student-learning results may have contributed to innovation diffusion in PCSD.

Ultimately, like leaders, teachers' concerns are varied. When asked- *Do you envision this program hanging around for a while?* One teacher's response was, "I hope not." Another teacher commented, "I enjoyed it so much. It's better than the other one (*Everyday Math*)." This diversity of concerns creates a tension that necessitates differentiated support for the users of the innovation.

School Leaders' Interventions

Using the CBAM research, effective change facilitators know that teachers have different concerns at the introduction of an innovation, during the implementation of the innovation and upon consideration of impact of the innovation (Evans & Chauvin, 1993). When change facilitators align their interventions to teachers' concerns, they can successfully support the process of change. For example, at the beginning of an innovation, *Information* and *Personal* concerns tend to be high. Effective interventions for informational concerns include providing reading materials, overview presentations, or a videotape of the innovation in action. Interventions for *Personal* concerns include build trust, clarify expectations and offer moral support. During the implementation, teachers' *Task* concerns tend to be higher. Interventions that can support these concerns include sharing time management strategies or helping with planning.

As *Impact* concerns emerge, effective change facilitators invite teachers to examine student-learning data, share ideas with each other, and consider next steps (Evans & Chauvin, 1993).

Research question number two seeks to identify the specific actions of support or the interventions that change facilitators provided to teachers during the implementation of *My Math.* These are considered in light of Stage 3 of the CFSoC as school leaders with intense Stage 3 concerns are focused on the process of change facilitation. *Management* concerns focus on the time, logistics, and resources involved in facilitating the use of the innovation (Hall et al., 1991). When Stage 3 concerns are intense, school leaders employ interventions to manage the change for others. Stage 3 *Management* concerns were present but not intense for school leaders as they tended to be focused on other priorities. Although school leaders were *Unconcerned* about facilitating the change, they did employ some interventions to support the implementation of *My Math*. These specific interventions varied across buildings.

It is important to consider this tension between the intensity of *Unconcerned* Stage data and the perceived interventions employed by school leaders. Five items on the CFSoCQ measure Stage 3 *Management* concerns. Questionnaire item 34 was the only item on the *Management* scale that received more than two high scores. This item asked school leaders to rate their concerns relative to the statement- *I am concerned about finding and allocating time needed for this innovation.* This confirms the intensity of concerns at the *Unconcerned* Stage and notes that since school leaders have other priorities, they are concerned about finding time to support *My Math*. Although largely concerned about other things, school leaders and teachers reported interventions that were used to support the implementation of *My Math*.

The interventions reported in the qualitative data by either the school leaders or the teachers are listed in Table 27. School leaders noted that the strategies employed were varied and sporadic throughout the year. The interventions are sorted according to the Stages of Concerns (Evans & Chauvin, 1993). If the action of a school leader was intended to address a specific stage concern of a teacher it was placed at that stage. For example, asking teachers what materials they need would align with teachers' Stage 3 *Management* concerns.

Teachers' perceptions of school leaders' support. In an attempt to address research question 2b, we now turn to a brief discussion of teachers' perceptions of school leaders. Teachers are the drivers of curricular programs and as such the perception that school leaders take an active role in administering curricular programs translates to the belief that school leaders should support teachers. Teachers' perceptions of school leaders are linked to their expectations for change facilitation. Examining the perceptions of teachers can be a way to measure the effectiveness of the school leader. Research indicates that teachers want principals to take an active role in the administration of curricular programs (Blasé, 1993; Odhiambo & Hill, 2012; Saitis & Menon, 2004; Yavuz & Bas, 2010). Specifically, school leaders should supply resources to teachers in an equitable fashion. They should evaluate teaching and learning and provide feedback. Effective school leaders should maintain a vision to ensure quality teaching and learning (Odhiambo & Hill, 2012).

When teachers in this study were asked to identify the supports provided by school leaders, their responses were varied. These supports, also referred to as interventions, ranged from emails about materials to professional development provided at faculty meetings. In this study, a consistent intervention was that school leaders reported they provided materials to teachers. Additionally, all school leaders also had some attention focused on evaluation of

instruction with feedback. This study did not yield extensive data on teachers' perceptions beyond what was reported in alignment to Stage 3 *Management* concerns.

Alignment of interventions. At the heart of this study is the examination of the alignment between the interventions used by school leaders to facilitate the innovation implementation and teachers' concerns. Teachers' highest concerns were located in the *Self*, *Consequence* and *Collaboration* Stages. Teachers were concerned about their ability to implement *My Math*, they wanted to collaborate with others and they were concerned about how their students were performing. As shown in Table 27, the concerns stage with the most interventions employed by school leaders was Stage 3 *Management* concerns. These interventions were largely logistical and focused on teachers' *Management* concerns. These interventions were examples of managerial leadership rather than instructional leadership (Hallinger & Lee, 2013). Additionally, teachers' perceptions of the supports provided by school leaders centered on Stage 3 *Management* concerns. One teacher stated, "He's always asked if we needed any books, right?". Another teacher shared that the principals had sent two or three emails asking if more books were needed.

School leaders provided support for *Self* concerns at Stages 1 and 2 by providing information to teachers, supporting workshop attendance and talking with them about how the program is working. One principal's intervention was that he told teachers to support the *My Math* program. As a strategy for addressing teachers' *Personal* concerns, this directive likely did not mitigate concerns that teachers may have had about their ability to implement the program.

Consequence and *Collaboration* concerns of teachers were skewed high yet the interventions employed by school leaders were inconsistent. All school leaders observed

mathematics lessons as part of the APPR process. Only one of the five school leaders asked teachers to share *My Math* strategies or updates at monthly faculty meetings. Only one school leader led mathematics data meetings.

At Stages 0 and 6 the interventions of school leaders were more aligned in the sense that teachers had low *Unconcerned* stage scores and low *Refocusing* concerns as well. School leaders had minimal if any interventions aligned to those stages.

Identifying systemic interventions that could support innovation implementation across buildings based on teachers' general concerns would further support the change management effort of the schools and the district.

Table 27

School Leaders' Interventions by Stages of Concern

Stage of Concern	**Intervention**
6 Refocusing	Purchased supplemental texts
5 Collaboration	Encouraged teachers to visit each other's classrooms
	Asked teachers to share strategies at monthly faculty meetings
	Established *My Math* as a regular agenda item for faculty meetings
4 Consequence	Gathered evidence of implementation and shared with teachers
	Facilitated mathematics data meetings
	Observed lessons as part of APPR process
3 Management	Arranged for needed materials/resources
	Arranged for one teacher to get a Smart Board
	Supported pacing calendar creation
	Provided regular co-planning time
	Supported and arranged for meetings with BOCES instructional support
	Provided time for technology staff developers to assist teachers
	Secured an agreement with teachers to spend 5 minutes on fluency each day
2 Personal	Communicated expectations to teachers
	Told teachers to support the *My Math* program
	Organized parent informational meetings
	Conducted check-ins with teachers with diagnostic questions asked to assess need
	Encouraged teacher flexibility as long as instruction was standards based
1 Informational	Planned and delivered professional development
	Supported workshop/conference attendance
	Provided support at faculty meetings
0 Unconcerned	

The *Diffusion of Innovations* theory identifies the role of the change agent in the social system as attempting to influence others to adopt the innovation (Rogers, 2003). The change agent is charged with facilitating the change that has been determined to be beneficial to the entire system. Rogers (2003) contends that change agents are in a difficult position between the agency and a client. He goes on to describe the sequence of seven roles that effective change agents proceed through. The data collected relative to the school leaders' interventions in the *My Math* innovation focused on the first four roles of a change agent including increasing relative

advantage, establishing an information exchange, diagnosing problems and creating intent to change.

The first of these roles begins with the developing the need for change. This role focuses on increasing the *relative advantage* of the innovation for the users. In this study, school leaders communicated the importance of this innovation to teachers and told them that this program would support student learning on state assessments.

Establishing an information exchange relationship is the second role of effective change agents. This role includes developing a positive and credible rapport with clients by listening and empathizing with their concerns. In the *My Math* study, school leaders spoke to teachers individually, in grade level and faculty meetings to share information or arrange for additional materials or professional development resources to support their *Informational* concerns. School leaders also held informational sessions for parents relative to the new Common Core mathematics program.

To diagnose problems and create intent to change in the client are the next two roles in the sequence. These roles include examining why the status quo is not meeting clients' needs, selecting an innovation and motivating clients' interest in the change. During the *My Math* adoption in PCSD, the majority of teachers and school leaders were ready and excited to adopt a new program and therefore motivating clients' interest in the change was not a high priority. Diagnosing need occurred during informal conversations with teachers, grade level meetings, faculty meetings and district wide meetings. Check-ins with teachers allowed school leaders to diagnose teachers' concerns and needs and provide aligned support.

The last two change agent roles were not observed in this study. To translate intent into action is the fifth role of a change agent. The sixth role is to stabilize adoption and prevent discontinuance. The last role is to achieve a terminal relationship where clients are autonomous change agents (Rogers, 2003). Because this study was conducted during the initial year of implementation, it is not surprising that these roles were not evident.

Implications for Practice

This study examined the concerns of school leaders and teachers in a climate of CCSS and high accountability in an attempt to develop a comprehensive plan for organizational support that could inform the field and future research. Of particular interest were the specific actions of support provided by school leaders to teachers in the initial year of innovation implementation.

A discussion of the implications of these data on school leader and teacher practice is presented in this section. Implications for school leaders and teachers in Plymouth, in New York State and in the nation are discussed. In PCSD, an examination of the implications for practice include what these data mean for year two of *My Math* implementation as well as implications for future innovation efforts in the district. In New York State, these data are discussed relative to the implementation of the Regents' reform agenda. Nationally, these data are discussed relative to the CCSS implementation in tandem with the *Race to the Top* requirement for a revised APPR (S. 844 (112th): Race to the Top Act of 2011).

***My Math* in the Plymouth Central School District.** School leaders in this study were *Unconcerned* about the innovation and about their roles as change facilitators. They had daily priorities that included safety, discipline, staffing and parent concerns. Teachers' concerns were related to opportunities for collaboration and the consequences of *My Math* on student learning. School leaders' interventions minimally supported *Collaboration* concerns and teachers'

Consequence concerns. As we consider the continued implementation of *My Math* into year two, these trends in the data hold three distinct implications for further implementation. The addition of school-based change facilitators to provided added content specific support to the principals is first, next is to build additional structures for teachers to collaborate in order to support professional learning and finally collecting and reporting student learning data.

Add school-based change facilitators. School leaders are increasingly called upon to support change and implement reforms in their schools. An implication for practice is the addition of school-based change facilitators that can act as the change facilitator in lieu of the principal; this would allow the principal to focus on other things. Consultants, coaches, or BOCES professional developers could be charged to be school-based change facilitators.

I acknowledge that a suggestion to remove school leaders from the work of curriculum implementation may seem bold. These data reveal that school leaders' are predominantly *Unconcerned* about *My Math* implementation as a priority in their practice. As school principals prioritize their work, discipline, safety, staffing and parent concerns emerge as most pressing. National and local trends support the addition of school based change facilitators including curriculum directors and coaches as external agents to support and manage the curriculum implementation process. For example, the addition of mathematics coaches to the district has proven to be a successful improvement strategy (Grant & Davenport, 2009). Adding content and pedagogical experts who also have coaching skills to a school culture can serve to support changes in teaching and learning.

The addition of school-based change facilitators to a school has some difficulties and unintended consequences. School-based consultants that are shared between schools may not be

as available as needed to provide communication updates and supports to teachers. Additionally, the school leader might fail to own the innovation and the subsequent student learning results. Unintended consequences may also include the school leader's release of the role of instructional leader. School principals frustrations relative to the external support provided by change facilitators include confusion about their decision-making latitude, lack of involvement in the planning phase as well as the notion that external personnel may not have a good understanding of the culture and context of the school (Warren & Higbee, 2007).

Ultimately, a school-based change facilitator whose sole charge is to support innovation implementation should increase the probability of innovation diffusion. In an attempt to define a successful change facilitator, Hord (1992) reviewed the literature and crafted a model for creating a context supportive of change. The model, presented in Chapter Two, is composed of six essential functions that in essence make up the job description for a change facilitator (Hord, 1992, as cited in Roach et al., 2009, p. 301). Figure 4 is presented again to show how the six essential functions operate reciprocally with supporting a context supportive of change in the center. These six functions are "(a) developing, articulating, and communicating a shared vision of change; (b) planning and providing resources to support educators' implementation efforts; (c) supporting educators' professional learning and development; (d) checking on progress in use of research-based practices; (e) providing continuous assistance for implementation; and (f) creating a school context supportive of change" (Roach, 2009, p. 301).

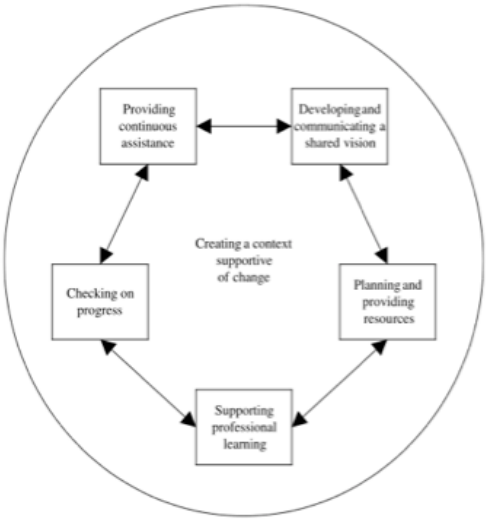


Figure 4- Six Essential Functions of Change Facilitators (Roach, et al., 2009)

Developing and communicating a shared vision. In Plymouth, school leaders communicated to teachers that *My Math* would be the program that they were expected to use to teach mathematics. The decision to implement *My Math* was a district level decision. With this decision, PCSD would be considered in compliance with the NYSED Regents' reform agenda (New York State Education Department, 2012). Otherwise, the development and communication of a shared vision, a critical function of school-based change facilitators, was not widely noted in these data and could be a critical function of an added school-based change facilitator.

Planning and providing resources. The *planning and providing resources* function includes a focus on the nuts and bolts of implementation. Distributing materials at the start of the school year as well as the subsequent exchange of materials mid-year were interventions that all school leaders employed. This function is typically employed at the beginning of an innovation and the managerial nature of the task has low *complexity* for change agents. This intervention is

relatively simple and can provide teachers with support that they perceive they need. In this study, school leaders arranged for support and materials for teachers as needed and they enlisted the help of school-based change facilitators to provide additional technical support to teachers in terms of the management of *My Math*. Planning and providing resources can happen when school leaders and school-based change facilitators are available to work together.

Supporting professional learning. The function of *supporting professional learning* included encouraging teachers to attend conferences or workshops outside of the district. Providing teachers with time to meet with the BOCES instructional specialists or district technology staff developers was another intervention that supported professional learning. Collaboration was encouraged at faculty meetings, in grade level meetings and during co-planning time. District opportunities for professional learning included *My Math Collegial Circles* held in March and June. Each grade level *Collegial Circle* included one teacher from each school and each grade level, and others could voluntarily participate. The addition of school-based change facilitator who could be responsible for providing job-embedded professional development to all teachers could increase innovation diffusion.

Checking on progress. Most school leaders checked on progress by collecting evidence of the implementation of *My Math* in classrooms. Some assigned this job to the assistant to the principal. This evidence collection effort ranged from observing *My Math* materials in use in classrooms to monitoring levels of student engagement in the program. Checking in with teachers by school leaders happened through informal conversations, short informal visits and formal observations. School-based change facilitators could regularly check on progress outside of the evaluation process. This non-evaluative support from school-based change facilitators may contribute to increased risk-taking and subsequent innovation diffusion.

Providing continuous assistance. Most principals supported the *My Math* implementation inconsistently during the school year. Given the other priorities of school leaders, this essential function could be maximized by the addition of a school-based change facilitator whose primary job could be to support the teachers with the management of *My Math*.

The six functions of change facilitators that create a context supportive of change in a school could be more completely operationalized with the addition of a school-based change facilitator to support but not replace the efforts of the school leader.

Build structures for collaboration. PCSD should design a plan for ongoing opportunities for collaboration and professional learning for both teachers and school leaders. Data from this study indicated that teachers crave time to meet together for collaboration. Change theory highlights the social nature of change and credits the "near peer" (Rogers, 2003) as having great influence on the adoption of innovations. Collaboration as an implication for practice is supported by this concept. Collaboration supports innovation diffusion when teachers can see how others are implementing the innovation and this becomes a model for them. For some teachers, the *compatibility* of the innovation is an ongoing tension. When teachers are presented with an instructional plan that does not align with their personal beliefs about teaching and learning or with their knowledge of mathematics content, they resist or work around the innovation. Teachers may want to collaborate to support their own feelings of adequacy and efficacy. In a policy brief from the Aspen Institute, a recommendation for practice included daily time for teacher collaboration around Common Core related activities (Wiener, 2013).

In this study, school leaders did not indicate a need to collaborate; however, the lack of evidence of instructional leadership indicates a need to problem solve around daily priorities.

School leaders would benefit from learning more about managing the change process and the role of an effective change facilitator. District and school leaders in the PCSD should build structures for consistent communication and collaboration with all educators.

Collect and report on student learning data. The low *Consequence* concerns of school leaders may increase with an increased focus on data. Currently, state assessment data are the only data reported publicly and these data are not available until August of each school year. Table 28 shows the student proficiency data for mathematics after year one of utilizing *My Math* in PCSD. These data indicate an increase in proficiency at each grade level except fourth grade, which remained flat. Further analysis of these data in each school is appropriate but may not occur without a district level focus and plan for examining student learning data.

Selecting and administering curriculum-based measurements or benchmark tests would provide an opportunity for ongoing monitoring of student learning in mathematics. This recommendation has implications for principal professional development. School leaders who want to improve their schools need to know how to look at benchmark tests to be sure they are aligned with the CCLS. They need to know how to analyze the data from these formative assessments. Most importantly, school leaders need to be aware of the interventions that are most effective and efficient (Duke & Salmonowicz, 2010). Collecting and reporting these school and district data would promote accountability and satisfy teachers' concerns about the impact of the innovation on student learning.

Table 28

PCSD Mathematics Achievement Data

Grade Level	2013 Proficiency	2014 Proficiency
3	25 %	29 %
4	33 %	33 %
5	22 %	30 %
6	25 %	30 %

Note. NYSTP Mathematics Achievement 2013 & 2014

Teachers assess student learning periodically within the *My Math* program but results are not shared district-wide. PCSD should develop systems to collect, share and analyze student achievement data in mathematics. This will assist teachers in measuring student progress toward proficiency on the CCLS. Additionally, publicly reporting these data will increase the *observability* of the innovation and speed up diffusion. *Relative advantage* also increases with more opportunities to examine data. As teachers analyze student-learning data, they can see the improvement as a result of *My Math*.

Future innovations in the Plymouth Central School District. Future innovation implementation in PCSD would benefit from the three suggestions discussed in the prior section. For year two of the *My Math* implementation, PCSD should consider adding school-based change facilitators, building structures for collaboration and collecting and reporting on student learning data are systemic practices that could support and enhance any innovation diffusion. In consideration of the implementation of future innovations in PCSD, identifying and communicating the need for the change so that stakeholder buy-in is high is a critical first step. Developing the need for the change and giving teachers an opportunity to pilot a new program before adopting it would increase the speed of the diffusion.

New York State. The Regents' reform agenda in New York State requires the implementation of the CCLS and the revised APPR for teacher and principal evaluation. These reforms result in the simultaneous implementation of innovations. For example, third grade teachers are charged with implementing a new mathematics program and a new ELA program and they are being evaluated on how their students perform on state assessments measuring proficiency of the CCLS. These sound like best practices in educational reform; however, the fact that they are all happening at the same time increase the intensity of concern for teachers and principals.

Based on the data from this study, the *Race to the Top* mandated APPR and the implementation of the CCLS in New York State were positively connected. School leaders gave some attention to mathematics instruction through the teacher evaluation process. Teachers' *Self* concerns became interwoven with their *Consequence* concerns as a result of the connection between student learning and teacher evaluation. In New York State, APPR policy has impacted practice by increasing teacher attention on student learning.

Nation. The CCSS have been adopted by 43 states, the District of Columbia and four territories (http://www.corestandards.org/CCSS). Although the CCSS effort was a result of a national collaboration, the implementation of the CCSS will continue to be realized through state-led initiatives. Individual states have control over the adoption and implementation of the CCSS. States determine specific supports that will be provided to districts, states hire vendors to develop and score CCLS-aligned assessments and states can determine how they will report student achievement results. Implications for practice related to *Collaboration* and *Consequence* concerns include the potential for national teacher support along with virtual and web-based professional development that is aligned and relevant. For example, support for teacher

collaboration in New York State includes the ongoing development of a comprehensive web portal as part of the EngageNY website (Boser, 2012). One of the two goals of this web portal, expected to be ready to use during the 2014-15 school year, is to promote online professional learning communities for educators to collaborate across the state. This professional learning community has the potential to support teachers by broadening their professional networks (Boser, 2012). *Consequence* concern implications include examining student learning across all states. A larger demographic provides deeper insight into student learning and illuminates the different ways that states are enacting the CCSS.

The discord between qualitative data and quantitative data relative to *Consequence* concerns can be explained by the interconnectedness of the stage model. Teachers' *Personal* concerns about their own efficacy with the innovation are closely linked to how their students are performing. If teachers are struggling with the program and in turn students are not improving, teachers will have ammunition for abandoning the reform. On the other hand, if teachers are supportive of the program and finding success in implementing it and student achievement increases, teachers may feel more successful and effective. *Self* concerns are connected to *Consequence* concerns.

In PCSD, the implication that this idea holds is that ongoing opportunities for teachers to share their concerns about a reform could promote more targeted interventions and subsequently increase innovation diffusion. Additionally, teachers could be given an opportunity to privately reveal their concerns as well as publicly share and problem solve with other teachers. Beyond PCSD, teachers in New York and in the nation could be supported in their reform efforts by being asked about their concerns. Identifying specific concerns might assist school leaders in providing differentiated interventions.

This study suggests that enhanced training for both school leaders and teachers is in order. In consideration of near constant innovations that schools are being asked to implement, an inclusion of the skills and dispositions that support effective innovation implementation would benefit preparation programs. Methodology including case studies, simulations and authentic problems related to school reform could simulate the day-to-day work of school leaders and teachers. These practices, as part of a preparation program, could prepare teachers and leaders for innovation diffusion in schools.

School leaders should strive to empower teachers to be change agents. The development of structures for collaboration may enable teachers to support each other in managing change and implementing innovations. Accountability structures that are established by a school leader can provide support for teachers by monitoring the impact of the innovation on student learning. Instructional leaders who want to transform their schools can do so systemically by providing teachers with opportunities to work together to learn about innovations and to examine student data to drive their instructional planning.

These findings go beyond what we already know from previous research by suggesting that school leaders actions and interventions have low alignment with teachers' concerns. This study confirms the intensity of school leaders' concerns at the *Unconcerned* Stage and notes that since school leaders have other priorities, they are concerned about finding time to support the *My Math* innovation. Although largely concerned about other things, school leaders and teachers reported interventions that were used to support the implementation of *My Math*. From the teacher data, these findings confirm what is known in the field that teachers want to collaborate to affect change. Finally, a key finding from this study was that current policy for teacher and principal evaluation practices contributed to a blurring of teachers' concerns about *Self* with their

Consequence concerns. Teachers are concerned about student learning during the initial stages of innovation implementation. I discuss the limitations and significance of this research next followed by recommendations for future research.

Limitations of the Study

A limitation of this study is that the participants are all employees of one small city school district in Central New York. Although each school is unique in terms of demographics, the fact that the schools in this study are all part of the same small city school district may restrict the possible outcomes. Communication relative to the innovation established at the district office level is uniform throughout the five elementary schools. School leaders may be uniform in their management of *My Math* because they live in the same large system. In the teacher participant sample, only four of the elementary schools were represented. This may unintentionally omit key data relative to teachers' concerns and perceptions of school leaders' interventions.

The current state of the district includes numerous school reforms and innovations. This made data analysis challenging when trying to identify concerns specific to the *My Math* innovation. When multiple innovations occur simultaneously, culling concerns relative to one innovation becomes difficult.

As described in Chapter Three, a limitation of a mixed methods research design, is that you cannot always discern the true meaning of the responses when using an instrument with a Likert scale. Some dissonance among the data may result when using multiple methods of collection. A qualitative research design including individual interviews with teachers conducted

by a researcher with no connection to the district may be a way to elicit more depth on specific concerns of teachers.

In terms of identifying aligned interventions, teachers may know what they need and not want to tell you (Loucks-Horsley, 1998). The tension between the private concerns of a teacher relative to his/her feelings of efficacy and evaluation score and the very public concern about increasing student learning is central to this study. Teachers can freely share their concerns for student learning yet may be more reluctant to share concerns about their own value as teachers. Thus the methodological design of this study may have been a limitation.

Significance of the Study

This study is significant because it includes the simultaneous examination of the concerns of the school leader and of the teacher. Because change is complex and deeply personal, this research utilized the Change Facilitator Stages of Concern and the Stages of Concern models and questionnaires. This represents the first study that utilized both models and both instruments concurrently. The CFSoCQ has not had the widespread use in the field as compared to its companion, the SoCQ. This study examines both school leader and teacher concerns using CBAM and contributes to the research on school reform.

Some forty years after the conceptualization of the CFSoC, this research adds value to the field by confirming the developmental nature of the model. Novice school leaders have other school leadership concerns and are therefore *Unconcerned* about the innovation. School leaders with more experience tend to have increased concerns at the higher stages. School leaders and teachers are the key players in school reform and this study examines how the actions of school leaders interconnect with the concerns of teachers.

A potentially positive effect from this study was that current policy for teacher and principal evaluation practices contributed to a blurring of teachers' concerns about *Self* with their *Consequence* concerns. Teacher efficacy resulting in increased student achievement is at the heart of school reform efforts. This finding is significant as it suggests that policy can impact practice.

Recommendations for Future Research

The current rhetoric around school reform calls for improved teacher evaluation processes, less standardized testing and more accountability for schools and districts. Given the high visibility of public criticism of schools, the process of change in schools warrants further studies. This study represents an effort to identify effective practices of school leaders that facilitate change in schools. In doing so, an examination of the concerns of both school leaders and teachers along with the actions of school leaders provides insight into the alignment of concerns and actions.

A primary recommendation for future research would be to plan for the collection of concerns data on a regular basis throughout the school system. Utilizing surveys and interviews with more school leaders and teachers across a variety of schools can contribute to an increased understanding about the concerns of change facilitators and teachers. Additional instruments in the CBAM toolkit may prove valuable in terms of collecting data on the levels of use (LoU) of *My Math.*

Some data in this study provided a link between teachers' evaluations and *Consequence* concerns. An area of further research might include an examination of the school leader concerns' relative to the APPR for principals. Evaluations of' principals in New York State is

guided by one of several state approved rubrics. These tools all contain indicators that represent sub skills of change facilitation. Data on the concerns of school leaders and teachers are helpful for districts in order to design effective organizational support for school improvement.

A second area for further research would be to continue to examine size, demographics and support staff relative to high performing elementary schools. In this study, each of the school leaders represents the single administrator in the school with enrollments hovering around 500 children. One assistant to the elementary principal is available for one day a week. This is a result of diminishing resources in education. Two literacy coaches are shared among the five elementary schools in the district and there are no mathematics coaches. Additional research on optimal school sizes and staffing in the current climate of CCSS implementation and high accountability would be a benefit to the research base on school reform.

A third recommendation for future research would be to examine teacher and leadership preparation programs in terms of change management. Clinically rich programs are the current trend and claim that they are preparing teachers and school leaders to lead school reform efforts (Jacobs, Brody, Rosen, & Madden, 2010). Future research might include a focus on identifying and practicing the skills and dispositions that are required in schools where reform is the norm and not the exception. Further research on how preparation programs have evolved given the current climate of school reform would add value to the field.

Summary

The CBAM as a conceptual framework suggests that concerns are developmental relative to change. Typically, concerns move from lower stages to the higher stages as an innovation is

implemented. Moving individual concerns from the lower stages to the higher stages can sustain innovation.

Data from this study showed that school leaders concerns were largely at the lowest stage of concern throughout the initial year of implementation. These data suggest that more support and or preparation is in order for school leaders concerns to move to the upper stages where concern is focused on improving their role as a change facilitator. Principal interventions aimed at measuring the impact of the innovation on students were few. An opportunity exists for school principals to reprioritize their work to support teachers involved in frontline innovation implementation. Identifying district level interventions to support school leaders as change facilitators may support a shift of concerns to *Impact* stages.

Teacher quantitative data revealed that the lower stages of concerns were skewed high which would be predicted at the start of an innovation. Qualitative data skewed high on stages 4 and 5 concerns. Teachers wanted to collaborate with others and they had a predominance of thought on how the students were performing with the innovation. High Stage 5 concerns support current research on the power of collaboration in school reform. Professional learning communities, critical friends, communities of practice, and collegial circles are structures that support teacher collaboration.

The Stage 4 data indicate a tension between the methods. Quantitative data skewed low on *Consequence* concerns where the qualitative data was rich with teachers' *Consequence* concerns. Qualitative data indicate that teachers' concerns escalated to a higher stage early in the innovation implementation process.

A possible explanation for high Stage 4 *Consequence* concerns could be found in the revised APPR for teacher evaluation. This model integrates student achievement results into teacher evaluation scores. A reconceptualization of Stage 1 *Self* concerns to include student-learning results or *Consequence* concerns may explain this divergence in the data. Further, a conclusion may be drawn that teacher evaluation policy changes contributed to the escalation of concerns to the *Impact* stages. This is potentially a positive consequence of the new teacher evaluation system.

As the landscape of educational reform continues to evolve, teachers and school leaders could benefit from continued preparation on how to manage multiple changes simultaneously. Continued examination of the concerns of both change facilitators and teachers can provide insight as to the interventions that best support innovation diffusion and implementation.

APPENDICES

Appendix A

PCSD Expectations for *My Math* Implementation

Chapter Assessments: (Before, During and After instruction)

1. Am I Ready?
2. Check My Progress
3. Chapter Tests

Practice and Apply: *Use the data from the assessments to differentiate-*

1. Approaching level
2. On Level
3. Beyond Level

Lesson Design: (Posing Questions)

1. Explore and Explain
2. Problem solving- **HOT problems- higher order thinking/** Reflection of the essential question

2013-14 CCLS	My MATH components	NYSUT RUBRIC (APPR)
Marking Period 2- **FOCUS AREAS**	**Chapter Assessments:** ***Am I Ready?, Checking My Progress, Chapter Tests***	**3.6.A Uses Formative Assessment**
Marking Period 3- **FOCUS AREAS**	**Practice & Apply** **(On My Own) -*Approaching Level*, -*On Level*, -*Beyond Level***	**3.4 A- Differentiates Instruction**
Marking Period 4- **FOCUS AREAS**	**Posing Questions, *Explore and Explain*** ***Problem Solving: HOTS= Higher Order Thinking***	**3.2 B- Uses Questioning Techniques**

Additional components of My Math that should be incorporated:

Academic Vocabulary is essential- words are provided for each chapter and lesson- it is essential that students are using these words when they are discussing mathematics and problem solving collaboratively. Of the many resources that the program provides, you can select those that are most helpful- flashcards, vocabulary journal, on line games, etc.

Fluency- Fluency drills should be incorporated daily but do not always have to be on paper or online. FAST MATH is still available to all of you!

Appendix B

School Leader and Teacher Email to Participate

School Leader email:

Thank you for agreeing to participate in the research project- concerns of school leaders and teachers about the implementation of a new math program. You are invited to participate in a questionnaire related to the facilitation of the *My Math* program implementation. The purpose of the survey is to determine what school leaders are concerned about at various points during the first year of the *My Math* implementation

This survey is called the Change Facilitators Stages of Concern Questionnaire and it will take 10-15 minutes of your time to complete.

The survey is available online at: http://www.sedl.org/concerns/cf/

Enter the password: Plymouth to log on and click submit survey responses to complete the survey.

The first round of the survey will be available to you until **September 27th**.

Thank you again for your participation!

Teacher email:

Thank you for agreeing to participate in the research project- concerns of school leaders and teachers about the implementation of a new math program. You are invited to participate in a questionnaire related to the facilitation of the *My Math* program implementation. The purpose of the survey is to determine what school leaders are concerned about at various points during the first year of the *My Math* implementation

This survey is called the Stages of Concern Questionnaire and it will take 10-15 minutes of your time to complete.

The survey is available online at: http://www.sedl.org/concerns/

Enter the password: **Plymouth** to log on and click submit survey responses to complete the survey.

The first round of the survey will be available to you until **September 27th**.

Thank you again for your participation!

Appendix C

Change Facilitator Stages of Concern Questionnaire

1	I would like more information about the purpose of *My Math.*	0	1	2	3	4	5	6	7
2	I am more concerned about facilitating the use of another innovation.	0	1	2	3	4	5	6	7
3	I would like to develop working relationships with administrators and other change facilitators to facilitate the use of *My Math.*	0	1	2	3	4	5	6	7
4	I am concerned because responding to the demands of staff relative to *My Math* takes so much time.	0	1	2	3	4	5	6	7
5	I am not concerned about *My Math* at this time.	0	1	2	3	4	5	6	7
6	I am concerned about how my facilitation affects the attitudes of those directly involved in the use of *My Math.*	0	1	2	3	4	5	6	7
7	I would like to know more about *My Math*.	0	1	2	3	4	5	6	7
8	I am concerned about criticism of my work with *My Math*.	0	1	2	3	4	5	6	7
9	Working with other administrators and other change facilitators in facilitating the use of *My Math* is important to me.	0	1	2	3	4	5	6	7
10	I am preoccupied with things other than *My Math*.	0	1	2	3	4	5	6	7
11	I wonder whether the use of *My Math* will help or hurt my relations with my colleagues.	0	1	2	3	4	5	6	7
12	I need more information and understanding about *My Math.*	0	1	2	3	4	5	6	7
13	I am thinking that *My Math* could be modified or replaced with a more effective program.	0	1	2	3	4	5	6	7
14	I am concerned about facilitating the use of *My Math* in view of limited resources.	0	1	2	3	4	5	6	7
15	I would like to coordinate my efforts with other change facilitators.	0	1	2	3	4	5	6	7
16	I would like to know what resources are necessary to adopt *My Math.*	0	1	2	3	4	5	6	7
17	I want to know what priority my superiors want me to give to *My Math.*	0	1	2	3	4	5	6	7
18	I would like to excite those directly involved in the use of *My Math.*	0	1	2	3	4	5	6	7
19	I am considering use of another innovation that would be better than the one that is currently being used.	0	1	2	3	4	5	6	7
20	I would like to help others in facilitating the use of *My Math*.	0	1	2	3	4	5	6	7
21	I would like to determine how to enhance my facilitation skills.	0	1	2	3	4	5	6	7
22	I spend little time thinking about this instruction.	0	1	2	3	4	5	6	7
23	I see a potential conflict between facilitating *My Math* and overloading staff.	0	1	2	3	4	5	6	7

24	I am concerned about being held responsible for facilitating the use of *My Math*.	0	1	2	3	4	5	6	7
25	Currently, other priorities prevent me from focusing my attention on *My Math*.	0	1	2	3	4	5	6	7
26	I know of another innovation that I would like to see used in place of this innovation.	0	1	2	3	4	5	6	7
27	I am concerned about how my facilitating the use of *My Math* affects those directly involved in the use of it.	0	1	2	3	4	5	6	7
28	Communication and problem solving relative to *My Math* takes too much time.	0	1	2	3	4	5	6	7
29	I wonder who will get the credit for implementing *My Math*.	0	1	2	3	4	5	6	7
30	I would like to know where I can learn more about *My Math.*	0	1	2	3	4	5	6	7
31	I would like to modify my mode of facilitating the use of *My Math* based on the experiences of those directly involved in its use.	0	1	2	3	4	5	6	7
32	I have alternate innovations in mind that I think would better serve the needs of our situation.	0	1	2	3	4	5	6	7
33	I would like to familiarize other departments or persons with the progress and process of facilitating the use of *My Math*.	0	1	2	3	4	5	6	7
34	I am concerned about finding and allocating time needed for this innovation.	0	1	2	3	4	5	6	7
35	I have information about another innovation that I think would produce better results than the one we are presently using.	0	1	2	3	4	5	6	7

Appendix D

Stages of Concern Questionnaire

1	I am concerned about students' attitudes toward *My Math*.	0	1	2	3	4	5	6	7
2	I now know of some other approaches that may work better.	0	1	2	3	4	5	6	7
3	I am more concerned about another innovation.	0	1	2	3	4	5	6	7
4	I am concerned about not having enough time to organize myself each day.	0	1	2	3	4	5	6	7
5	I would like to help other teachers in their use of *My Math*.	0	1	2	3	4	5	6	7
6	I have a very limited knowledge about *My Math*.	0	1	2	3	4	5	6	7
7	I would like to know the effect of reorganization on my professional status.	0	1	2	3	4	5	6	7
8	I am concerned about the conflict between my interests and my responsibilities.	0	1	2	3	4	5	6	7
9	I am concerned about revising my use of *My Math*.	0	1	2	3	4	5	6	7
10	I would like to develop working relationships with both our teachers and teachers in other buildings using *My Math*.	0	1	2	3	4	5	6	7
11	I am concerned about how *My Math* affects students.	0	1	2	3	4	5	6	7
12	I am not concerned about *My Math*.	0	1	2	3	4	5	6	7
13	I would like to know who will make the decisions in *My Math*.	0	1	2	3	4	5	6	7
14	I would like to discuss the possibility of using *My Math*.	0	1	2	3	4	5	6	7
15	I would like to know what resources are available if we decide to adopt *My Math*.	0	1	2	3	4	5	6	7
16	I am concerned about my ability to manage all that *My Math* requires.	0	1	2	3	4	5	6	7
17	I would like to know how my teaching or administration is supposed to change.	0	1	2	3	4	5	6	7
18	I would like to familiarize other departments or teachers with the progress of *My Math*.	0	1	2	3	4	5	6	7
19	I am concerned about evaluating my impact on students.	0	1	2	3	4	5	6	7

20	I would like to revise *My Math's* instructional approach.	0	1	2	3	4	5	6	7
21	I am completely occupied with other things.	0	1	2	3	4	5	6	7
22	I would like to modify our use M*y Math* based on the experiences of our students.	0	1	2	3	4	5	6	7
23	Although I don't know about *My Math*, I am concerned about things in the area.	0	1	2	3	4	5	6	7
24	I would like to excite my students about their part in *My Math*	0	1	2	3	4	5	6	7
25	I am concerned about the time spent working with nonacademic problems related to *My Math*.	0	1	2	3	4	5	6	7
26	I would like to know what the use of *My Math* will require in the future.	0	1	2	3	4	5	6	7
27	I would like to coordinate my effort with others to maximize *My* Math's effects.	0	1	2	3	4	5	6	7
28	I would like to have more information on time and energy commitments required by *My Math*.	0	1	2	3	4	5	6	7
29	I would like to know what other faculty are doing with *My Math*.	0	1	2	3	4	5	6	7
30	At this time, I am not interested in learning about *My Math*.	0	1	2	3	4	5	6	7
31	I would like to determine how to supplement, enhance or replace the innovation.	0	1	2	3	4	5	6	7
32	I would like to use feedback from students to change *My Math.*	0	1	2	3	4	5	6	7
33	I would like to know how my role will change when using *My Math.*	0	1	2	3	4	5	6	7
34	Coordination of tasks and people is taking too much of my time.	0	1	2	3	4	5	6	7
35	I would like to know how *My Math* is better than what we have now.	0	1	2	3	4	5	6	7

Appendix E

Change Facilitator Stages of Concern Questionnaire Open-Ended Items

Administration	*Demographic Information*	Open-ended Items
September	What specifically is your current position?	Additional comments.
	How many years have you been in your current position?	Please describe what you perceive to be the greatest benefit of this innovation.
	How many years have you been a school leader?	Please describe any significant barriers to your participation in this innovation.
	How many years were you a teacher?	

Administration	*Demographic Information*	Open-ended Items
January	What specifically is your current position?	Additional comments.
	How many years have you been in your current position?	Please describe the concerns expressed by teachers about implementing the *My Math* program.
		Please describe the specific supports that you have provided to teachers to help them implement the *My Math* program.

Administration	*Demographic Information*	Open-ended Items
May	What specifically is your current position?	Additional comments
	How many years have you been in your current position?	Please describe the concerns expressed by teachers about implementing the *My Math* program since March.
		Please describe the specific supports that you have provided to teachers to help them implement the *My Math* program since March.
		What data assists you in determining the success of the My Math program?

Appendix F

Stages of Concern Questionnaire Open-Ended Items

Administration	*Subgroup Data*	*Open-ended Items*
September	Building	Additional comments.
	Primary Grade Taught	Please describe what you perceive to be the greatest benefit of this innovation.
	Years of Teaching Experience	Please describe any significant barriers to your participation in this innovation.
	Number of mathematics courses or mathematics methods courses taken in college	
Administration	*Subgroup Data*	*Open-ended Items*
January	Building	Additional comments.
	Primary Grade Taught	Please describe what you perceive to be the greatest benefit of this innovation.
	Years of Teaching Experience	Please describe any significant barriers to your participation in this innovation.
		How are students responding to the innovation?
		How are parents responding to the innovation?
Administration	*Demographic Information*	*Open-ended Items*
May	Building	Additional comments
	Primary Grade Taught	Please describe what you perceive to be the greatest benefit of this innovation.
	Years of Teaching Experience	Please describe any significant barriers to your participation in this innovation.
		Describe the resources, structures, or supports that your principal uses to help you implement *My Math*.
		How have your beliefs about teaching mathematics changed, if at all, with *My Math*?

Appendix G

School Leader Focus Group Items Aligned with the Change Facilitator Stages of Concern

- Describe the implementation of *My Math* in your school so far? (Stage 0)
- Are there aspects of *My Math* that you would like to know more about? Are there aspects of *My Math*, where you feel like you know what you need to know? **(**Stage 1)
- Describe your highest daily priorities in your building each day. Does the implementation of *My Math* rank on that list? If so, where on that list? **(**Stage 2)
- How will the implementation of *My Math* reflect on your school, your teachers, and/or your students? **(**Stage 2)
- Describe the resources, structures, or facilities your school uses to help facilitate the implementation of *My Math*. Are there additional resources that you believe would help you in the implementation process?
- Have you taken action to support of the implementation of *My Math* in your school? If so, what specifically have you done to support teachers? If not, what barriers have you encountered?
- Do you believe teachers have concerns are about implementing *My Math*? If so, what might these concerns be? **(**Stage 4)
- Do you believe parents and students have concerns about *My Math*? If so, what might these concerns be? **(**Stage 4)
- Have you been collaborating with other school leaders to facilitate *My Math* implementation?
  - If so, what does that look like?
  - If not, what are the barriers? (Stage 5)
- To your knowledge, have your teachers been collaborating to implement *My Math*? If so, please describe those collaborations.
- Do you believe that there are better alternatives to teaching mathematics other than *My Math*? If so, what? **(**Stage 6)
- Is there anything else that you would like to say about the *My Math* implementation in your school?

Appendix H

Teacher Focus Group Items Aligned With the Stages of Concern

- Describe the implementation of *My Math* in your classroom so far? **(**Stage 0)
- Are there aspects of *My Math* that you would like to know more about? Are there aspects of *My Math*, where you feel like you know what you need to know? **(**Stage 1)
- Describe your highest daily priorities in your classroom each day. Does the implementation of *My Math* rank on that list? If so, where on that list? **(**Stage 2**)**
- How will the implementation of *My Math* reflect on your students and/or you? **(**Stage 2)
- Describe the resources, structures, or facilities your school uses to help facilitate the implementation of *My Math*. To what degree are those resources available to you? Are there additional resources that you believe would help you in the implementation process?
- Has your school building administration taken action to support of the implementation of *My Math* in your school?
- If so, what specifically has been done to support you in your classroom?
- If not, what barriers have you encountered?
- As a teacher, do you have concerns about implementing *My Math*? If so, what might these concerns be? **(**Stage 4)
- Do you believe parents and students have concerns about *My Math*? If so, what might these concerns be? **(**Stage 4)
- Have you been collaborating with other teachers or personnel to facilitate *My Math* implementation?
    - If so, what does that look like?
    - If not, what are the barriers? **(**Stage 5)

Appendix I

School Leader Semi-Structured Interview Guide

Opening Question:

Have there been any changes in focus, effort or concern since the focus group meeting in December?

Stages of Concerns Questions:

Unrelated concerns- Stage 0

Describe the implementation of *My Math* in your school so far? **(Stage 0)**

Self Concerns-Stages 1,2

Are there aspects of *My Math* that you would like to know more about? Are there aspects of *My Math,* where you feel like you know what you need to know? **(Stage 1)**

Describe your highest daily priorities in your building each day. Does the implementation of *My Math* rank on that list? If so, where on that list? **(Stage 2)**

How will the implementation of *My Math* reflect on your school, your teachers, and/or your students? **(Stage 2)**

Task Concerns-Stage 3

Describe the resources, structures, or facilities your school uses to help facilitate the implementation of *My Math*. Are there additional resources that you believe would help you in the implementation process?

Have you taken action to support of the implementation of *My Math* in your school?

If so, what specifically have you done to support teachers?

If not, what barriers have you encountered?

Impact Concerns- Stages 4,5,6

Do you believe teachers have concerns are about implementing *My Math*? If so, what might these concerns be? (Stage 4)

Do you believe parents and students have concerns about *My Math*? If so, what might these concerns be? (Stage 4)

Have you been collaborating with other school leaders to facilitate *My Math* implementation?

If so, what does that look like?

If not, what are the barriers? (Stage 5)

To your knowledge, have your teachers been collaborating to implement *My Math*? If so, please describe those collaborations.

Do you believe that there are better alternatives to teaching mathematics other than *My Math*? If so, what? (Stage 6)

Since the district will continue to use the *My Math* program next year, what are your future plans, strategies, etc. with regard to the math curriculum? (Stage 6)

Closing Question:

Do you have anything else that you would like to say about the *My Math* implementation in your school?

Appendix J

Change Facilitator Stages of Concern Questionnaire Raw Score Conversion Chart

Five	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
0	0	0	0	0	0	0	0
1	1	2	1	1	0	0	1
2	2	3	2	1	0	0	3
3	4	5	4	2	1	0	5
4	7	8	7	2	1	0	8
5	14	13	12	5	1	0	13
6	22	18	18	8	1	1	18
7	31	21	24	11	1	1	23
8	40	26	30	15	2	2	31
9	48	30	34	19	2	3	39
10	55	34	39	22	2	3	47
11	61	37	43	26	2	4	55
12	69	40	49	30	2	5	63
13	75	43	56	35	3	7	68
14	81	46	62	40	3	8	75
15	87	49	68	44	4	9	81
16	91	53	73	50	5	12	86
17	94	56	77	55	6	15	89
18	96	59	79	60	7	18	90
19	97	61	81	66	9	21	92
20	98	64	84	71	11	24	95
21	99	66	87	74	13	28	96
22	99	69	89	78	16	32	97
23	99	72	91	82	20	36	97
24	99	76	93	86	27	40	98
25	99	79	95	89	33	43	98
26	99	81	97	91	39	48	99
27	99	84	98	93	46	54	99
28	99	87	99	94	54	60	99
29	99	89	99	94	62	67	99
30	99	92	99	95	68	72	99
31	99	94	99	96	74	77	99
32	99	96	99	97	82	82	99
33	99	98	99	98	87	85	99
34	99	99	99	99	91	91	99
35	99	99	99	99	97	97	99

Appendix K

Stages of Concern Questionnaire Raw Score Conversion Chart

Raw	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
0	0	5	5	2	1	1	1
1	1	12	12	5	1	2	2
2	2	16	14	7	1	3	3
3	4	19	17	9	2	3	5
4	7	23	21	11	2	4	6
5	14	27	25	15	3	5	9
6	22	30	28	18	3	7	11
7	31	34	31	23	4	9	14
8	40	37	35	27	5	10	17
9	48	40	39	30	5	12	20
10	55	43	41	34	7	14	22
11	61	45	45	39	8	16	26
12	69	48	48	43	9	19	30
13	75	51	52	47	11	22	34
14	81	54	55	52	13	25	38
15	87	57	57	56	16	28	42
16	91	60	59	60	19	31	47
17	94	63	63	65	21	36	52
18	96	66	67	69	24	40	57
19	97	69	70	73	27	44	60
20	98	72	72	77	30	48	65
21	99	75	76	80	33	52	69
22	99	80	78	83	38	55	73
23	99	84	80	85	43	59	77
24	99	88	83	88	48	64	81
25	99	90	85	90	54	68	84
26	99	91	87	92	59	72	87
27	99	93	89	94	63	76	90
28	99	95	91	95	66	80	92
29	99	96	92	97	71	84	94
30	99	97	94	97	76	88	96
31	99	98	95	98	82	91	97
32	99	99	96	98	86	93	98
33	99	99	96	99	90	95	99
34	99	99	97	99	92	97	99
35	99	99	99	99	96	98	99

Appendix L

Qualitative Data Coding Scheme

CODE	CATEGORY	Description	Explanation/Example
CONCERN (SoC)			
UNCO	*Unconcerned*	Aware but not concerned	I don't really know what this innovation is all about and I am not concerned about it
INFO	*Informational*	Interested in some information	I want to know more about this innovation
PER	*Personal*	Wants to know the personal impact of the change	How is this going to affect me? Can I do this? How much control will I have over the way I use this?
MGMT	*Management*	Concerned about how to manage the change in practice	I seem to be spending all of my time getting materials ready Where will I find the time to do all of this?
CON	*Consequence*	Interested in the impact on students or the school	How is using this going to affect my students? I am concerned about whether or not I can change this in order to ensure that students will learn better as a result
COL	*Collaboration*	Interested in working with colleagues to make the change effective	I'm concerned about how what I am doing compares to what other teachers are doing. I want to see more cooperation as we work though this
REF	*Refocusing*	Begins improving the innovation to improve student learning results	I have some ideas about something that would work even better than this.
PAR	*Parent concern*	Parents are concerned about	Teachers comments about parents questions and concerns and how they

		the change	are supporting them
CODE	**CATEGORY**	**Description**	**Explanation/Example**
CF CONCERN (CFSoC)			
CFUNCO	*Unconcerned*	Aware but not concerned	Change facilitation is not an intense concern
CFINFO	*Informational*	Interested in some information about the innovation	I want to know more about this innovation in general
CFPER	*Personal*	Concerned about personal adequacy for being a change facilitator	Uncertainty about one's own ability to play the role of a change facilitator; concerns about organizational support
CFMG	*Management*	Concerned about how to manage the change in practice	Focus on "how to" facilitate change and manage the change process
CFMGMAT	*Materials*	Arranged for materials	Arranged for the exchange of student and teacher books half way through the year
CFMGTI	*Time*	Provided time	Provided time on agendas for faculty and grade level meetings
CFMGEVAL	*Evaluations*	Innovation is part of evaluation process	Formal observations and walkthrough visits
CFMGTECH	*Technology*	Arranges for technology or technology support	School leader requests smart board and or Technology staff developers
CFMGPD	*Professional Development*	Provides PD to teachers	School leader delivers PD to teachers
CFMGSUP	*Supplemental Resources*	Purchases needed materials to support the program	School leader buys supplemental materials
CFCON	*Consequence*	Interested in becoming a better change facilitator	Attention is on improving one's own style and skill of change facilitation so as to make a difference for the innovator

CFCOL	*Collaboration*	Interested in working with colleagues to improve change facilitation skills	Collaborating with others to improve change facilitation skills for increased impact
CFREF	*Refocusing*	Begins thinking about alternatives to the innovation	Ideas about alternatives to the innovation; thoughts are focused on increasing the benefit to the client
CFPAR	*Parent concerns*	Parents are concerned about the change	School leaders comments about parents concerns

Appendix M

Change Facilitator Stages of Concern Questionnaire by Stage Scale

	Stage 0
2	I am more concerned about facilitating the use of another innovation.
5	I am not concerned about *My Math* at this time.
10	I am preoccupied with things other than *My Math*.
22	I spend little time thinking about this instruction.
25	Currently, other priorities prevent me from focusing my attention on *My Math*.
	Stage 1
1	I would like more information about the purpose of *My Math.*
7	I would like to know more about *My Math*.
12	I need more information and understanding about *My Math*.
16	I would like to know what resources are necessary to adopt *My Math*.
30	I would like to know where I can learn more about *My Math*.
	Stage 2
8	I am concerned about criticism of my work with *My Math*.
11	I wonder whether the use of *My Math* will help or hurt my relations with my relations with my colleagues.
17	I want to know what priority my superiors want me to give to *My Math*.
24	I am concerned about being held responsible for facilitating the use of *My Math*.
29	I wonder who will get the credit for implementing *My Math*.
	Stage 3
4	I am concerned because responding to the demands of staff relative to *My Math*. takes so
14	I am concerned about facilitating the use of *My Math* in view of limited resources.
23	I see a potential conflict between facilitating *My Math* and overloading staff.
28	Communication and problem solving relative to *My Math* takes too much time.
34	I am concerned about finding and allocating time needed for *My Math.*
	Stage 4
6	I am concerned about how my facilitation affects the attitudes of those directly involved in the use of *My Math.*
18	I would like to excite those directly involved in the use of *My Math*.
21	I would like to determine how to enhance my facilitation skills.
27	I am concerned about how my facilitating the use of *My Math* affects those directly involved in the use of it.
31	I would like to modify my mode of facilitating the use of *My Math* based on the experiences of those directly involved in its use.
	Stage 5
3	I would like to develop working relationships with administrators and other change facilitators to facilitate the use of *My Math.*

9	Working with other administrators and other change facilitators in facilitating the use of *My Math* is important to me.
15	I would like to coordinate my efforts with other change facilitators.
20	I would like to help others in facilitating the use of *My Math*.
33	I would like to familiarize other departments or persons with the progress and process of facilitating the use of *My Math*.
	Stage 6
13	I am thinking that *My Math* could be modified or replaced with a more effective program.
19	I am considering use of another innovation that would be better than the one that is currently being used.
26	I know of another innovation that I would like to see used in place of this innovation.
32	I have alternate innovations in mind that I think would better serve the needs of our situation.
35	I have information about another innovation that I think would produce better results than the one we are presently using.

Appendix N

Stages of Concern Questionnaire by Stage Scale

	Stage 0
3	I am more concerned about another innovation.
12	I am not concerned about *My Math* at this time.
21	I am completely occupied with other things.
23	Although I don't know about *My Math*, I am concerned about things in the area.
30	At this time, I am not interested in learning about *My Math*.
	Stage 1
6	I have a very limited knowledge about *My Math*.
14	I would like to discuss the possibility of using *My Math*.
15	I would like to know what resources are available if we decide to adopt *My Math*.
26	I would like to know what the use of *My Math* will require in the future.
35	I would like to know how *My Math* is better than what we have now.
	Stage 2
7	I would like to know the effect of *My Math* on my professional status.
13	I would like to know who will make the decisions in *My Math*.
17	I would like to know how my teaching is supposed to change.
28	I would like to have more information on time and energy commitments required by *My Math.*
33	I would like to know how my role will change when using *My Math*.
	Stage 3
4	I am concerned about not having enough time to organize myself each day.
8	I am concerned about the conflict between my interests and my responsibilities.
16	I am concerned about my ability to manage all that *My Math* requires.
25	I am concerned about the time spent working with nonacademic problems related to *My Math.*
34	Coordination of tasks and people is taking too much of my time.
	Stage 4
1	I am concerned about students' attitudes toward *My Math*.
11	I am concerned about how *My Math* affects students.
19	I am concerned about evaluating my impact on students.
24	I would like to excite my students about their part in *My Math*.
32	I would like to use feedback from students to change *My Math*.
	Stage 5
5	I would like to help other teachers in their use of *My Math*.
10	I would like to develop working relationships with both our teachers and teachers in other buildings using *My Math*.
18	I would like to familiarize other departments or teachers with the progress of *My Math*.
27	I would like to coordinate my effort with others to maximize *My Math's* effects.
29	I would like to know what other faculty are doing with *My Math*.

	Stage 6
2	I now know of some other approaches that may work better.
9	I am concerned about revising my use of *My Math*.
20	I would like to revise *My Math's* instructional approach.
22	I would like to modify our use *My Math* based on the experiences of our students.
31	I would like to determine how to supplement, enhance or replace the innovation.

Appendix O

School Leader Individual and Mean Percentile Data

Fall Administration							
School Leader/Stage	0	1	2	3	4	5	6
Rob Gore	**55**	26	18	8	*2	*3	13
Bill Monk	**98**	64	49	50	46	82	39
Cheryl Link	*1	***34**	*12	2	*13	***36**	*1
Rachel White	91	**99**	87	44	*39	67	*39
Craig Mann	**96**	84	77	50	27	32	13
Average	**75**	64	49	26	*16	36	*18

Winter Administration							
School Leader/Stage	0	1	2	3	4	5	6
Rob Gore	**69**	26	12	5	*1	*3	13
Bill Monk	**87**	40	*43	26	*13	*43	*13
Cheryl Link	*14	*13	*12	5	3	**36**	0
Rachel White	**99**	64	43	19	*2	*2	89
Craig Mann	**55**	43	30	*8	*6	9	13
Average	**81**	40	30	11	3	12	18

Spring Administration							
School Leader/Stage	0	1	2	3	4	5	6
Rob Gore	**48**	21	12	5	*1	*0	13
Bill Monk	**99**	56	73	55	*13	40	*13
Cheryl Link	**14**	8	4	5	*2	3	*0
Rachel White	**99**	43	39	19	*5	*7	18
Craig Mann	**99**	53	43	22	11	3	13
Average	**94**	37	34	19	*4	*5	8

*Tie- a difference of only 1 -2 points on a person's highest or lowest stage concern

Underline & Bold- Highest Concern; Green- Second Highest; Blue- Lowest Concern

Appendix P

Teacher Individual and Mean Percentile Data

Fall Administration							
Teacher/Stage	0	1	2	3	4	5	6
1	48	72	78	**90**	63	76	60
2	55	**63**	59	34	8	31	30
3	***48**	16	14	27	5	***48**	9
4	75	37	89	**94**	30	48	57
5	**55**	19	25	*15	*13	40	*14
6	*4	**45**	28	15	*3	19	17
7	***48**	19	45	39	5	***48**	17
8	**87**	43	72	56	16	80	42
9	40	12	17	11	8	59	**77**
10	**91**	34	28	47	33	*22	*22
Average	**55**	37	48	43	13	48	34

Winter Administration							
Teacher/S	0	1	2	3	4	5	6
1	48	57	28	52	24	**59**	52
2	**81**	72	57	77	13	40	60
3	22	16	*12	**47**	*13	36	30
4	69	**75**	63	43	38	31	42
5	**48**	*37	25	15	8	*36	30
6	**61**	27	28	15	8	40	9
7	**48**	*23	*25	18	5	19	9
8	48	**60**	45	56	3	40	30
9	14	19	5	43	19	52	**90**
10							
11	31	60	48	56	**63**	59	52
12	69	88	**92**	47	27	55	47
Average	**48**	**48**	41	43	16	44	38

Spring Administration							
Teacher/S	0	1	2	3	4	5	6
1	40	16	21	27	43	**55**	22
2							
3	**61**	27	31	18	7	36	30
4	**75**	34	67	56	*24	36	*26
5	**61**	16	21	15	7	31	34
6							
7	**55**	30	21	18	5	52	17
8	22	**51**	*39	27	5	16	*38
9	14	16	*12	*11	16	28	**47**
10							
11	*55	**84**	70	80	*54	64	69
12	40	**69**	57	27	13	48	38
Average	***41**	38	32	30	11	***41**	29

*Tie- a difference of only 1 -2 points on a person's highest or lowest stage concern

Underline & Bold- Highest Concern; Green- Second Highest; Blue- Lowest Concern

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Biography

Leela Jean George was born on September 23, 1962 in Haverhill, New Hampshire. She graduated from a small school district in New Hampshire in 1980. She attended St. Lawrence University in Canton, New York and was a member of the women's basketball team. After graduating from college in 1984, she began her teaching career in the West Genesee Central School District in Camillus, New York. She served the district as a social studies teacher and coach. In 1986, she began teaching in the Cazenovia Central School District and she taught social studies and coached girls' varsity basketball. She received her MS in Social Studies Education in 1990 from the State University College at Cortland. In 1992, she was hired by the Fayetteville-Manlius School District to teach middle school social studies at Eagle Hill Middle School. Later she served the district as the gifted and talented teacher at Wellwood Middle School. Throughout her 18 years as a teacher, Leela was involved in professional development through the local district, the BOCES or institutions of higher education.

Leela enrolled in Syracuse University to pursue a Certificate of Advanced Studies in Educational Leadership. In 2002, she left teaching to become a professional development specialist at a BOCES in Central New York. While at the BOCES she served in three educational leadership roles, Instructional Specialist, Coordinator of Data, Curriculum and Assessment and Director of the Professional Development Unit. This work focused on professional development and support for teachers and school leaders in nine school districts. Currently, Leela serves a small city school district in Central New York in the capacity of Assistant Superintendent for Curriculum and Instruction. She has held this position since 2010.