THE EFFECT OF NYS K-6 SUPERINTENDENT LEADERSHIP PRACTICES ON ELEMENTARY MATH-LEARNING ENVIRONMENTS

A Doctoral Research Project
Presented to
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I don't remember a time when I wasn't convinced about the transformative nature of questing for knowledge in the spirit of positively informing my personal and professional lives. I'm sure that this was a gift from my parents, Clyde and Alma Evelyn who rescued me from the orphanage some fifty years ago. This act of charity surely changed the trajectory of my existence and one that for as long as I live, I can never repay. There are still more countless individuals who are responsible for eternally motivating and fortifying my efforts to perpetually strive for excellence, most especially Eunice Crawford and all of my sisters. For this, I am forever grateful and know that I am especially blessed to have had the fortune of having a space in their minds and hearts.

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The Sage Colleges has created a space for professionals to come together in ways that promote a haven to exchange critical ideas that further innovation and leadership in the field of education.

ABSTRACT

THE EFFECT OF NYS K-6 SUPERINTENDENT LEADERSHIP PRACTICES ON ELEMENTARY MATH-LEARNING ENVIRONMENTS

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The Sage Colleges, Esteves School of Education 2016

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A recent administration of the National Assessment of Education Progress, deemed "The Nation's Report Card" revealed that almost forty percent of American students at the cusp of entry into college, the workforce and the military lack basic mathematics skills. Underperformance in mathematics is a longstanding concern in the United States and New York State is not immune to this issue. This study examined how school superintendents in K-6 common school districts in New York State ensure the occurrence of high quality elementary math-learning environments within the school systems they lead.

In the current era of perpetual education reform, superintendents and central administration charged with the oversight of curricular practices must pursue the role of instructional leadership and develop systems that support principals and teachers in meeting the demands of raised mathematics standards. These leaders must promote a shared vision that is well communicated and integrates the expertise and necessary targeted professional

development for all stakeholders responsible for implementing robust elementary math-learning environments.

This study considered the responses of 16 NYS district leaders including 9 superintendents and 7 assistant superintendents for curriculum and instruction in regards to the specific leadership actions that increased both their involvement and assurance of math-learning environments. The study found evidence of five key leadership responsibilities of superintendents and central administration overseeing curriculum and instruction to advance comprehensive elementary math-learning environments that promote teacher and student success.

The study concluded that district leadership's ability to actualize the development of strong elementary math-learning environments is fundamentally dependent on their role as instructional leaders and ability to effectively engage teachers and principals in collaboratively implementing mathematics program. Additionally, these efforts must include the provision of targeted professional development and a regular review of data to ensure the installation of programs that address students' needs and advance the district's instructional goals.

Keywords: Math-learning environment; instructional leadership; systems leadership; frames

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CHAPTER 1

Introduction

Background and Overview

Success in the 21st Century will demand a working engagement in global citizenry. In order to achieve this bar, the American public education system will need to ensure student mastery of math and science skills to bolster preparedness and active participation in the careers that will dominate a knowledge-based economy (Wagner, 2012). Nevertheless, there has been a long-standing debate that has judged the gap between these skills and the level of instruction in our schools, particularly as it relates to the fields of science, technology, engineering, and math, often referenced as STEM (Wagner, 2012).

"We are in a crisis, a crisis that is imperiling our future economy and position in the world" (Bertram, 2014, p. 2). In 1983, this statement was submitted by then Secretary of Education, Terrence Bell as part of a data rich report commissioned by his office, 'A Nation at Risk' (National Commission on Excellence in Education (NCEE), 1983). In this open document, assertions were posited about American schools indicating that public education was not adequately preparing students for successful membership in a global economy. For example, the report notes that average SAT scores decreased over fifty (50) points in the verbal section and almost forty (40) points in the mathematics section during the period between 1963-1980, and that only one-third of our nation's twelfth graders could solve multi-step mathematics problem. In more recent years, the landscape of public education has become increasingly turbulent requiring educational leaders to effectively respond to building systemic capacity within their organizations to implement raised standards and prepare professionals to be instructionally responsive to higher levels of accountability

(NYSED, 2012).

In reviewing the many reform efforts since 'A Nation at Risk' including No Child Left Behind Act (NCLB) of 2001 (P.L. 107-110), Race to the Top (2010), and the most current amendment, the Every Students Succeeds Act (ESSA) of 2015 (Pub.L. 114-95), low math achievement can be observed as one of the primary concerns regarding the need for these legislatively imposed school improvement initiatives (National Commission on Excellence in Education (NCEE), 1983; U.S. Department of Education, 2001, U.S. Department of Education, 2009; U.S Department of Education, 2015) .

This qualitative phenomenological research study examines the actions of sixteen superintendents and executive managers of district-wide curriculum and instruction that impact the establishment of high quality elementary math-learning environments. The critical nature of their role in administering programmatic choices, resource allocations for both curricular materials and human capital, and relative professional development is important to understand in the context of instructional and systemic leadership in this heightened era of school reform.

Statement of the Problem

The most recent National Assessment of Educational Progress (NAEP) for mathematics demonstrated that only 26% of students in New York are proficient on this national benchmarking assessment (Bertram, 2014). There is a considerable research base documenting a plethora of reasons attributed to depressed math achievement in this country (Ma, 1999). A review Ma's (1999) meta-analysis documenting these studies demonstrates that research has greatly focused on gender gap and math anxiety issues, but in fact both genders at various grade levels demonstrate levels of angst that contribute to decreased math

performance. There is additional evidence in Ma's (1999) work regarding differences in achievement affected by children's developmental stages as well as parental and student attitudes towards mathematics. The National Research Council's (NRC) recent report on the topic of early mathematics outlined that the definition of basic literacy should be broadened to include both reading and math skills (Cross, Woods, & Schweingruber, 2009). Notwithstanding, the myth purporting that not everyone is capable of learning math has persisted in the fiber of American culture (Dubois, 2017). The role of the superintendent and central office leadership is to imbue confidence in organizing the district's efforts to successfully align with addressing decades of low student achievement in mathematics (Johnson, 1996). "In simple terms, when constituents believe a proposed reform meets their district's educational needs, when they come to see that a strategy for change makes sense, and when they believe that their superintendent is informed, trustworthy, and committed to the effort, they will respond with support" (Johnson, 1996, p. 116).

Study Context

There are seventeen (17) K-6 public school systems all of which are located in both Nassau and Suffolk Counties representing a subset of the three Central high school districts in New York State. Central high school districts were authorized in 1917 with the hope of providing an effective example for reorganizing smaller districts. In this model, "the central high school district provides secondary education to children from two or more common or union free districts; the latter provide for the children's elementary education" ("Education Management Services", 2015). Additionally, the Central High School District Board of Education is comprised of members of the K-6 component school districts. The Central High School District model did not encourage replication of this configuration and was further

prohibited by state legislation in 1944. In 1981, legislation solely reinstated this opportunity for reorganization in Suffolk County, however, no new districts of this type have been established. ("Education Management Services", 2015).

The historical context of how K-6 common school districts were created is important to understand within the context of this study as they represent a very specific region in New York State. This information is also noteworthy because the superintendent's work and accountability measures within these districts are concentrated on a system comprised of only seven grades. As there is a populous of over one hundred public school districts in the state of New York, the structure of these school systems provides an uncommon opportunity for these leaders to drive systemic innovations within an abbreviated hierarchical environment.

"The chance of any reform improving student learning is remote unless district and school leaders agree with its purposes and appreciate what is required to make it work" (Leithwood, Louis, Anderson, & Wahlstrom, 2004, p.5). How leadership influences student learning within current reform efforts may lie within core successful leadership practices requiring skills to develop a shared vision and to motivate the people with the organization to cultivate and implement the relative goals (Leithwood, et al., 2004). Moreover, superintendents and district leaders must be cognizant about the importance of overcoming organizational barriers that prevent the sustainability of continuous improvement efforts (Leithwood, et al., 2004.).

Theoretical / Conceptual Framework

Bolman and Deal have developed four diverse frames to promote the understanding of organizational leadership comprised of varied perspectives or 'frames' encompassing a structural, political, symbolic, and human resource lenses. These individual frames project

multiple reflections of leadership practice (Bolman & Deal, 2003). Using Bolman and Deal's leadership framework, this study will evaluate how superintendents apply these diverse leadership strategies to promote the development of robust, high-quality math-learning environments in grades K-6 in ten of the sixteen elementary school districts in New York State.

The Four Frames

The structural frame is based primarily in management science and suggests that the rigidity of any organization must be navigated to successfully meet the main purpose for its existence, the attainment of established goal and objectives (Bolman & Deal, 2003). Bolman & Deal's human resource frame is focused on the needs and feelings of individuals and leaders are challenged by ensuring that the morale of the people working within their organizations are continuously reinforced by a kindred relationship to the work (2003). Specific challenges have been identified within Bolman & Deal's political frame including conflict amongst diverse interests and scarce resources (2003). Leaders working within the political frame require skills in agenda setting, negotiation, and coalition building. Lastly, the symbolic frame is characterized by the organizational acculturation of its members through stories, myths, and rituals. These traditions engender faith and meaning in the work among people within the organization (Bolman & Deal, 2003).

Purpose

The purpose of this phenomenological qualitative research study was to examine how school superintendents in K-6 common school districts in New York State ensure the occurrence of high quality mathematics-learning environments within the school systems they lead. This study analyzed the relative leadership and organizational activities directed by

these K-6 superintendents and their executive administrators providing oversight of the district's curriculum and instructional practices using Bolman and Deal's "Four Frames" model. The main discussion is focused on the superintendent's leadership in building a systemic approach toward fostering math-learning environments that promote high quality instruction for students attending the seventeen K-6 New York State Elementary School Districts. This chapter will provide information and conditions that define the study including pertinent research questions and definitions of key terms related to the research.

Research Questions

The research questions listed below were developed by the researcher and provided structured guidance in the development of this study.

1. To what extent are New York K-6 Superintendents involved in the mathematics programming in their district?
2. What support(s) do NYS K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?
3. What actions, if any, have NY K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?

Significance of the Study

The average score of American 15 year olds on PISA is 470, well below Singapore, who holds the number one slot with a score of 564 (Sparks, 2017). The National Assessment of Educational Progress, often referred to as "The Nation's Report Card, has been regularly administered to public school students in America since 1990 (Kena, 2014). The 2013 administration of this national exam confirmed that the nation is mired in a math crisis. The report found that almost forty percent of American students at the cusp of entry into college,

the workforce, and the military were grossly underprepared to perform basic mathematics (Bertram, 2014). The projected number of jobs that will be available by 2020 exceed 2.5 million and our students must be prepared to compete for them in what has become an increasingly global economy.

New York State Superintendents, Assistant Superintendents and Directors for Curriculum and Instruction assume multifaceted roles in the coordination of high quality teaching and learning in K-6 school systems (Browne-Ferrigno & Glass, 2005). Their instructional and systemic leadership must establish an urgent agenda promoted by a shared vision and relative policy implementation. Moreover, there must be a definite plan that is focused on the promotion of robust elementary math-learning environments to position these public schools to overcome the history of limited student growth in mathematics in this country.

Contemporary superintendents are considered the responsible stewards of instructional leadership in their districts and the results of this study have implications for helping system leaders to meet current expectations (Schechter, 2011). This study is focused on the instructional and system leadership capacity of New York State K-6 superintendents to achieve high quality elementary math-learning environments in their respective districts. District and school leaders can benefit from the collective successes at the central office level examined in this study.

Definition of Terms

1. **Math-Learning Environment - (a term created for this study)** although not distinguished in literature review, for the purpose of this study a math-learning environment will be defined as a compelling classroom environment where educators

and students are provided opportunities to master fundamental and high level math concepts.

2. **High Quality Instruction –** Lessons structured and implemented in a manner that enhanced student engagement, conceptual understanding, and application to new learning (Weiss & Pasley, 2006).
3. **Instructional Leadership –** Instructional leadership is a dimension of leadership practice that emphasizes the leader's responsibilities in generating enhanced opportunities for improved teaching and learning (Spillane, 2004).
4. **Frames –** A mental map, mind-set, schema, and/or cognitive lense that Bolman & Deal use to categorize major schools of organizational thought into four perspectives (Bolman & Deal, 2003).
5. **Systemic Leadership –** Marked by the proactive use of data to inform decisions and remove barriers to achieving continuous improvement with measurable outcomes (Scheurich & Skrla, 2003).

Assumptions

Data was compiled through the development of questions that were designed to elicit honest responses to answer the research questions. These questions were asked during an interview process to a pool of participants that included the superintendent and assistant superintendents for curriculum and instruction of ten of the sixteen K-6 common school districts in New York State. All participants were asked the same questions for the purpose of this data collection.

This researcher has generally accepted that the participants' responses are factual and based in their active administrative practice. The anonymity and confidentiality of the

participants was consistently reinforced in a brief statement immediately preceding each individual interview along with a reminder to each volunteer participant that withdrawing at any time during the interview process remained a constant parameter to their participation sans any deleterious consequences. Furthermore, the interviews with the assistant superintendents from districts where the superintendent was also interviewed often provided information that was uniform with the superintendent in these cases.

Limitations

The scope of this study was limited in three substantial ways that provoked a relatively small sampling of New York State Superintendents and central office leaders providing executive oversight for curriculum and instruction in their respective districts. First, the sampling of leadership could only be found in one region of the state, namely Long Island in Nassau and Suffolk Counties, and therefore the inherent perspectives represented are limited to the exploration of the research topic relative to this group of administrators. The data examined represents the responses from 10 of the 17 New York State K-6 common school districts, a reflection of 59 percent of elementary districts throughout the state. Superintendents and Assistant Superintendents for Curriculum and Instruction responded at a relatively equivalent rate. Specifically, nine superintendents and seven assistant superintendents voluntarily participated in this study. Moreover, school districts in this region of New York State holistically represent the highest graduation rates in the state. Thus, generalizations to other parts of the state were limited and a broad representation of the urgency of low math achievement in New York State and the country may not have been attained.

Altogether there are only 17 districts in NYS that are structured as elementary common school districts, and therefore wide-ranging statements should consider these potential limitations. The data collected through a single interview included K-6 district leaders, and did not contain secondary or alternative schools, however their specific leadership roles provided distinctively important perspectives that were critical to the study. Having submitted this, it is true that all other districts in NYS and the country encompass elementary math-learning environments and consequently, the findings of this study can have implications within all public school systems in America.

The researcher has engaged in this study within the first five years of the implementation of the Common Core Mathematics Standards, a critical part of the ongoing legislative reform efforts to improve the math performance of American students driven by both the federal and state governments. As of the writing of this dissertation, forty-two states in America and the District of Columbia continue to use the Common Core Standards to guide curriculum and instructional initiatives for elementary mathematics in their public schools. The researcher did not disaggregate the districts relative to the demographics, and therefore differences relative to specific socioeconomic status and race could be a limitation to broadly generalizing the results this study.

Delimitations

The researcher did not explore the math achievement of students in the participating K-6 common school districts, as standardized test scores were not the focus of this qualitative study. Although poverty was included in the chart reflecting some of the identifying information for each district, the demographics of each district relative to the socio-economic status of the school community was also not a consideration of this study. These decisions

that eliminate this quantitative data are a delimitation of this study as it may have yielded more data about correlations between poverty and math achievement scores as it relates to high quality elementary math-learning environments. Additionally, the exclusion of elementary principals and teachers as participants should also be noted as they may have added a different perspective about primary math-learning environments.

Summary

This chapter prepares the reader to understand the historical context of math achievement in the United States and both federal and state legislative interventions that have been a catalyst to improve math achievement in America. This purpose of qualitative phenomenological study is also delineated within this chapter focused on NYS K-6 superintendent and central office leadership. The significance of this study and the key terms are included to build the reader's background and conceptual knowledge of the relative impact of leadership on elementary math-learning environments. There is also a section devoted to briefly describing the limitations of this study.

An examination of the literature relative to systems and instructional leadership that is discussed within the context of Bolman & Deal's Four Frames Model is presented in Chapter Two. Chapter Two also provides a research-based historical look at policy development regarding math education in the United States to help the reader understand the impact of these legislative actions on NYS Superintendent's ability to ensure high quality elementary math-learning environments in K-6 common school districts. More specifically, this chapter describes the multi-facetted roles of the superintendent and central office administrators providing oversight for curriculum and instruction as systems and instructional leaders within their respective districts.

The research methodology used to conduct this study is delineated in Chapter Three. This chapter presents an explanation of the qualitative research design and methodology utilized to complete this study. New York State Superintendents and Assistant Superintendents for Curriculum and Instruction currently serving K-6 common school districts were engaged in a semi-structured interview lasting up to an hour. This chapter also provides information about the purpose of the study, instrumentation, data collection and analysis, and the consideration related to ethics as well as limitations and delimitations of the study.

Chapter Four provides information about the background of the study along with a synthesized analysis of the data collected through semi-structured interviews with sixteen superintendents and assistant superintendents for curriculum and instruction. This chapter will also discuss the emergent themes and findings regarding how these district leaders continually reframe barriers to ensuring the occurrence of high quality elementary math-learning environments using Bolman & Deal's Four Frames Model in their respective districts.

Chapter Five promotes an evaluation of the findings and recommendations for the practice of districts leaders to effectively address the assurance of robust elementary math-learning environments in K-6 common school districts in New York State.

CHAPTER 2

Review of the Literature

Introduction

The realm of public education in the United States has been the recipient of multiple and continuous national reform efforts to improve depressed student achievement in mathematics. In 1983, the chorus of governmental dissatisfaction with the education of public school students began at the federal level with *A Nation at Risk: The Imperative of Educational Reform*. "Our Nation is at risk… What was unimaginable a generation ago has begun to occur--others are matching and surpassing our educational attainments" (National Commission on Excellence in Education, 1983).

Several decades have elapsed since the federal government projected our nation's inability to adequately compete for active participation in the economies that would dominate the ensuing global market. However, this urgent advisory for educational reform did not translate into improved student achievement, particularly in mathematics. In fact, the early eighties promoted the simultaneous publishing of a *Nation at Risk* and *Agenda for Action* marking the beginning of concerted efforts for deep changes in the teaching and learning of mathematics in America (National Commission on Excellence in Education, 1983; National Council of Teachers of Mathematics, 1980). Thus, the impact of their message has not remarkably increased achievement of American students on internationally benchmarked assessments of mathematics performance (Bertram, 2014).

Purpose Statement

The purpose of this qualitative phenomenological study was to examine how New York State School Superintendents in K-6 districts ensure high quality elementary math-

learning environments using Lee Bolman and Terrence Deal's "Four Frames" model (2003) to analyze the pertinent leadership and organizational issues. District leaders that are preparing today's students must be mindful that student needs have become more instructionally diverse for a milieu of reasons including sharp demographic changes and robust modifications of state policies impacting practice at the local level (NCES, 2014; EngageNY, 2015**)**. Thus, K-6 school district leaders may be in a unique position to focus early instructional and organizational efforts towards improving elementary math-learning environments in meaningful and informative ways.

This chapter provides an examination of the academic literature in an effort to interpret how the systemic and instructional leadership of superintendents develop and sustain high quality elementary math-learning environments. Though there are divergent opinions within the literature as it relates to the sustainability of effective superintendent and district leadership, common elements of the research reviewed include the development of distributive leadership, particularly the increased practice of principals as instructional leaders. Additionally, targeted professional development delivery models are a prevalent idea in the literature review along with specific practices of the superintendent and executive management that promote continuous improvement in student achievement.

Historical Look at Mathematics Policy in the United States

The 1983 report commissioned by President Ronald Regan, *A Nation at Risk* is a targeted assessment of the status of public schools in America. As implied by the title, the report provided narrative indicating that America's schools were failing to create an adequate workforce to meet the needs of our country and further presented improving the quality of teaching and learning in our schools as a matter of national security. As the longitudinal

underperformance of math achievement continued to persist in the United States, the federal government's reform strategies evolved. The No Child Left Behind Act of 2001 (NCLB) was a legislative action by the federal government that sought to guarantee a minimal set of standards for every child in America irrespective of their ethnic background(s), socioeconomic status, or other special circumstances. Moreover, the legislation mandated school systems "to close the achievement gap with accountability, flexibility, and choice, so that no child is left behind" (NCLB, 2001). NCLB also invoked changes to purposefully and unilaterally transform the learning standards driving the math curriculum in public schools across America (NCLB, 2001).

Race to the Top, the 2009 federally funded competitive grant was tied to states' adoption of reformed grade level learning targets. By 2012, forty-four (44) states had adopted the Common Core Standards (U.S. Department of Education, 2015). The Common Core Standards essentially shifted the scope and sequence of K-12 mathematics and also prompted changes that teachers had to make in the delivery of math instruction (EngageNY, 2015).

The *Every Student Succeeds Act* (ESSA) signed into law by President Obama in late 2015 reauthorized the 50-year old *Elementary and Secondary Act* (ESEA) that was adopted by the Johnson Administration in 1965. Although both legislative actions uphold the ideal of narrowing the achievement gaps relative to poverty, ESSA expands the federal reach into local control of public education by maintaining expectations that states create accountability systems to effectively monitor student achievement of rigorous curriculum aligned with the Common Core Learning Standards (ESSA, 2015).

Under the stewardship of Commissioner of Education John King, New York led the way along with a handful of other states to implement these new standards. New York further tied these new learning standards to their 3-8 New York State Testing Program and enacted laws that calculated student performance on these assessments to the annual professional performance review (APPR) of certificated teachers who taught in these respective grades (Kena, et al., 2014).

In New York State, these targeted reform efforts essentially shifted leadership activities towards ensuring student preparation for successful entrance into college and careers. Aligned with this targeted shift, there has been a sharp focus on the increasing job development in the fields of science, technology, engineering, and math (STEM) (Seely, 2009), however, the prerequisite math achievement of students in America bolstering access to this part of our economy have not kept pace with students in many other parts of the world for decades (Betram, 2014). These reasons have compelled an increase in the critical expectations of how district leaders build and promote contiguous systems that not only support organizational capacity, but also target instruction that will effectively improve math achievement to better prepare students for employment opportunities that are being generated by this increased focus on STEM careers (Seely, 2009).

In order to adequately build rich elementary math-learning environments, New York State K-6 Superintendents will have to create organizational systems that critically engage staff and students in high quality instruction (Curtis & City, 2009). As Susan Johnson referenced in her book *Leading to Change, the Challenge of the New Superintendency* (1996), "First, as educational leaders, prospective superintendents must have thought deeply about the purpose of schooling, be informed about the history of public education, and

understand current issues of pedagogy and organization" (p. 286). The aptitude for New York State superintendents to create high quality elementary math-learning environments will also enhance opportunities for both teachers and students to meet the increased rigor presented by the Common Core Learning Standards (Leithwood, Louis, Anderson, & Wahlstrom, 2004). These math-rich classrooms are imperative to sustaining student participation in higher-level mathematics at the secondary level and essential for college completion and entry to those careers that have been predicted to dominate the job market now and into the future (Bertram, 2014). "Our quality of life depends on the quality of our leaders" (Bennis, 2003, p. 3).

The hope for today's superintendent to lead versus merely managing organizational practice lies in their mastery of the technical core of the education business, teaching and learning (Johnson, 1996, p. 286). More importantly, in relation to this study, math achievement data in the United States has not significantly increased over the past decade. **"**In the most recent assessment of fourth and eighth graders, released in 2013, we found that only thirty-four percent of our nation's fourth graders were "proficient in math—that is, they were at an achievement level one would think of as "competent" or higher—and seventeen percent were "below basic in their math abilities" (Bertram, 2014). In light of this information and what has been acknowledged for many years, there is a needed shift regarding qualifications for effective leadership of public school systems to improve math achievement.

Superintendent as Systems Leader

Systemic leadership equates to enduring change that is cared for and sustained at all levels in an organization. In an era focused on school reform, attaining continuous

improvement goals are dependent on efforts targeting the maintenance of effective school leadership practices (Hargreaves & Fink, 2004). Moreover, one of the heavy lifts for all district leaders is to systematize student-centered instructional environments that actively connect children at all levels of readiness to learning that promotes the wellness of the whole child (Hargreaves & Fink, 2004). "The prime responsibility of all education leaders is to put in place learning that engages students intellectually, socially, and emotionally" (Hargreaves & Fink, 2004, p. 1).

Superintendents that align their actions with best practices ensure that district goals are highly recognizable as the primary objectives that drive major strategic initiatives (Marzano & Waters, 2009). Further, the superintendent's systemic leadership in promoting capacity for building-level administrators and classroom educators to develop high quality math-learning environments is critical to meeting targeted achievement goals for K-6 students' math performance (Lambert, L, 1998). "Hence, leadership requires knowledge about how teachers develop professionally as well as the ability to build momentum for school-wide changes" (Burch & Spillane, 2003, p. 522).

Kotter (1996) describes twenty-first century organizations as dependent on the performance of many information systems that provide and distribute data on customers widely. In this way, the systemic processes of companies and school districts are not mutually exclusive in that they both heavily rely on the support of many trained individuals to effectively manage the hierarchal tasks associated with meeting identified goals. In the case of schools, a balance is maintained with the vision of leadership and the concerted efforts of the Board of Education and the superintendent relative to expected outcomes (Carver, 1997).

Although today's school systems, entirely modeled after the linear 20th century industrial factory were designed to standardize outcomes for children, they have emerged as challenging bureaucracies with systems that reinforce resistance to change and innovation (Horn & Staker, 2014). Additionally, the globalization of education has compelled much reflection about the current design of our institutions tasked with schooling and building the capacity to meet compromising challenges of converging cultural and intellectual diversity (Lawson, 2008). Bolman and Deal (2003) contend that, "the proliferation of complex organizations has made most human activities collective endeavors" (p.5).

Leadership has been defined using multiple frameworks and through a variety of lenses that are mostly concerned with the impact and influence of the leaders' practices on identified organizational goals (Marzano, Waters, & McNulty, 2005). Generally, these well-researched explanations for the observed variances in leadership effectiveness are based on the reflection of the leader's voice and purposed resources in the set vision and pursuant motivation by relevant followers (Marzano, Waters, & McNulty, 2005).

Superintendent as Instructional Leader

"Leadership is second only to classroom instruction among all school-related factors that contribute to what students learn at school" (Leithwood, Louis, Anderson, & Wahlstrom, 2004, p. 5). Superintendents do not provide leadership or executive strategic actions without assistance from others helping them to guide the work (Spillane, J., 2004). Honig (2012) also found that school district leaders that engaged in *jointwork* 'alongside' educators at different levels within the organization (e.g., principals) strengthened their commitment and engagement in instructional leadership practices.

Today, superintendents have had to reexamine their more traditional and linear role focused on managerial practices and transition to modeling focused instructional leadership of both administrators and classroom educators (Honig, 2012; Lambert, 1998). In an effort to investigate school reform processes related to improving instruction, Johnson & Chrispeels' (2010) qualitative study represented central administrator practices as directly related to successful alignment between the district leadership's vision and relative professional and organizational capacity within schools. Hoy and Forsyth (1986) delineate components of the instructional system as a combination of the formal and informal organization, individuals and role groups, the teaching task, and resources generated from the external environment. **"**What is important from a system is the congruence among system parts so that one part operates in harmony with other parts**"** (Hoy & Forsyth, 1986).

In organizing the research on leadership theory, Marzano, Waters, & McNulty, (2005), posit that although educational leadership has been regularly discussed, particularly instructional leadership, there is no widely accepted view of this skill set. The demands presented by the work of the modern day American superintendency have forced these leaders to enhance their instructional competency to meet reform efforts rapidly spurred by the changing economic and political landscape (Honig, 2012). More specifically, The No Child Left Behind Act (2001), the federal law representing governmental accountability measures, amplified the rigor associated with superintendents' attention and expertise to assess targeted student improvement in mathematics and English Language Arts (ELA).

Recent research has focused on the role of the school principal as associated with instructional leadership (Honig, 2012**).** Nevertheless, the superintendent's ability to build capacity for instructional leadership is clearly linked to ensuring the supervisory and

professional needs of principals are met to support their work with teachers (Marzano, 2003). In this way, superintendents' instructional expertise becomes essential as a critical asset to build and refine the skills of school leaders as the instructional experts in their respective buildings (Smith & Andrews, 1989, p. 40).

Instructional leadership is a dimension of leadership practice that emphasizes the leader's responsibilities in generating enhanced opportunities for improved teaching and learning (Spillane, 2004). While there have been many studies (Bamburg & Andrews, 1990; Duke, 1982; Johnson, 1996; Leithwood, et al., 2004) focused on the impact of school leadership on instructional improvement, there is a more limited research base that contributes to the exploration of the superintendent as the district's primary instructional leader. Thus, much is yet to be discovered about how superintendents perform as effective instructional leaders, and specifically how their actions promote an increase in high quality elementary math-learning environments (Browne-Ferrigno & Glass, 2005).

Prior to 1990, the conventional role of the superintendent had long been established as a manager of operations, finance, and the general maintenance of district-wide order (Browne-Ferrigno & Glass, 2005). "Although several distinctive role expectations for the American superintendency emerged over time, management emerged and was inextricably embedded as one of the most important role expectations" (Browne-Ferrigno & Glass, 2005, p. 138). School district stakeholders expect high levels of accountability to be aligned with necessary supports to achieve these specified standards. This includes the provision and alignment of adequate resources and systemic competence. In other words, inspiration and vision can give way to anarchy and rebellion without effective management (Johnson, 1996). Consequently, improved student achievement may bear the deleterious effects of a

minimized organizational focus on instruction (Petersen, 1998) and "reforming districts requires a new kind of leadership to support innovative approaches to schooling" (Moore Johnson, 1996, p. 273).

In a paper presented at the Annual Conference of the American Educational Research Association, George Petersen (1998) contended that his findings concluded four essential elements marked the cornerstone of demonstrated instructional leadership by superintendents. These elements included prioritizing an "instructionally-oriented vision that is widely communicated throughout the district". Petersen outlined three other areas of importance to the superintendent's role as the primary district instructional leader encompassing the effective utilization of principals as communicators and enactors of the instructional vision, frequent presence of the superintendent in school, and recognition of the importance of buy-in of the school community. "No reform can succeed without the endorsement and energetic support of teachers and principals, who must not only change as educators but make change happen in their schools" (Johnson, 1996, p. 92). Further, Petersen contended that all of these variables be supported by the adequate provision of professional development for educators within the organization.

Establishing an effective system to monitor the school's curriculum, instruction, and assessments practices requires effective communication between leadership and staff dedicated to teaching and learning (Marzano, Waters, & McNulty, 2005). Marzano and Waters' (2009) distinct exploration of the relationship between district leadership and student achievement found a positive correlation between specific behaviors of the superintendent and/or district level leadership and increased student achievement. These specific actions are listed below.

1. *Ensuring collaborative goal setting.*
2. *Establishing nonnegotiable goals for achievement and instruction.*
3. *Creating board alignment with and support of district goals.*
4. *Monitoring achievement and instruction goals.*
5. *Allocating resources to support the goals for achievement and instruc*tion

(Marzano & Waters, 2009, p. 6).

Elementary Math-Learning Environment

In reviewing the literature relative to the development of effective teaching and learning of elementary mathematics, three primary issues have emerged as central to the success of this effort (Seely, 2009). These central ideas include the superintendent's instructional leadership as an essential component to reform core elements of elementary mathematics-learning environments, the development of systems supporting prioritizing math instruction at the elementary level, and best practices as it relates to the teaching and learning of elementary mathematics (Sassi & Nelson, 1999). The following section pursues these focused areas and offers a qualitative description of how leadership influences the development of robust elementary math-learning environments focused on establishing students' deep conceptual understanding of mathematics. It also offers a fundamental review and supportive evidence of why a systemic approach to ensuring that students' master math skills and concepts during the elementary school years can be accomplished through a comprehensive approach promoted by superintendent leadership. Finally, the alignment of mathematics standards with high quality elementary math practices including programmatic choices and teacher professional development are necessary supports to realize the kind of

gains that can dismantle the historic downward trend of poor math performance in New York State and across our country (Price, Ball, & Luks, 1995).

Best Practice Elementary Math Instruction

How discriminately superintendents determine and ultimately ensure their schools, principals, and teachers are prepared to promote students' proficiency of the NYS K-6 elementary math standards is dependent on a broad range of qualifying factors. This problem is not unique to New York State. "American students are increasingly unable to compete globally in STEM—science, technology, engineering, and math—fields. In 2010, only 26% of high school seniors in the U.S. scored at or above proficient level in math. Another 36% were failing" (Bertram, 2014, p. 1).

The math achievement of American students should compel changes in teaching of mathematics in today's classrooms (Wagner, 2008). Research demonstrates that high-quality mathematics instruction in elementary settings can be characterized as using curriculum guidance that is evidence-based, incorporates formative assessment, and differentiated supports scaffolding mastery of students' skills. It should also encompass both direct instruction, and student and family engagement opportunities for hands-on exploration of concrete and abstract mathematical concepts (Szekely, 2014).

A synthesis of empirical research focused on mathematics-based intervention strategies found that increased achievement for low performing students in math could be attained using a multitude of targeted supports that reinforce the characteristics of high quality elementary math instruction listed above (Baker, Gersten, & Dae-Sik, 2002). In this summary of controlled experimental and quasi-experimental studies, the research indicated that increased student achievement was recognizable when teachers directly engaged in

active instruction to assist students in promoting mathematical proficiency. Furthermore, these teaching strategies included the clear identification of learning targets for each math lesson that incorporated student practice of written explanations of the math concepts they used to generate responses to open-ended problems.

This approach to the teaching of mathematics provided rich opportunities for students to received immediate and authentic feedback. Marzano, Pickering, & Pollock (2001) have submitted authentic feedback as one of the nine research-based high yielding instructional strategies relative to increased student learning. Additionally, peer-assisted learning was also found to promote improved student learning in struggling math students. Inherent in peer tutoring models, students that are challenged by the intensity of overcoming independent problem-solving feel encouraged to ask questions because of ready access to their peers rather than having to wait for delayed attention from a teacher. The findings of this empirical study promote the likely concept of students persisting when faced with difficulty in solving mathematical problems because of the immediacy of support from their peers (Baker, Gersten, & Dae-Sik, 2002). Lastly, explicit, contextualized instruction was also found to result in effective student understanding of conceptual principles related to problem solving. This involved increasing students' ability to discriminately identify information in story like problems that were relevant to calculating the solutions to complex multi-step equations.

There is compelling research that supports that high performing teachers exponentially strengthen the technical core of any school systems – the quality of teaching and learning (Abdul-Amin, 2013). In part, poor instruction in early mathematics classrooms is born from a lack of targeted educator professional development and confidence to

effectively teach fundamental math concepts and skills. Elementary educators report that they find math a difficult subject to teach, that it is less important than other skills, and submit that mathematics education is underrepresented in their teacher preparation programs. Moreover, training programs fail to support elementary educators' capacity to overcome the resultant diminished confidence levels and consequently reinforce the negative cycle of low quality elementary mathematics instruction (Szekely, 2014).

School districts are complex organizations that are multilayered relative to pervasive decision-making that positively impacts improvement, in the case of schools increased student achievement. As more accountability measures have been rooted in the evaluative performance rubrics of school district leaders, it is imperative that superintendents develop an acute level of understanding about the adequacy of their vision and management of their school systems to meet targeted goals. "When the world seems hopelessly confusing and nothing is working, reframing is a powerful tool for gaining clarity, generating new options, and finding strategies that work" (Bolman & Deal, 2003, p. 19).

"The Four Frames Model"

Bolman and Deal (2003) have distinguished four major perspectives or frames to describe dominant leadership behavior(s) that can promote success or failure within organizations characterized by a focus on a structural, human resource, political, and symbolic approach. Each frame or perspective reflects those actions directed by leaders that leverage specific activities to navigate and achieve targeted goals within an organization (Bolman & Deal, 2003). The task faced by superintendents and central office leadership is the thoughtful consideration of the strengths and weaknesses of each of these frames as they work towards accomplishing the vision and mission of the districts they serve. More

pointedly, this qualitative study utilizes Bolman and Deal's focus on organizational leadership to evaluate what perspectives or 'frames' school district leaders employ to support the occurrence of high quality math-learning environments in the elementary school setting.

Structural Frame

A clarifying assumption that illuminates one of the basic ideas of Bolman & Deal's structural frame is the suggestion that organizations exist to achieve established goals and objectives (Bolman & Deal, 2003). The natural structure of an organization including age, size, and raw materials (e.g., for schools, students) can dictate the level of communication, integration of ideas, and processes that lead to effective outcomes (Bolman & Deal, 2003, pp.58-60). "… long-term behavior provides clues to the underlying system structure. And structure is the key to understanding not just what is happening, but *why*" (Meadows, 2008, p. 89).

Schools are traditionally organized into hierarchies that departmentalize assigned work mimicking a system that is closely associated with many of the fundamental tenets of Bolman & Deal's structural frame. This perspective is borne from two main schools of thought. The first originated in the industrial age and highlights the "scientific management" approach that typically separates tasks into specialty areas that are tightly controlled by those responsible for measurable outcomes (Taylor, 1911). The second conceptual explanation of the structural frame is a more fixed model that stems from Max Weber's work (Weber, 1947). In particular, this perspective promotes patriarchy or an overarching father-like authority figure directing all facets of work within an organization that are categorized into a hierarchy of bureaucratic roles (Bolman & Deal, 2003). These concepts are important to understand when considering the kind of leadership that is necessary to successfully respond

to the long-standing wait for substantial improvement in the overall math performance of American students. Moreover, critical progress in developing a shared sense of urgency around improving elementary math-learning environments in our country calls for leaders that recognize this expected outcome as an essential part of their organization's mission that must be linked to the nourishment of teacher efficacy in the current era of reform (Bolman & Deal, 2003). Furthermore, the sustainability of this commitment must promote measurable systems for ensuring that leadership efforts are lasting on behalf of this goal. "Sustainable leadership …carefully husbands its resources in developing the talents of all its educators rather than lavishing rewards on a few proven stars (Hargreaves & Fink, 2004).

The efforts of NYS K-6 superintendents and central office leaders to create a "satisfactory system of roles and relationships" (Bolman & Deal, 2003, p.69) that will produce high quality elementary math-learning can be challenged by the static nature of the structural perspective. The shifts in the teaching and learning of mathematics driven by the adoption of the Common Core Standards in New York have grown more complex by changing landscape of relative federal policies. In this environment, a critical problem that leaders can face in utilizing the structural frame is maintaining a balance "… of holding an organization together without holding it back" (Bolman & Deal, 2003, p. 71). In other words, coordinating the message and universal response to reorganize existing structures within elementary school districts that may not primarily encourage robust elementary math-learning environments should not be understated in light of what we know about district's strict delineation of role assignments and skills (Bolman & Deal, 2003).

Human Resource Frame

The recruitment and retention of highly qualified educators is the most important means to ensure the delivery of rigorous curriculum and instruction in the classroom (Leithwood, Louis, Anderson, & Wahlstrom, 2004). Concomitant to this ideology, Bolman & Deal's human resource frame (2003) is concerned with people and how to get them commit to a collective effort and purpose towards meeting organizational goals (Bolman & Deal, 2003, p. 115). "We expected that the good-to-great leaders would begin by setting a new vision and strategy. We found instead that they *first* got the right people on the bus, the wrong people off the bus, and the right people in the right seats—and *then* figured out where to drive it." (Collins, 2001, p.13). "The human resource perspective focuses on the relationship between the individual and the organization, but people at work relate mostly to others" (Bolman & Deal, 2003, p. 161). District leaders must have a central understanding of how relationship building is connected to the district's culture, and thereby its capacity to foster motivation towards the attainment of goals.

One of the organizational challenges in engaging the human resource frame is the existent multi-level managerial structures within educational systems (Hallinger & Heck, 2009). Bennis submitted that good leadership permeates all layers of an organization. "It gives pace and energy to the work and empowers the workforce" (Bennis, 1989, pp. 22-23). Leaders that engage the human resource frame are clear about how and why to build effective interpersonal relations at work and they leverage these relationships to meet both the goals of the organization and individual followership needs (Bolman & Deal, 2003). In fact, superintendents and central office administrators that possess strong skills in this frame understand that positional power is authoritative, but not enough to meet identified

organizational goals. "In simplest terms, network power amounts to the power of your friends minus the power of your enemies" (Bolman & Deal, 2003, p. 85). Nonetheless, the fast pace of mandated reforms has made it more difficult for superintendents and central office administrators to build support for a common vision, thereby replacing community with political struggle (Johnson, 1996).

Engaging principals and teachers in meaningful reform paired with simultaneous efforts to build organizational capacity is not easy. Strong superintendents and central office leaders prioritize building a sense of efficacy within their schools and teachers towards insuring that all students have the opportunity to meet and exceed their potential. (Leithwood, Louis, Anderson & Wahlstrom, 2004*).* Although perhaps not obliged, superintendents must concede to the realm of politics to establish their priorities and influence within these working relationships (Bolman & Deal, 2003).

Political Frame

No manager is free from the pressures of politics (Bolman & Deal, 2003). School districts are complex systems that are perpetually impacted by the pressure of local, state, and federal level politics all vying for the expenditure of responsive energy to focus organizational attention towards the achievement of identified organizational goals (Curtis & City, 2009). Superintendents that expect to successfully represent leadership on behalf of the Board of Education must be cognizant of the political nature of their role in both the district and the larger political arena within the school community (Johnson, 1996). "Viewed from the political frame, politics is simply the realistic process of making decisions and allocating resources in a context of scarcity and divergent interests" (Bolman & Deal, 2003, p. 181).

Leaders must acknowledge within their own thinking that politics is ever present in the work of their districts. "Scarce resources and enduring differences make conflict central and power the most important asset" (Bolman & Deal, 2003, p. 187). Because of this vital theme to the political frame, superintendents must be able to make judgments about when it is important to use strategies that drive positive responses and support. Likewise, they need to regard those times where the sentiment about a particular approach to problem solving and the resultant solution do not necessarily have to be arrived at in a way that is conceived as collaborative or negotiated.

There are four critical skills within the political frame that a superintendent can manage to meet the district objectives including "agenda setting, mapping the political terrain, networking and forming coalitions, and bargaining and negotiating" (Bolman & Deal, 2003, p. 205). The primary mechanism in disseminating organizational goals reflective of stakeholder feedback and expectations is agenda setting (Bolman & Deal, 2003). The political talent of communicating an agenda offers the superintendent and central officer leadership an opportunity to help people connect the organizational vision to the heart of identified issues that need a directed voice. This focused managerial tactic is important because the underpinnings of effective agenda setting are a deliberate knowhow and consideration regarding the competing sides of all issues. Successful superintendents learn how to effectively negotiate engaging their proponents as assets whilst networking to bring naysayers into the fold (Bolman & Deal, 2003).

Promoting robust math-learning environments at the elementary level has been a longstanding issue in the United States for many reasons, most notably the lack of teacher preparedness (Chazan & Ball, 1995). Building a coalition of support to prioritize

strengthening elementary math-learning environments is a political assignment in that it will require a change in the mindset regarding teaching children to read as the primary thrust of elementary education. Alternatively, symbolism drives the mechanics connecting the organization's vision to being valued in the minds and hearts its members (Bolman & Deal, 2003) and an examination of this frame helps one determine a different sense about how and when to use this lens to provoke shared performance expectations.

Symbolic Frame

The symbolic frame is marked by feelings and a leader's ability to evoke an emotional resolve that organizational members necessarily develop to work towards identified goals. Superintendents that are new to districts and even those that have mined the naturally supportive resources marked by human capital within a district for years know that "culture is the glue that holds an organization together and unites people around shared values and beliefs" (Bolman & Deal, 2003, p. 243). "… it is not enough for a leader to do things right; he must do the right thing" (Bennis, 2003, p. 23). Deeply embedded with the fabric of an organization is its culture that is mostly shaped by symbols that have widespread group identity and significance (Bolman & Deal, 2003).

"Effective organizations are full of good stories" (Bolman & Deal, 2003, p. 258). The guiding principles or 'stories' of effective school districts often take shape in a vision and mission that is widely communicated by the superintendent (Schlechty, 2009). Stories like myths are known by all within an organization to have some basis in truth. That is what makes them acceptable to the group culture (Peck, 1987). Accordingly, superintendents and central office administrators that lead with compelling and accurate data build trust and demystify the reasons for improving elementary-math learning environments. This can

essentially promote an opportunity to engage the truth as an imperative strategy to provoke substantial growth in student math achievement. In this way, superintendents and central officer leaders adapt a staunch appreciation for their values into the vision and mission of the organization. "Once the superintendent becomes identified with the mission of school improvement, visibility in schools and classrooms—even at the symbolic level carries weight" (Cuban, 1984, p. 133).

Summary

The maintenance and achievement of rigorous mathematics standards in America has been an ongoing problem for more than 50 years. Multiple reform efforts driven by legislative actions have not remarkably changed this condition in the United States. This is evidenced by the most recent national standards movement (i.e., Common Core Standards) again representing this long-lasting commentary around the needed shift in the instructional approach to mathematics to improve student achievement.

Superintendents and central office leaders charged with the executive oversight of curricular and instructional decisions are challenged in this perpetual reform environment to create sustainable elementary math-learning environments marked by high quality instruction within their respective districts. The development or adoption of district-wide curricula and instructional practices are resultant of both their practices as instructional and systemic leaders.

The literature regarding the management of improving teaching and learning in mathematics classrooms reiterates that successful efforts relative to this work are marked by developing organizational capacity to build essential components supporting math-learning environments. These include strong instructional leadership of the superintendents and

central office staff that is connected with building level administrative professional development and capacity building. The alignment of district resources is also essential to enduring efforts insuring that educators and students optimally benefit from standards-aligned curricular materials and best practices as it relates to the teaching and learning of mathematics.

The Four Frames Model (Bolman & Deal, 2003) was reviewed to highlight dominant leadership behaviors that this study used to consider when and how superintendents and central office leaders made decisions about increasing the occurrence of robust elementary math-learning environments. Assumptions were clarified about why superintendents engaged different strategies within these frames to advance the urgency and actionable improvement efforts of the current reform agenda. This chapter can be a resource to all superintendents and assistant superintendents for curriculum and instruction engaged in the work of creating high quality robust math-learning environments preparing students for the jobs that will be in high demand in the 21st Century.

CHAPTER 3
Methodology

Introduction

This chapter will present the research methodologies utilized to study the actions of NYS K-6 Superintendents and district leaders providing executive oversight for curriculum and instruction that promote the assurance of high quality elementary math-learning environments. The information included will delineate the research design and questions, sampling procedures, instrumentation, data collection and analysis, limitations, and a chapter summary.

Purpose of the Study

The purpose of this qualitative phenomenological study was to examine how superintendents in K-6 common school districts in New York State ensure high quality elementary mathematics-learning environments in their respective districts. This study will analyze the relative instructional and organizational issues using Lee Bolman and Terrence Deal's "Four Frames" model (Bolman & Deal, 2003). More pointedly, this study will consider the ways that these superintendents learned from the complexities of their districts to build and promote their leadership ability and organizational capacity maximizing educator and student ability to construct math knowledge (Jaramillo, 1996). Organizational learning and personal biases are fundamental concepts to Bolman & Deal's four frames of organizational leadership **(**Bolman & Deal, 2003). The research will use the lenses of Bolman & Deal's framework to describe which of the four frames perspectives are most closely aligned with Superintendent's ability to systemically support the creation of high quality elementary math-learning environments.

Research Questions

The research questions below were developed by the researcher and represent the prevailing basis of this study including the instrumentation as well as the data collection and analysis. This was done with the intention of conducting an unbiased and more organically evolving investigation of the research study (Gubrium & Holstein, 2003). They were developed with the intent of enabling the researcher to access information about the leadership activities of participants that ensure robust math-learning environments in elementary school districts in New York State.

1. To what extent are New York State K-6 Superintendents involved in the mathematics programming in their districts?
2. What actions, if any, have New York State K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?
3. What support(s) do New York State K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?

Research Design

Creswell (2009) asserts that, "Qualitative research is a means for exploring and undertaking the meaning of individuals or groups to ascribe to a social or human problem" (p.4). Moreover, according to Creswell, phenomenological research can provide a description of the lived experiences of the individuals who share the phenomenon to more consistently and objectively determine "what" and "how they experienced. In this way, the researcher boosts the ability to determine an amalgamated portrayal of the spirit of their collective experiences (Creswell, J., 2013). Therefore, in consideration of the purpose of this

study, mainly how NYS K-6 Superintendents ensure math-learning environments that engage high quality instruction, the researcher selected this methodology to focus on the elementary district leadership in New York.

The phenomenological research approach provided a keen way to narrow the sample size to a homogeneous group of superintendents and district executive leadership for curriculum and instruction. This research study explored direct leadership activities through a single interview with each participant to develop a critical knowledge base about the efforts of these leaders to actively pursue the promotion of high quality elementary math-learning environments in their respective districts. Decades of research substantiate a favorable nexus of leadership and improved student achievement (Hallinger & Heck, 2009**).**

In order to ensure maximum understanding about what steps superintendents have taken to systematically improve mathematics-learning environments district-wide, this researcher identified both the superintendent of each respective district as a participant in the interview process as well as the executive or district leader providing direct oversight of the district's curriculum and instructional practices. Moreover, these participants would most likely be either leading or directly involved in transforming the math-learning environments in their respective districts.

The structure of this qualitative phenomenological study is closely aligned with other qualitative research focused on the exploration of diverse ideas (Padilla-Diaz, 2015). Edmund Husserl often referenced as the "father" and greatest mind regarding phenomenological thinking, posited that phenomenology was "an experimental method based on the conscious of phenomena in which the pure essences of content and consciousness stood out" (Padilla-Diaz, 2015, p. 102). Furthermore, Creswell (2013) outlines steps to

maximize results gleaned from the phenomenological analysis that this researcher utilized to complete this study. These steps initially include identifying study participants and relative sites, and a sampling technique that will maximize your overall comprehension of your purpose and related research question. Further, gaining access to these sites with appropriate permissions must also be a consideration. Next, the researcher must be deliberative about the type of information collected as well as the protocols and instrumentation. And finally, the management of the data collection process must be ethically conducted.

Population and Sampling

The population for this study included 16 NYS K-6 Superintendents and 10 Assistant Superintendents for Curriculum and Instruction from NYS K-6 common school districts. The maximum number of participant responses that could be collected was twenty-six representing sixteen districts. Within these districts only ten had both presiding superintendents and assistant superintendents for curriculum and instruction. The remaining six districts did not employ assistant superintendents for curriculum and instruction, and were only located in one of the two counties that were necessarily included in this study.

All of the participants are engaged in implementing the Common Core Standards that have been articulated for elementary mathematics by the New York State Department of Education. This researcher focused on the direct leadership practices of these participants as it relates to the development of high quality math-learning environments at the elementary level in New York State. The similarities amongst the districts are listed below.

- Common, standards-based mathematic instruction to guide teacher practice (Common Core Standards);
- Performance standards for all students, delineated by grade level, K-6;

- Clear expectations for the essential knowledge and skill development for all students in grades K-6.

Purposeful sampling was used to identify and select participants for this phenomenological qualitative study. "In purposeful sampling, researchers intentionally select individuals and sites to learn or understand a central phenomenon" (Creswell, 2012, p. 206). Due to the fact that there are only sixteen K-6 common or public school districts in New York State, one other central administrative officer of these New York State elementary districts was asked to participate in this research. These central office administrative team members were identified as providing executive oversight and management of the district's curriculum and instructional department and hold the title of Assistant Superintendent for Curriculum and Instruction or Director of Curriculum and Instruction. As these central officer administrators provide a deep understanding of curriculum and instruction for their respective districts, it was essential to include these key programmatic decision makers in this study. The request for their participation was also outlined to them as voluntary and they were notably engaged in the same interview protocol. This was also done with the intention of ensuring the saturation of ideas (Morse, 1995).

Much of the research considering the impact of leadership on student achievement is focused on the role of the principal at the building level (Hallinger & Heck, 2009**).** Further, there is limited research that explores and provides evidence for the importance of the superintendent and central leadership to effectively insure high quality learning environments for elementary mathematics. The lack of research base evaluating superintendent and central office impact on core instruction at the elementary provoked this researcher to choose district leaders of NYS K-6 common school districts. Of the potential twenty-six participants, the

sample for this study was comprised of nine Superintendents and seven Assistant Superintendents for Curriculum and Instruction from ten different districts. These cadres of leaders hold positions that both naturally and primarily focus their efforts on ensuring the effectiveness of district's core instruction. More specifically, their curriculum and instructional practices are directly correlated with how these elementary districts structure the math-learning environments and the resultant impact on meeting shifts in the teaching and learning of elementary mathematics represented by the latest reform efforts.

Instrumentation

The researcher used a self-developed interview tool that was approved through the Institutional Review Board (IRB) Process. The interview tool consisted of fifteen (15) semi-structured questions focused on garnering information from the participants about their direct actions impacting the positive occurrence of high quality math-learning environments in their elementary districts. These (15) questions included the collection of information related to the participants' backgrounds, systemic leadership of instruction, and leadership activities that directly influence the promotion of high quality math-learning environments in their respective districts.

Data Collection

In their research, Kyale & Brinkman (2009) contend that the phenomenological interview will yield the best results when conducted using an open or semi-structured interview process. This qualitative phenomenological study required the researcher to utilize a semi-structured interview protocol to encourage participants' expression of their individual perspectives and for latent information to organically develop as a result of participant responses (Vogt, Gardner, & Haefelle, 2012). The participants were initially contacted via a

letter to encourage voluntary engagement in this study. When this primary recruitment effort failed to capture a rich sample of participants, the researcher followed up with both a phone call and second email to boost participation.

Data was collected using a semi-structured interview protocol within a homogeneous group of superintendents and district leaders of curriculum and instruction. Although the interview questions were open-ended, there were minimal unplanned questions following the responses of participants' contingent upon the robust nature of any particular answers. The only follow up inquiries were inserted to clarify the number of minutes to which districts dedicated the direct instruction of mathematics in comparison to English Language Arts (ELA) in the master schedules.

During this study, the participants, active New York State K-6 Superintendents and Assistant Superintendents for Curriculum and Instruction were asked to voluntarily respond to open-ended questions during unstructured interviews that lasted up to one hour. The interviews were conducted using a variety of strategies including one-on-one, telephone, and collection of interview responses via email depending on circumstantial factors not limited to accessibility, time, and cost (Creswell, 2012). The researcher took notes during each interview session and wrote an interpretation of these notes following each interview. The interviews were recorded with the intention of having them professionally transcribed, however, the researcher transcribed all of the interviews to ensure time to "live with the study" (Piantanida & Garman, 1999). These interview questions along with the relative interview processes served as the data collection instrument to facilitate the assemblage and coding of information from the participants.

All of the superintendents and assistant superintendents for the K-6 common school districts were emailed a letter introducing the researcher and describing the research study. This initial email also served to formally request their voluntary participation in the study, offered a brief explanation of the motivation and purpose of the study, and described the data collection process.

Four semi-structured interviews were conducted in person and five semi-structured interviews were conducted by telephone. The interviews conducted in person and by phone were all recorded with the participants' consent. The remaining seven participants submitted their responses in writing via email. All interviews were conducted within the timeframe of one hour that was outlined in the introductory letter and each participant submitted a signed consent form.

Data Analysis

After the data collection was completed, the researcher categorized participant responses in various ways to evaluate themes and connections within the participants' responses. This part of the data analysis used a phenomenological approach is often referred to as a textual and structural analysis of the data (Moustakas, 1994). Initially, the researcher endeavored to cluster the participants' answers within two primary groups; leadership focused on building organizational capacity or systemic leadership and leadership efforts supported the delivery of high quality math instruction building more robust math-learning environments within their respective districts. In an effort to best understand the direct and relative actions of the superintendent to promote high quality math-learning environments, immediately following the transcription of each interview with the superintendent the

researcher analyzed these transcriptions for content and patterns before reviewing the interview responses of the Assistant Superintendents for Curriculum and Instruction.

The enduring codes borne from this study emerged from the structure of the questions embedded in the interview process. Therefore, the three main codes that ran parallel to the three sections of the interviews included: (1) Superintendents as Systems Leaders, (2) Superintendents as Instructional Leaders, and (3) Role of Targeted Professional Development

- Instructional Leadership: defining and communicating the district's vision and mission, managing the instructional program, and promoting a positive school climate (Hallinger & Murphy, 1985)
- Systems Leadership: alignment of targeted goals with resources and capacity building efforts
- Targeted Professional Development: "well designed staff development that has as its goal the improvement of student learning" (Guskey, T. R., 2000, p. xii)

The data analysis evaluates how the actions of the superintendents and central leadership categorically align with Bolman and Deal's four frames of organizational leadership in assuring the occurrence of high quality elementary math-learning environments. In this way, the researcher hoped to enhance the base of literature that discusses the impact of superintendent's leadership on promoting rich math-learning environments at the elementary level.

Ethical Considerations

The Sage Colleges provides strict guidelines to conduct research as an active doctoral student in the School of Educational Administration. The methodology utilized to conduct

this research study was approved by the Institutional Review Board (IRB) in advance of any actions related to data collection. Of primary concern was the protection of confidentiality of this study's participants. Tape recordings and notes gained from all interview processes were collected and stored in a locked file cabinet in the researcher's home office. Interviews were only conducted during the specified times of the research study and transcriptions were saved on a password protected hard drive. To further ensure confidentiality, participant identities have been replaced with pseudonyms and coded to collect and maintain data.

Researcher Bias

Studying people that share the same work environment, job title, and work responsibilities may create challenges relative to the intrusion of judgment and bias during research. To fulfill the purpose of this study, the researcher must reflectively examine the potential for bias in the self-developed instrumentation and ensure adequate levels of rigor throughout the interview process. Moreover, some of the research addressing instrumentation and researcher bias suggests that the choice of investigators to develop their own instrumentation rather than utilizing pre-established interview tools promotes the researcher as the instrument itself through which data for their study is collected (Poggenpoel & Myburgh, 2003).

In an effort to reduce the potential for researcher bias, the researcher disclosed that her work is closely aligned with that of her interviewees. The researcher attempted to maximally limit bias by engaging in peer debriefing (Lincoln & Guba, 1985) and debriefing with a disinterested peer in an attempt to reveal assumptions on the researcher's part. This was done to minimize the prevalence of this susceptibility (Lincoln & Guba, 1985).

Reliability

The establishment of reliability and validity are components of qualitative research control for the transferability and quality of the data collected (Reige, 2003). This researcher understands the importance of incorporating strategies that increase the credibility of the research design and implementation. Achieving reliability posits the assumption that the processes utilized within the research inquiry including the instrument are duplicable by other researchers and should result in similar outcomes when using the same systematic approach to the investigative procedure (Creswell, 2012). However, reliability and validity are not mutually exclusive measures of good research (Creswell, 2012). "If scores are not reliable, they are not valid; scores need to be stable and consistent first before they can be meaningful" (Creswell, 2012, p. 159).

This researcher employed various strategies to bolster the reliability of this study. "It takes training and practice to write open-ended questions, the hallmark of a qualitative interview, and then to keep from transforming them into closed-ended questions, especially with a resistant subject…" (Sofaer, 2002, 334). Before engaging voluntary participants in the study, this researcher practiced asking questions with the instrument that was used in this research study with an objective superintendent colleague. Afterwards, this researcher debriefed with this professional colleague to assist in recognizing inherent bias or assumptions about the answers provided. This was done to minimize subjectivity in identifying themes borne from the interview data and to ensure the interview questions would yield data to address the research questions.

Validity

Internal consistency was established by ensuring that each participant in the study was engaged in the same process in a way that was aligned with the approval of the

Institutional Review Board (IRB). Also each voluntary member of the study was asked the same questions in a single semi-structured interview and this data collection instrument was the singular means of collecting the data (Creswell, 2012). The interviews that were conducted in person were recorded giving the researcher the opportunity to verify with accuracy of the data that was collected. This along with allowing each participant an opportunity to review and approve the transcript of their interview ensured that an objective account of their responses was adequately represented. This strategy reflects the effort on the part of the researcher to increase validity of both the instrument and the data collection process.

Summary

This chapter provides a delineation of the phenomenological qualitative research design, protocols, and data collection methods used to facilitate this study. Information was collected to contextually extend the knowledge base highlighting the nexus between the leadership of superintendents and the assurance of high quality elementary math-learning environments within their respective districts. Specifically, interview data from the superintendent and one other central officer leader in NYS K-6 Elementary Districts that provide direct oversight for curriculum and instruction contributed to a robust narrative about how public school districts can increase the occurrence of high quality math-learning environments in their schools. Chapter Four will present a descriptive analysis of the thematic information that was developed from the interview process.

CHAPTER 4
Findings

Introduction

The results of our Nation's Report Card (NAEP) present critical concerns about the perpetually low levels of math proficiency demonstrated by American students (Bertram, 2014). Much of the research regarding the impact of leadership on student achievement has focused on the role of the principal; however, there is a dearth of investigation into the impact of the superintendent's leadership to improve student learning in the current era of educational reform. There are over 700 common public school districts in New York, and only seventeen (17) are organized as elementary school districts. These K-6 school districts represent a rare adaptation of common public school systems in New York State serving children in Nassau and Suffolk Counties in Long Island, New York. The purpose of this phenomenological qualitative study was to examine how New York State K-6 Superintendents ensure the occurrence of high quality mathematics-learning environments within the school systems they lead. This study provides an analysis of the leadership and organizational activities directed by these K-6 superintendents and their executive administrators providing oversight of the district's curriculum and instructional practices using Bolman and Deal's "Four Frames" model (2003).

The questions below were utilized as a guide to this research study. They were developed with the intent of enabling the researcher to access information about the active leadership strategies of participants that ensure robust math-learning environments in elementary school districts in New York State.

1. To what extent are New York State K-6 Superintendents involved in the mathematics programming in their districts?
2. What support(s) do New York State K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?
3. What actions, if any, have New York State K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?

This chapter is organized into four distinct sections. The first section provides the reader with a description of the participants including some demographic and experiential information. The next two sections provide a presentation of this study's emergent findings resultant from the data analysis. The evidence supporting each finding are presented as verbatim quotes from the participants and definitively linked to each research question. Further, a detailed description of the connection between the findings and supporting data will be submitted. The last section of the chapter will summarize all of the findings and introduce Chapter Five.

Participants/Descriptive Information

The participants in this study included nine (9) superintendents and seven (7) assistant superintendents from ten different K-6 elementary common public school districts in New York State. The size of the districts ranged from 0 – 1500 to 1500 – 4000 (see chart). Six of the sixteen districts ranged in size from zero to fifteen hundred and the remaining four districts represented an enrollment range of fifteen hundred to four thousand students. One of the participating districts did not employ an assistant superintendent for curriculum and instruction. Ten of the sixteen potential school districts (59%) were represented in the sample.

A total of sixteen K-6 district leaders participated in this study including one female superintendent and eight male superintendents along with one male and six female assistant superintendents. The chart below provides the range in administrative experience of participants as well as information relative to poverty and enrollment. Superintendents in this study had one to twenty-eight years of administrative experience and assistant superintendents reported having one to six years of administrative experience.

K-6 School District	Participating Superintendent	Years of Experience	Participating Assistant Superintendent	Years of Experience	Enrollment General Range	Percent Poverty
1	M (S)	20 + years	F (AS)	5 years	0 - 1500	45%
2	M (S)	9 years	M (AS)	1 year	1500 - 4000	25%
3	M (S)	5 years	F (AS)	6 years	0 - 1500	10%
4	M (S)	20 + years	F (AS)	5 years	0 - 1500	20%
5	M (S)	5 years	F (AS)	8 years	1500 - 4000	20%
6	M (S)	6 years	F (AS)	8 years	1500 - 4000	70%
7	M (S)	5 years	N/A	N/A	0 - 1500	10%
8	M (S)	1 year	N/A	N/A	0 - 1500	10%
9	F (S)	5 years	N/A	N/A	0 - 1500	10%
10	N/A	N/A	F (AS)	6 years	0 – 1500	20%

* Numbers are rounded to the nearest 5% to preserve confidentiality

** Participants were interviewed between January 2017 and March 2017

Research Question 1

To what extent are New York K-6 Superintendents involved in the mathematics programming in their districts?

This initial question of the study aims to describe the participants' instructional leadership practices. The data collected to address this part of the inquiry was specifically relevant to four interview questions that each participant answered. The questions were designed to draw out participants' thinking regarding their engagement in curricular and instructional decision-making. The four emergent findings from these interviews are listed below.

1. District leaders are involved in mathematics programming by working collaboratively with teachers.
2. Superintendents and Assistant Superintendents partner with principals to enhance their instructional leadership of mathematics programming.
3. Superintendents and Assistant Superintendents often identify themselves as the instructional leader in the district.
4. Superintendents and Assistant Superintendents reported that the regular review of data was a strong component of their leadership practices.

Collaborative work. The first finding was that the majority of the participants' responses recognize collaborative work or consensus building as a critical part of ensuring successful implementation of mathematics curriculum and relative teaching and learning practices.

Most of the participants, 13 out of 16, reported that collaborative efforts with teachers were an essential part of the work associated with the adoption of mathematics curricular and instructional practices. The seven superintendents and six assistant superintendents who acknowledged this connection between working closely with teachers and increasing their engagement in the implementation of mathematics programming often cited the importance of building consensus or 'buy-in' from the ranks of teachers as a critical element in the adoption and implementation of mathematics curricular resources and instructional practices. For example, Superintendent S1 posited direct evidence in his response about his level of involvement in the decision-making process:

> I meet with the teachers directly in grade level meetings, with the Director of Curriculum and on the committees with the Director of Curriculum established for review of new curriculum materials. I will participate with the committees. I also attend the presentations by publishers and participate in conferences.

Superintendent S2 relayed a more systemic interpretation of engagement in the curriculum and instruction decision-making, albeit it is still evident that collaborative work amongst the staff is of primary concern:

> I am engaged in curriculum and instruction decision-making. We have a system in place that honors grassroots leadership that means basically that we look to our teachers as well as our principals in developing curriculum, as well as fostering leadership for the work that they ultimately do. That type of management leadership I think lends itself to more collaborative work amongst the staff as well as the administration.

In the next example, Superintendent S8 acknowledges the need to engage teachers and parents throughout the process as essential to ensuring both teacher and community engagement.

> I have a mathematics committee, and anytime we're thinking about adopting a new curriculum, I bring in publishers to meet with the committee to build consensus and buy-in from our teachers. I also engage parents so that they know what's ahead as we are a very small community.

Further, four out of six of the assistant superintendents for curriculum and instruction articulated not just that teachers were involved in the selection of curricular resources, but also submitted commentary about the mechanics of how they were engaged in the process. Two of the assistant superintendents described their actions in detail. Assistant Superintendent AS1 submitted the comments below.

> I supervise the math specialists. I provide professional development and support to the classroom teachers and the supportive math teachers. I facilitate the District Comprehensive Education Plan where the goals are directed by the committee. This is done by collecting and analyzing data and gathering input from our stakeholders. I monitor district data on an ongoing basis. I am currently working with a collaborative team of grade level teachers, supportive math teachers, and special area teachers to investigate new materials for our math programs.

Assistant Superintendent AS4 described the collaborative role of her office from beginning to end relative to adoption and implementation of mathematics curricular and instructional programming.

> I work directly with a team of people starting from reviewing programs which encompasses bringing in teachers in committee settings and so I'm intimately involved with staging of all of the logistics of the processes associated with choosing programs. Obviously, they must be aligned with the common core standards; they must meet the needs of our staff. And so we create opportunities for teachers at all grade levels to provide feedback and participate in the decision making process regarding programmatic choices and then I work with the professional developers in setting up schedules for teachers to meet with them.

District partnership with principals. The second finding reflected that most of the participants, 12 out of 16, identified partnering with principals of primary importance to enhance their instructional leadership of mathematics programming. Specifically, commentary from both superintendents and assistant superintendents emphasized that principals must intimately understand the mathematics programs including the pedagogy and alignment with the common core standards. In this instance, Superintendent AS2 offered the following response:

> Programs and instructional designs are only as good as the people who design, implement, and evaluate them. The principals must understand our math instructional program and the foundation of pedagogy that is representative of the research base associated with the program in order to effectively help teachers teach content in an appropriate manner.

Another superintendent, Superintendent AS6 similarly commented expressing the expectation that principals develop expertise to effectively supervise math instruction.

> I believe whole-heartedly in the instruction and the supervision of instruction…It starts with supervising principals, assistant principals; observing them while they observe, observing the pre-observation conferences and post observation conferences. Looking at the actual write-ups of the observations. I believe that drives instruction, it really does.

Four of the Assistant Superintendents expressed the reliance of partnering with principals in leading the work at the building level as essential in the implementation of mathematics programming in the district. Assistant Superintendent AS6 described how important this relationship is in her response below.

> At the building level, our principals hold grade level meetings with our teachers. Once a month we have curriculum meetings where we work on district initiatives. We rely on collaboration between principals in the building and me.

Assistant Superintendent AS4 also highlighted what she believed was critical to implementing the mathematics programming with fidelity.

> And then I work directly with our building level administrators to support the implementation of the program(s). You must work with the change agents and involve them right from the start if you expect to meet your intended outcomes.

Central office administration as instructional leaders. In the third finding, participants acknowledged instructional leadership as a cornerstone of their practice. Fifty percent of the participants identified themselves as the instructional leader of the district including four superintendents and four assistant superintendents for curriculum and instruction. For example, Superintendent S1 commented:

> I don't there was ever a conscious decision or question on being involved in the curricular and instructional decisions. How could a superintendent not be involved; the educational leader of the district must be engaged in instruction and learning.

Similarly, Superintendent S2 explained the importance of working with the principal and other educators:

> I am the instructional leader of the district and I attend the Math Committee Curriculum Meetings on a regular basis. I am one of the many people who give input on curricular and instructional decisions regarding math instruction. I was instrumental in working with our principals and staff in thoroughly understanding the shifts in math practices to implement the new math standards.

A third superintendent, Superintendent S5 was even more matter of fact about his decision to be engaged in the decisions about math curriculum and instruction in his district.

> It's a part of the job description. It's what you have to do. Instructional leadership is the cornerstone of any leadership position that you have in a school system. And the fact that my background is in curriculum development and professional development makes this an area that I enjoy and work towards improving.

The remarks of the Assistant Superintendents were congruous with the explanations of the superintendent participants in the study regarding their role as instructional leaders in the district. One Assistant Superintendent, AS3 succinctly stated, "It's an integral aspect of my current position to be involved in these decisions."

Another Assistant Superintendent, AS2 echoed the comments of one superintendent relative to how likeability of this part of his role commenting, "Aside from the fact that it is

part of my job, I enjoy being part of curriculum related decisions. I enjoy the discussions that go along with it and watching it play out."

Regular review of data. The fourth finding revealed that all of the participants signified that the regular review of state and local data was a key factor to effectively provide supplemental math instruction to meet the programmatic needs of all students in their districts. For instance, Superintendent S1 shared:

> We use the NWEA, New York State Assessments, Diagnostic Pre Assessments, teacher input, and direct observation in determining who should be included in AIS within and outside the school day. We use both a push-in and pull-out model.

Similarly, Superintendent S2 echoed consistent remarks regarding the provision of targeted and supplemental math instruction for students presenting this need.

> We use NYS Math Assessments and the STAR results to provide supports to students that aren't grade level proficient. We have two full time AIS math support teachers who utilize either NYS Math test results or our STAR Math results to create their service banks of students and provide them a minimum of 90 minutes every week of intensive support using a specific program…

Again, Superintendent S3 commented, "We use multiple measures such as rubrics formal and informal observations, and student outcomes."

Assistant superintendents who participated in this study expressed the same sentiments as all of the participating superintendents regarding the provision of supports for students performing below grade level. Assistant Superintendent, AS7 had the following comments regarding this issue:

> Depending on the opt-out numbers, we look at the state tests from the previous year. We look at their STAR results to see if they're performance is a year or less below grade level. If they're below grade level, those students are picked up for AIS and provided academic intervention support.

Assistant Superintendent, AS5 remarked, "we follow an RtI Model that is very well developed in addressing both the math and English Language Arts (ELA) needs of our students. She provided a more detailed explanation outlined below.

> We have systems in place including data meetings where teachers are required to provide specific information about students so that the IST Team can determine the right learning prescription for any particular child. This can include additional support in the classroom or AIS services in small pull-out groups.

There were four findings garnered from the interview data relative to research question 1. A majority, 81% of the participants in the study believe that collaborative efforts with teachers are an essential part of the work associated with the adoption of mathematics curricular and instructional practices. Moreover, most of the participants reported that there is a critical nexus in supporting strong relationships with principals as a primary avenue to boost their instructional leadership of mathematics programming. Only 50% of the participants identified themselves as the instructional leader of the district including four superintendents and four assistant superintendents for curriculum and instruction. The remaining superintendent participants indicated support for frequent meetings with key members of their administration remarking that these teams often integrated the assistant superintendent for curriculum and instruction and principals. Of significance was the

recurring regard for review of data to inform decisions about the provision of supplemental math supports to meet the needs of all learners.

Research Question 2

What support(s) do New York State K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?

This research study utilized Bolman and Deal's (2003) four frames model to guide an understanding of how New York State K-6 superintendents engage these perspectives or 'frames' to identify and successfully attain organizational goals within their respective school districts. Specifically, this section focuses on the second research question that discusses the supports that NYS K-6 Superintendents provide to augment teacher practices in ways that raise the quality and effectiveness of their math instructional delivery. The findings for this research question are listed below and will be discussed using the Bolman & Deal's frames to evaluate the choices of leadership strategies operationalized by these participants to achieve their objectives.

Targeted professional development. District leaders often find themselves operating within existing structures or 'structural frames' that can thwart their efforts to keep pace with necessary change (Bolman & Deal, 2003). "Managers rarely face well-defined problems with clear-cut solutions. Instead, they confront enduring structural dilemmas, tough trade-offs without easy answers (Bolman & Deal, 2003, p. 69). Considering the administrative tasks associated with the demands promoted by raised New York State standards, it is crucial for superintendents to align organizational structures for effective response time in confronting this work. This includes creating professional development

experiences that are differentiated within typical formats including Superintendent's Conference Days or more routine meetings at the grade or building levels.

Findings for research question two of this study indicate 12 out of 16, 75% of the participants reported the need for targeted professional development in mathematics and that much of these opportunities for training were delivered in existent organizational structures. For example, Superintendent S5 spoke about contractual issues related to professional development.

> What's mandated is what is in the contract of our school district. We have mandated Wednesdays. The math professional development is connected with other resources such as our online resources which is a professional development relative to using available resources in the district. The requirement is that we come to agreement in terms of what is a priority versus what is supplemental.

Equally constrained within the structural frame, Assistant Superintendent, AS7 made the following assertions about the use of Superintendent's Conference day to address the task of delivering professional development within this logical timeframe.

> Teachers are required to attend the Superintendent's Conference Days, which are really where we concentrate on the delivery of key elements, and then it's kind of filtered through grade levels and faculty meetings through the course of the school year. And when we rolled out the new math program, we required teachers to participate in professional development sessions during the initial implementation phase.

In the district where participants presented professional development in mathematics as a requirement, there was consistently a prescribed amount of time. This is most likely due

to the fact that teacher engagement in professional development requires the district to target resources for this specialized activity including the presumed cost for the professional learning opportunity as well as the provision of substitute educators. For example, Superintendent, S3 shared that, "each teacher is required to take a five-hour course each year; therefore, we are able to provide specialized instruction in mathematics that teachers must take." Superintendent S2's comments mirrored these sentiments for particular groups of teachers. He stated, "All math teachers, instructional support teachers, and inclusion teachers are expected to have at least ten hours of math professional development annually."

Beyond the structural limits for mandating professional development, half of the participants, 8 out of 16, offered assertions about the level of teacher preparedness to provide high quality math instruction indicating that there was 'room to grow' when asked for their opinion regarding how well trained teachers were to engage students in math instruction that built conceptual knowledge that could be applied to opportunities for new learning. Moreover, 6 out of 16, 37% of participants reported that new teachers presented limited ability in transferring theory into practice as it related to math instruction. Superintendent, S7 succinctly expressed his observations of elementary teacher preparedness to promote high quality math-learning environments. "Our staff is made up of predominantly seasoned teachers. After a number of years of training and practice, they are generally skilled at math instruction. New teachers need a great deal of support." Only one of the sixteen, 6% of participants declared that their elementary teachers were satisfactorily equipped to deliver high quality math instruction.

The statements about the lack of preparedness of elementary teachers to deliver high quality math instruction are both political and symbolic of a larger issue. The historic focus

of elementary education has been to promote literacy. However, in spite of this, superintendents and central office administrators have trumpeted the narrative of reform within Bolman & Deal's political and symbolic frames to increase the significance of mathematics education in the minds and perspectives of elementary educators. Presently, these efforts are mightily supported by both federal and state legislation mandating curricular and instructional changes in K-12 mathematics (EngageNY, 2015).

A subset, 62% of participants that identified the need for targeted professional development further described the opportunities for teacher development in their districts as an active progression of systemic professional learning structures, some in response to governmental changes regarding teacher evaluations. Superintendent S8 responded that there were several ways that he made decisions about ensuring high quality professional development and math instruction in his district.

> We are currently updating the professional plan as part of our work this year and obviously professional development devoted to math is pervasive throughout the plan. The observation process, and again the enhanced professional conversations about instruction as a result of the new Annual Professional Performance Review (APPR) are also considered professional development.

Superintendent S4 made similar comments although his remarks underscored leadership's ability to engage the symbolic frame to provoke increased commitment from the district staff to further their professional learning.

> The long-term plan is what we referenced before in that the understanding is that this is a dynamic process that we keep current. We're always looking for ways to enhance the idea of people improving themselves and ways in seeking out their own

> development. One of the things that we're looking at is actually incentivizing in-house professional development attendance by granting graduate course credit on our salary schedule. We believe if we make it important that teachers will make it important.

Assistant Superintendent AS7 described the logic of employing the structural and human resource frames (Bolman & Deal, 2003) by engaging the existing district committees to maintain an open dialogue, thereby sustaining teacher input and morale. These existent district committees can also be regarded as political in nature as they provide a mechanism for administrators to 'network and form coalitions' to meet specific district objectives (Bolman & Deal, 2003, p.205).

> I would also say that through working with the professional development committee, we're able to look at and gather feedback from the teachers to see what they feel they really need and we're doing this on an annual basis. In this way, we are making sure the identified needs are current, and that we're addressing teachers' needs.

One superintendent's comments suggest that he regularly operates within the Bolman & Deal's (2003) human resource frame to evoke teacher reflection and collegial conversations around effective math-learning environments. In this case, Superintendent, S1 made the following statements:

> It is not requirements as much as opportunities. These would be intra-district class visitations, meetings with experts, publishers, and the math teachers. My cabinet and I work hard to establish an atmosphere of trust. Oftentimes, in casual conversations with teaching colleagues you can probe content knowledge and have frank discussion with them on what they need.

Assistant Superintendent, AS6 highlighted the need to promote systems that support continuous improvement and capacity building. Along the same lines, her discussion also provides details that are consistent with the human resource frame with a focus on the retention of highly qualified educators united in an effort to meet district goals (Bolman & Deal, p. 115).

> It starts with the children. And you need to know what they need to know and how to teach them what they need to know. At the same time within this system of helping students you can only do that if you have highly trained teachers. And these training opportunities can be informal. We have done a lot internally, and our teachers do fifteen hours on what is working well in their classroom, and they turnkey train their successes within our district with other educators. They have to be tenured people who are selected by their principals. And having them come forward to provide practical solutions about the programs we're using in the district is effective because there's a comfort level that is promoted by the fact that the audience is their colleagues. And so building a system of both formal and informal opportunities for professional development toward continuous improvement or professional practice is important.

Increased Human Capital. Finding two is the expressed need by 10 out of 16 or 62% of the participants for increased human capital devoted to supporting math instruction. This strategy is parallel to Bolman and Deal's (2003) human resource frame in that the targeted placement of highly qualified educators by district leaders' is a support committed to a collective effort towards meeting organizational goals. In discussing math student achievement in his district, Superintendent S7 stated that, "the Assistant Superintendent

meets regularly with teachers and building administrators to discuss academic matters." He further noted,

> We have developed a system of academic leaders for math, English Language Arts, science, and social studies with one leader representing each subject at every grade level in each school. These leaders periodically meet to discuss resource needs and instructional matters.

Superintendent S5 also talked about increasing the level of human resources to guarantee the consistency of math instruction in his district.

> In the time that I've been here, we have hired a district-level math specialist who works specifically on the area of math ant that role is a combination of assistant principals at one our buildings. This position was added to the district's administrative staff three years ago based on two years of monitoring the curriculum as well as the results of our kids.

Accordingly, Assistant Superintendent, AS1 asserted, "Targeted teachers are supported through classroom observations, coaching, class visits, individual meetings, and suggestions for classes to attend. I also model concepts or have math specialists model concepts and strategies for targeted teachers."

Additionally, Superintendent S3 made the detailed comments below.

> We have a number of support systems in place and usually start with in-class support by the teacher, extra help by the teacher, or AIS instruction with a math specialist. In addition, we have instructional support teams to discuss children's abilities and then provide the necessary specialists to support that child in either a pull-out or push-in model.

Assistant Superintendent, AS3 shared information about the dynamic inclusion of a coaching model, "When we offer specific staff development, especially when we employ a coaching model, we supervise to ensure that the recommended techniques are being utilized and implemented with fidelity."

Assistant Superintendent, AS7 described how her superintendent leveraged the Bolman & Deal's (2003) human resource frame to recruit and then ensure the retention of highly qualified educators. In other words, the superintendent presented a keen understanding of developing expertise and matching these skills with the right assignment within the organization (Collins, 2001).

> The superintendent has instituted an AIS Program where we have hired AIS teachers that push into the classroom to provide small group support and they're assigned to a grade level and rotate for forty-minute periods throughout the course of the day to work with teachers.

Alignment of curricular materials with common core learning standards. Most recently, with the requirement for districts to meet raised standards in New York State, the adoption of curricular materials has been a critical support indicated by many of the participants. In fact, 10 out of the 16, 62% of participants indicated that the alignment of curricular materials with the Common Core Learning Standards was a critical asset in increasing teacher and student success in math achievement. When making the choice about these math programs, many district leaders described the steps mainly associated with Bolman & Deal's (2003) political frame including the need to set and communicate the district vision for math and form teacher groups or 'coalitions' that in turn gathered stakeholder feedback and expectations. When describing the recent adoption of math

curricular resources, Superintendent S3 outlined the value of communication when negotiating to meet the needs of both students and educators.

> It is important to listen and have discussions with our staff to determine requested resources. Our principals, through observations, also confirm that these resources are needed and any new strategies, research, and approaches that can be incorporated into our instructional program. Each year we build on the previous years' instruction and student results.

Superintendent, S4 comments identified the critical connection between the adoption of new curricular materials and teacher training.

> It started for us with the implementation of the new math program over the last couple of years. Teachers had to really learn the program. And so the requirements were that not only did people have to become versed in the common core, but they also had to learn a new program. We were able to bring in and provide training for the new math program. This is an ongoing process as teachers become more immersed and adept with the program.

The Assistant Superintendents' responses were congruent with the comments shared by the superintendents in that many of them outlined a system to support human resources marked by a prescriptive communication feedback loop. Assistant Superintendent AS3 remarked that, "I seek out information from teachers, principals, and staff developers and obtain information from our Staff Development Committee when deciding what resources are needed to ensure high quality math instruction."

Assistant Superintendent, AS6 shared comments about ensuring that classroom instruction is well supported by revisiting the strength of the core curriculum.

> Since 2000, the district has developed curriculum maps that have been revised cyclically. Usually for math, it would not be longer than three years, but if a major initiative needs to be undertaken, such as the adoption of the Common Core, that might defy the three-year cycle. We engage in curricular writing projects during the summer and actually this past summer, our teachers wrote beautiful curriculum maps for math.

Assistant Superintendent, AS7 also talked about the need to update existing curriculum through directing support towards human resources.

> We have been following up with an initiative for about two years before I became the Assistant Superintendent. We have been actively involved in upgrading the program and moving to a newer version to ensure alignment with the Common Core Learning Standards and providing online support to our classroom teachers to help them work through the online resources.

The adoption of the Common Core Learning Standards represented a major shift in the curricular and instructional resources that were required to meet the rigor represented by these new standards. Four of the participating superintendents reported that teacher preparedness to ensure high quality math-learning environments was evolving and representative of an area for growth. In accordance with this sentiment, Superintendent, S5 made the following comments:

> Math is difficult, I think more difficult for teachers who have not had collegiate math instruction. Because you can get through, maybe one course and teach elementary math. This is not just in this district; this is statewide. It's mind-boggling. So unless

you take those courses, you're not going to necessarily be expert in it. So what happens is that teacher becomes reliant on the text.

There were three findings gleaned from the participant response data to research question 2. Relative to the first finding, 75% of the participants reported the need for targeted professional development in mathematics and that much of these opportunities for training were delivered in existent organizational structures. Some participants further reported that new teachers had the most difficulty translating theory into practice to ensure that students gained a strong conceptual understanding of mathematics. Finding two is the expressed need by ten out of sixteen or 62% of the participants for concentrated enhancements to the human resources dedicated to instructional supports included in high quality math-learning environments. The third finding was that 10 out of 16, 62% of participants reported supportive responses to raised standards in New York State including the revision or adoption new curriculum to ensure the maintenance of high quality math-learning environments in their respective districts.

Research Question 3

What actions, if any, have New York K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?

Marzano & Waters (2009) discuss the correlative actions of district leaders that strengthen the relationship between district-level administration and average student achievement as a critical component of effective leadership. This part of the research study is devoted to highlighting what superintendents do as part of their operative tasks to ensure math-learning environments that provide high quality instruction. The participants used various descriptions of their actions to assure a high rate of robust math-learning

environments. The challenges of guaranteeing consistency of high quality elementary math instruction in their respective districts are apparent in the significant variances of their answers.

Two findings resulted from the analysis of responses to research question 3. The first is that a strong consensus amongst all sixteen participants stated that controlling the master schedule was the only way to actively organize district guidelines driving the time devoted to math instruction at all grade levels. The second finding is that the majority of participants, ten out of sixteen, 62% reported that the quality of instruction during this bloc of time must be measured through a purposeful and focused approach during the observation process. The two findings are outlined below.

District guidelines for daily instructional schedule. The first finding presented solid agreement amongst district leaders in that all sixteen participants posited that the district guidelines controlling the master schedule directed math instruction at all grade levels. To ensure that the prescribed amount of time is devoted to daily math instruction, one participant, Superintendent S9 made the following assertions:

> By having a consistent schedule that everyone has to follow. We have modified our scheduling so that we have assigned blocks of time for math and ELA and we make sure that it's an integrated approach…We control the schedule, and then we rely on the teachers to get us to our goals within the schedule.

Along the same lines, Superintendent S7 talked about expectations as it relates to the daily instructional schedule and its alignment with district guidelines, "Teachers have a daily schedule that must include a minimum of one hour for math instruction. While they have

some flexibility, they are expected to generally dedicated this allotted time to instruction of math."

Assistant Superintendent, AS3 described how her district ensures the organization of instruction in their schools.

> We follow the Princeton Plan. Our district is organized into centers so that all classes on a grade level are in the same building. In this way, it is easy to ensure that the same minimum amount of time is spent on mathematics in each classroom by grade level.

Assistant Superintendent, AS1 made similar remarks about the importance of protected time dedicated to high quality math instruction, "Our district has blocked out time of 60 minutes established for each grade level. There are not interruptions or pull-outs during that time."

In the same vain, Superintendent S8 made the following statement, "We established blocks or block scheduling as some reference it. It's expected that one hour is spent on math instruction each day. I'd like to say it's protected from pullouts." Superintendent S2 succinctly posited his comment, "We have a one hour, no pullouts math block in every grade in every school each day.

Accountability for effective math instruction. The observation process was identified by 10 of 16 of the participants, 62%, as an essential system to gauge the effectiveness math instruction. For example, Superintendent S2 made the following comments:

> It is our expectation that what gets measured gets taught. As a result, principals agree that certain practices must be part of all classrooms K-6 and look for these things

> when they observe math classes. At least one of the formal observations each year must be a math period.

Assistant Superintendent, AS7 also shared the following:

> During our observation of mathematics lessons, we look for teachers that are engaged in some kind of pre-assessment and that they are modifying the lesson to meet the needs of all their students which might require them to make some adjustments during the planning and/or delivery of their lesson. We give them ownership and we ask them for feedback about what's working and what's not working. And when we visit classrooms, we're able to see that evidence of high-level math instruction come into play in the classroom.

Similarly, Assistant Superintendent AS5 framed the importance of the observation process in this way, "After you have ensured that everyone has access to targeted professional development and resources, then critically important is the observation process. It our job to make sure that teachers are implementing what we've collectively decided to do with efficacy."

The comments submitted by Superintendent S6 mirrored the sentiments about the critical nature of the observation process. In fact, in a separate interview, his assistant superintendent described working with him as a 'road show.' Superintendent S6 stated,

> Accountability and ensuring high quality instruction really starts with hands on for me during the observation process. I'd say that I probably do between 120 to 150 observations of each year. Sometimes full observations, sometimes 20 minutes to target math instruction in each classroom, depending. But it starts with that.

There were two findings derived from the response data to research question 3. The first finding presented fervent agreement in that all 16 participants actively utilized the master schedule to align district guidelines to individual classroom schedules as it related to math instruction. Many of the participants remarked that specific actions ensured uninterrupted instruction devoted to math instruction at all grade levels. The second finding was that the majority of participants, 10 out of 16, 62% reported the quality of math instruction during the respective 60 to 90 minute blocks across these districts was measured through a deliberate observation process. The purpose of these observations was described as insuring accountability for implementation of programmatic elements and the promotion of teacher efficacy relative to high quality math instruction.

Summary

This chapter described the challenges that school district leadership in New York State routinely face to develop math-learning environments that prepare both educators and students to meet rigorous learning standards in New York State within structurally rigid environments. Their efforts to systematize supports was evaluated within Bolman & Deal's Four Frames Model (2003) highlighting political ramifications as well as the dependency on the effectiveness and support of the people working within their organizations. A clear connection was observed between the ability of leadership to fluidly utilize the strengths of each the four frames to develop and maintain high quality instruction within comprehensive math-learning environments. Chapter Five will provide an analysis and conclusions of this study.

CHAPTER 5
Analysis and Conclusions

Introduction

This chapter includes a summary and analysis of the findings based on each of the three research questions anchoring this study. Additionally, the chapter provides a discussion and examination of the findings and respective conclusions drawn from these results organized into four segments. The first section encapsulates the findings of each research question. The second part of this chapter presents the conclusions derived from the findings. The third section contains recommendations for practice and policy based in this research and the chapter concludes with a synopsis of this study and considerations for future research.

The purpose of this phenomenological qualitative research study was to examine how school superintendents in K-6 common school districts in New York State ensure the occurrence of high quality mathematics-learning environments within the school systems they lead. This study analyzed the relative leadership and organizational activities directed by these superintendents and their executive administrators providing oversight of the district's curriculum and instructional practices using Bolman and Deal's "Four Frames" model. The main discussion targeted the superintendent's leadership in building a systemic approach toward fostering math-learning environments that promote high quality instruction for students attending the sixteen K-6 New York State Elementary School Districts included in this study.

Research Questions

The following research questions were developed by the researcher and provide structured guidance for this final chapter.

1. To what extent are New York K-6 Superintendents involved in the mathematics programming in their district?
2. What support(s) do NYS K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?
3. What actions, if any, have NY K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?

Summary of Findings

An analysis of the data collected for this phenomenological qualitative study disclosed nine central findings associated with systemic leadership as it relates to ensuring the occurrence of high quality math-learning environments in K-6 common school districts in New York State. There are four key findings regarding participants' involvement in the mathematics programming in their respective districts. Three are connected with the support that participants provide to increase the efficacy of teachers' math instructional practices, and two directly linked to the actions taken by district leaders to ensure rigorous math-learning environments within their districts. The findings for each of these sections are aligned with the following research questions:

Research Question 1

To what extent are New York K-6 Superintendents involved in the mathematics programming in their district?

This research question revealed four main themes based on an analysis of data gathered through a semi-structured interview conducted with 16 New York State school district leaders, nine of which are superintendents and the remaining seven, assistant superintendents for curriculum and instruction. A majority, 81% of the participants in the study believed that collaborative efforts with teachers should be aligned with the work of adopting mathematics curricular and instructional practices. In fact, many noted that these collective activities created a foundation that seeded grassroots support or 'buy-in' from classroom and special area teachers.

The results of this research question also yielded that 75% of district leaders reported cultivating formidable partnerships with principals as an essential strategy in enhancing their instructional leadership of mathematics programming. Specifically, participants shared the sentiment that school leaders must possess a comprehensive understanding of the district's mathematics programs to effectively help teachers accurately present relative instruction. In this way, the district can ensure that teachers' math pedagogy builds students' content knowledge, and moreover, children's ability to transfer this knowledge to new learning.

This research also resulted in half of the participants identifying themselves as the instructional leader of the district. The individuals who shared this sentiment presented it as a requirement of the job. The other participants indicated principles of instructional leadership that were shouldered by the joint work of both the central and building-level administrative teams.

All 16 participants commonly espoused the last finding associated with research question 1. This result uncovered unanimous agreement about the importance of cyclically

reviewing data to buttress curricular choices that are well matched and represent adequate math supports for all learners.

Research Question 2

What support(s) do New York State K-6 Superintendents provide to increase the efficacy with which teachers deliver math instruction in their respective districts?

The researcher developed an understanding of how New York State K-6 superintendents and central leaders of curriculum and instruction attained strategic goals relative to math instruction through the lenses of Bolman and Deal's (2003) four frames model. Specifically, research question 2 highlighted the supports that NYS K-6 district leaders provide to expand teacher practices in ways that raise the quality and success of their pedagogy relative to elementary math instruction. Three quarters of the participants talked about the need for targeted professional development in mathematics and that much of these opportunities for training were delivered in pre-existing organizational structures. Moreover, there was some agreement that new teachers had a higher propensity to struggle with the level of instruction that built students' foundational grasp of mathematics.

According to the research, a little more than half of the participants reported the need to fortify the human capital devoted to assisting elementary classroom teachers' reinforcement of high quality math-learning environments. The participants discussed this attention to enhancing human resources in the form of assigning grade level academic leaders for math as well as the hiring of math instructional specialists or coaches.

The third finding reflected that the majority of these district leaders used their savvy about raised standards in New York State to structure supports that focused on the review or

implementation of new curriculum to assure the sustainability of high quality math-learning environments in their respective districts.

Research Question 3

What actions, if any, have New York K-6 Superintendents taken to ensure math-learning environments that provide high quality instruction?

The results of this question revealed two major activities the participating district leaders maintained as effective accountability measures between their district's purported vision and what was actually happening in their classrooms during math instruction. This part of the research study illuminated the deliberate actions presented by participants as typical strategies they used to promote high-level math-learning environments.

Full consensus emerged amongst participants in the resultant initial finding. All members of this group described that district guidelines power the master schedule as the singular approach to actively manage the amount of daily instructional time scheduled for math at every grade. Moreover, the district leaders ardently expressed that the observation process be keenly attentive to the quality of instruction during the 60 to 90 minutes that was reportedly dedicated to math instruction each day.

Overall, the superintendents and assistant superintendents for curriculum and instruction participating in this study repeatedly referenced key considerations to ensure the maintenance of high quality math-learning environments within their learning institutions. Two key considerations were targeted professional development and alignment of district resources with stated objectives. In particular, a forward thinking plan was clearly communicated as an essential element that must be funded in concert with the purported district vision around math-learning environments. There was accordance amid these leaders

about their responsibility to acts in ways that did not impede the maintenance of these directed efforts supporting high quality instruction.

Discussion

An examination of the interview data collected during this study presents many commonalities among the participating superintendents and assistant superintendents for curriculum and instruction regarding how they meet their obligations to effectively direct instruction aligned with New York State's elementary math learning standards. The primary areas of investigation included: (1) instructional leadership, (2) systemic leadership, and (3) best practices in elementary mathematics instruction. The comparative evaluation of the participating districts will provide the fundamental relationship for the conclusions conferred in this section.

This study progressively began with a review of the literature regarding America's education reform efforts during the latter part of the 21st Century. It was found that this part of United States' history presents public education as being wrought with federally funded initiatives that buttressed strong political influence mostly informed by governmental leaders and big business (National Commission Excellence In Education, 1983). The latest rounds of these potentially transformative changes include Race to the Top and the Every Student Succeeds Act (U.S. Department of Education, 2016).

The findings in this study parallel other related research studies and further expand on them. New York State K-6 Superintendent leadership practices that ensure the occurrence of high quality math-learning environments focus on continuous improvement processes that are systemic and cyclical (Marzano & Waters, 2009). In other words, the participants engaged in cooperative work with principals and other critical stakeholders recognizing that

systemic collaboration optimizes key instructional leadership and the likelihood that program adoptions will meet students' needs. Moreover, enhancing levels of human capital dedicated to math instruction and targeting professional development to promote teacher efficacy emerged as critical supports identified by participants that effectively improved math instruction district-wide. The two most frequently reported actions associated with promoting robust math-learning environments within this study were assuring prescribed daily doses of math instruction at all grade levels and requiring teacher observations that purposefully monitored the pedagogy of mathematics. This finding is consistent with Marzano & Waters (2009) study in that "effective superintendents continually monitor district progress toward achievement and instructional goals to ensure that these goals remain the driving force behind the district's actions" (p. 7).

Multiple conclusions can be drawn from the results of this study in concert with the work of Marzano & Waters (2009) to help superintendents and key instructionally–focused central administrators facilitate a systems approach to executing the implementation of high quality elementary math-learning environments. Above all, the evidence from this research study along with Marzano & Waters' (2009) work indicates that leaders must focus on the critical relationship between district led actions and student achievement. There is agreement among leaders in both studies that collaborative work builds consensus promoting a shared opportunity to fulfill district student achievement goals. Moreover, superintendents strategically partner with central office instructional leaders and principals to monitor the achievement of these instructional goals.

Leadership investment in developing their practice as instructional role models can also be discerned from the collective findings of these two studies. Participants in both

studies engage in practice that projects their activities as instructional leaders including the creation of expectations for student achievement goals at both the district and school levels. Moreover, the regular review of data that supports accountability measures for successful alignment of resources to realize these identified benchmarks for success are also a regular part of their practice.

Instructional Leadership

The majority of participants in this study talked about their roles as instructional leaders in ways that established this facet of their jobs as a necessary requirement of their leadership. Again, most of the superintendents and assistant superintendents' responses mirrored reflections that included modeling instructional leadership through a distributive leadership approach (Spillane, 2004) involving principals as partners and other key instructional leadership positions within their respective organizations. Also, central to the participants' leadership practices was their keen awareness of the connectedness of the regular review of both local and state achievement data to ensure that district program implementations were well matched to address the needs of all students.

Systemic Leadership

This research study found that New York State K-6 district leaders relied on all four of Bolman & Deal's (2003) organizational frames to increase the assurance of high quality elementary math-learning environments. Within this framework both the structural and human resource frames emerged as the most frequently employed 'lenses' utilized by superintendents and assistant superintendents to create the motivation and systems to promote high quality elementary math-learning environments. Comparatively, the political

and symbolic frames were underutilized, however were equally effective when well matched to the administrative task(s).

Leaders that facilitate systemic continuous improvement efforts enact district goals that purposefully permeate all tiers of the organization. Marzano & Waters (2009) conducted research that concluded successful district leadership has performance indicators ensuring that all members of the organization understand their role(s) in successfully moving the work of the district forward. In this way, there is a greater opportunity for all members to engage in strategies that are closely matched to meeting the organizational objectives. There is evidence as a result of this research study that the participating leaders have a raised level of awareness regarding these best practices. In their collective responses, they highlighted the importance of enacting targeted professional development opportunities for teachers and administrators, increasing human capital devoted to mathematics programming, and aligning curricular materials to effectively improve math-learning environments.

Best Practice in Elementary Mathematics

Superintendents and assistant superintendents for curriculum and instruction regularly make programmatic decisions about mathematics instruction. The balance that these leaders must realize in meeting the current standards-driven reform efforts is marked by ensuring that teachers are prepared to satisfy demands of more rigorous instructional targets whilst assuring that student learning is progressing at an annual rate deemed ‘adequate’ by the New York State Education Department. These district leaders must also consider the elements noted in the research before selecting options they will utilize to address the learning gap between and among the children they serve. In all of the participating districts, math education took a back seat to reading instruction evidenced by a diminished amount of

instructional time reportedly dedicated to math instruction in their master schedules. It was commonplace for participating district leaders to report that 90 minutes was devoted to uninterrupted instructional time for English language arts (ELA) and only a maximum of 60 minutes accounted for instructional time reportedly assigned to mathematics instruction. The results of other studies support the finding that math instruction is often relegated to leftover instructional time that is often divided amongst other disciplines (HMHCO.com/numeracy counts)**.** Other studies have shown that this subjugated status for elementary math instruction is often compounded by lack of leadership for mathematics instruction in comparison to ELA, a necessity to meet the pedagogical shifts represented by the Common Core Standards (Burch & Spillane, 2003). The development of rich math-learning environments at the elementary level is aligned with Common Core Learning Standards that demands essential changes in the way children learn and build proficiency for mastery of mathematical concepts (NYSED, 2012). These changes call for a greater focus on fewer topics and require coherence or linking of topics across grades, rigor, and a deeper foundational understanding of mathematics to strengthen skill mastery in fluency and application ("Welcome to Achieve the Core").

Although our students are educated locally, 21st Century realities dictate active competition for jobs countrywide and on the world stage. It is for these reasons, that the perpetual cry for increased standards has become seemingly necessary and unending in this country.

Recommendations for Practice

This section is comprised of recommendations derived from the data analysis synthesizing the semi-structured interviews of participant responses in this study. The

recommendations are presented in three sections representative of the related research questions and the relative findings revealed from each inquiry. The review of this information starts with a section discussing instructional leadership, and then follows with systems leadership and best practice in elementary mathematics.

Superintendents and Assistant Superintendents for Curriculum and Instruction recognize that collaborative work with critical stakeholders builds consensus.

Collaboratively engage teachers and principals in the implementation of mathematics programming. Developing and sustaining high quality elementary math-learning environments is reliant on district leaders that effectively include teachers and principals in the execution of adopting mathematics curricular and instructional practices. Thirteen out of 16 participants identified collaborative efforts with teachers as integral to ensuring that educators in the classroom support or 'buy-in' for the implementation of curricular resources and instructional practices found in high quality math-learning environments. Further, 12 out 16 participants in this study reported that partnering with principals advanced their vision and instructional leadership of robust elementary math-learning environments. Sound district leadership involves the effective utilization of principals as communicators and enactors of the district's instructional vision (Petersen, 1998). Superintendents and central administrators charged with oversight of curriculum and instruction must continue to foster cooperative relationships with teachers and principals to ensure the implementation of best practices regarding high quality math-learning environments.

Signify instructional leadership as the core work of superintendents and assistant superintendents for curriculum and instruction. Half of the participants in this study

identified themselves as the instructional leaders in the district including four superintendents and four assistant superintendents for curriculum and instruction. The literature review regarding instructional leadership supports the ideal that superintendents have had to necessarily shift their administrative behavior(s) from managerial practices to a more instructionally based leadership focus (Honig, 2012; Lambert, 1998). These leaders were resolute about their engagement as instructional leaders as a necessary requirement of their jobs. The challenges presented by raised standards in mathematics have forced leaders to bolster their competencies related to pedagogy (Honig, 2012). The other participant responses reflected frequent meetings with their leadership teams that often focused on discussion about curriculum and instruction. Superintendents must continue to build their core knowledge and facility with the learning standards in New York State as they evolve and increase in rigor.

Regularly review data to effectively match programs to student needs. All of the participants in this study signified that the regular and global review of student achievement data was essential in meeting the elementary math programmatic needs of all students. Marzano and Waters (2009) highlight the importance of superintendents' diligence in constant monitoring district progress relative to established achievement goals. The assurance of well-maintained systems that provide feedback about sustaining the elements of high quality math-learning environments is one of the most important activities of this study's participants.

Superintendents and assistant superintendents for curriculum and instruction must ensure effective supports to bolster teacher efficacy in delivering math instruction.

Provide targeted professional development. Professional development that fails to meet identified teacher needs is problematic and does not support lasting behavioral changes in teachers that improve their instruction (Guskey, 2000). Three quarters of leaders in this study recognize the need for targeted professional development in mathematics as a vital way to improve the quality of math pedagogy in the elementary classroom. In fact, half of the sixteen participants made assertions about the diminished level of preparedness of elementary teachers to develop high quality math-learning environments in their respective districts citing some level of negligence on the part of teacher training programs. Current legislative actions at both the federal and state levels reforming instruction in K-12 mathematics provide fodder for superintendents to mandate these professional development expenditures and opportunities.

Expand human capital devoted to math instruction. Jim Collins (2001) talks about ensuring success within an organization by maintaining the 'right people on the bus'. More than half of the participants in this study decisively increased the human capital dedicated to supporting math instruction by targeting the employment of an instructional coach or academic leader for elementary mathematics. District leaders included in this research also talked about the recruitment of high qualified educators that had prerequisite skills in teaching mathematics that were given special assignments focused on providing small group math instruction. District leaders should utilize the hiring process to recruit highly qualified math educators as the most critical way to ensure the development of rich math-learning environments.

Invest in curricular materials aligned with Common Core Learning Standards. Participating superintendents and assistant superintendents in this study are increasingly

engaged in the adoption of curricular materials as an imperative in meeting raised elementary math standards in New York State. More than half of these leaders indicated the importance of ensuring a comprehensive K-6 math curriculum aligned with the Common Core Standards as an essential element to increase rate of teacher and student success. The purchase of new mathematics curriculum, and regular and active review of existing curriculum is an ongoing process that participating districts are authorizing to manage the curricular and instructional shifts presented by evolving state standards.

Superintendents and assistant superintendents for curriculum and instruction must engage in directive actions to establish math-learning environments that provide high quality instruction.

Establish a standard to meet instructional goals. Marzano & Waters (2009) associate five district-level responsibilities with effective leadership including the establishment of nonnegotiable goals for achievement and instruction. All of the leaders in this study agreed that centralized guidelines stipulating the expected amount of time purposed for daily math instruction at each grade was the most reliable indicator promoting district consistency of math-learning environments. Further, this time was often described as 'protected' from interruption of instruction. Superintendents and assistant superintendents should prioritize math instruction by presenting the time devoted to this discipline as a formal district guideline that is barred from intrusion of other academics or social emotional learning.

Monitor math-learning environments for effective instruction. The formal teacher evaluation process was acknowledged by 62% of this study's participants as a systems-wide approach to measuring the effectiveness of math instruction. This part of the participating

group of district leaders set high expectations for the observation of teachers engaged in mathematics instruction consistent with the targeted professional development and resources dedicated to committed goals within this academic discipline. District leaders should be deliberate in their guidance regarding observations of elementary mathematics to insure accountability for the implementation of programmatic elements and best practice germane to robust math-learning environments.

Recommendation for Policy

Superintendents and assistant superintendents for curriculum and instruction must engage in advocacy efforts to establish high quality instruction math-learning environments as a priority in New York State.

Advocate for state licensing for elementary math specialists. Currently, the certification requirements to teach reading at the elementary level require professionals to engage in specialized coursework and licensing assessments to be considered highly qualified. This is not the case for math. There is evidence from this study and other research that suggests that elementary teachers are underprepared to teach mathematics in ways that meet the demands of current learning standards in New York State. Superintendents and assistant superintendents for curriculum and instruction should advocate at the local and state levels to create certification requirements to teach math as a specialist at the elementary level (i.e., Math Coach, Academic Intervention Specialist (AIS) for Math).

Summary of Recommendations

The purpose of this study was to investigate how school superintendents in K-6 common school districts in New York State ensured the occurrence of high quality math-learning environments within their respective districts. Although there is support in the

evidence gathered by this research and the relative literature review for all of the recommendations presented in this section, there are clearly five individual leadership charges that emerged as the responsibility of superintendents and assistant superintendents for curriculum and instruction to initiate and lead to advance comprehensive elementary math-learning environments that meet the demands of raised standards in New York: (1) Signify instructional leadership as the core work of district leadership; (2) Collaboratively engage teachers and principals in the implementation of mathematics programming; (3) Provide targeted professional development; (4) Regularly review data to ensure programs are well matched to address student needs; (5) Establish standards to meet instructional goals. These five recommendations fundamentally help district leaders actualize a more conscious effort by educators to develop strong elementary math-learning environments that promote teacher and student success.

Consideration for further study

There are only 17 common school districts in New York State configured within a K-6 hierarchy of grades. Sixty-three percent, 10 of the 16 available K-6 school districts were engaged in this study. Considering that there are 950 school districts in the state of New York including NYC, the ability to make broad generalizations about the findings of this study may be overreaching. However, the findings of this study are corroborated by other research in the field such as Marzano & Waters (2009), and project shared conclusions about the central work of superintendents and its relative impact on the district's instructional goals. Furthermore, the ability for districts to meet the curricular and instructional shifts in elementary mathematics was described by at least three of the participants as evolving. In addition, the nature of the ongoing changes to the Common Core Learning Standards

themselves and the relative New York State Testing Programs can be equivalently depicted (i.e., New Generation Standards).

More research is necessary to explore the impact of superintendents' actions on the effective development of high quality elementary math-learning environments. Ensuring that students are equipped with the requisite skills in mathematics for college and career readiness has been a matter of national concern for over five decades. Future research could examine student achievement levels in mathematics for those districts that have leaders who support rich elementary math-learning environments using similar practices espoused by participants in this study. Additionally, more research could be conducted to identify the impact of promoting equity among the time and resources dedicated to English language arts and mathematics at the elementary level.

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Appendix A

Letter to the Superintendent of Schools
Letter to the Assistant Superintendent/Director for Curriculum and Instruction

Dear (Participant Name),

As part of my doctoral studies at the Esteves School of Education at Sage College in Albany, New York, I am conducting a research study on the well acknowledged and critical issue of perpetual low student math achievement in America. The most recent National Assessment for Educational Progress (NAEP) for mathematics demonstrate that only 26% of students in New York are proficient on this national benchmarking assessment often referenced as "The Nation's Report Card". The purpose of this study is to examine how school superintendents ensure high quality elementary math instruction in their respective districts.

I am writing to request permission to conduct an interview with you and your Assistant Superintendent and/or Director of Curriculum and Instruction. You and your Assistant Superintendent and/or Director of Curriculum and Instruction will be invited to participate in a volunteer capacity.

I will collect data through a single interview with each participant that will take about 1 hour of your time. I hope to meet with each participant in person, but some interviews might be done by telephone (or email) if needed. I will request that all interviews be recorded with the intention of having them professionally transcribed. All participant responses will be kept confidential and stored securely.

This research may provide a more comprehensive understanding about how superintendents and administrators providing oversight for curriculum and instruction can increase the occurrence of high quality elementary math-learning environments. It is my hope that this study will make a constructive contribution to the field of education and benefit educational leaders, teachers, and students.

Please email me if you are willing to participate in this study. If I do not hear from you, I will call you directly. If you have any questions regarding this study, please contact me at evelyce@sage.edu or at (315) 427-0475. You may also contact my Doctoral Advisor, Dr. Francesca Durant at duranf@sage.edu or (518) 292-1835.

Thank you for your consideration of supporting this research study.

Sincerely,

Constance Evelyn

Appendix B

Informed Consent Form
2016-2017

To: _____

You are being asked to participate in a research project entitled **The Effect of NYS K-6 Superintendent Leadership Practices on Elementary Math-Learning Environments.**

This research is being conducted by **Constance Evelyn,** doctoral student at the Esteves School of Education at Sage College in Albany.

The most recent National Assessment for Education Progress (NAEP) for mathematics demonstrates that only 26% of students in New York are proficient on this national benchmarking assessment often referenced as "The Nation's Report Card.". The purpose of this study is to examine how school superintendents ensure high quality elementary math instruction in their respective districts

The data will be collected through a single interview with each participant that will take about one (1) hour of your time. The researcher, Ms. Evelyn, will make every effort to meet with each participant in person, but some interviews might be done by telephone or email if needed. The interviews will be recorded with the intention of having them professional transcribed. All participant responses will be kept confidential and stored securely. The recordings and relative notes will be stored on a password-protected computer and used by the researcher for data analysis only. At the conclusion of the doctoral study, and required maintenance for data storage, all notes will be shredded, audio-recordings destroyed, and data files on the computer will be deleted and further removed from the recycling bin.

Participation is voluntary. There may some questions that you become concerned about answering. It is important to note that all participants can with decline responding to any question at any time. Ms. Evelyn understands that at any time during the course of this study you can revoke your consent and withdraw from the study without any penalty.

I have been given an opportunity to read and keep a copy of this Agreement and to ask questions concerning the study. Any such questions have been answered to my full and complete satisfaction.

I, _____, having full capacity to consent, do hereby volunteer to
participate in this research study.

Signed: _____ Date: _____
Research participant

This research has received the approval of The Sage Colleges Institutional Review Board, which functions to insure the protection of the rights of human participants. If you, as a participant, have any complaints about this study, please contact:

Dr. Donna Heald, PhD
Associate Provost
The Sage Colleges
65 1st Street
Troy, New York 12180
518-244-2326
healdd@sage.edu

Appendix C

Interview Questions and Protocols

I would like to start by asking you about your background.

1. Please share your educational experience including the positions you've held leading up to your current role.

Now, I'd like to move into questions about your system leadership of math instruction in your district.

2. In what ways, if any, are you engaged in curricular and instructional decisions as it relates to math instruction in your district?

3. What led your decision to be engaged in these curricular and instructional decisions?

4. How did you create systemic support that ensures high quality math instruction?

5. How do you decide what resources are needed to ensure high quality math instruction in your district?

6. How do you guarantee consistency of math instruction in your district?

Now, I will ask you to shift your focus to your ability (capacity) to ensure high quality math instruction in your district.

7. What are prime examples of ways that you support the provision of targeted teacher professional development for math instruction?

8. What professional development requirements do you have for math instruction?

9. Is there a long term plan for incremental math professional development and is there accountability for using practices presented within these professional development opportunities?

10. How do you control how much time is spent on math instruction at every grade level in your schools each day?

11. How do you ensure that your district provides support(s) to students who are not grade level proficient in mathematics and how do they access these supports?

12. What is your opinion of the preparedness of teachers to provide high quality math instruction in your schools?

13. What criteria do you use to determine which students qualify for additional math support in your schools and who provides it?

14. Describe how you measure effective delivery of math instruction?

15. Is there something you wanted to tell me about math education in your district that I forgot to ask? Do you have any questions for me?

Thank you for your participation in our interview today. I will be reviewing our interview in the next few weeks. After the interview recording is transcribed, I will invite you to review the typed transcript to check for accuracy. If you have any questions or concerns after our meeting today, please feel free to contact me by email at evelyc2@sage.edu.