Examining Effective Instructional Leadership in Mathematics: A Case Study

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DEDICATION

I wish to dedicate this study to my wife Sarah. She provided me with the encouragement and direction I needed to keep going in the process. She was always supportive, helpful, and willing to reread a portion of my writing and help me wordsmith a portion of my work. She proofread my writing and offered suggestions no matter how many times I asked her to assist me. Sarah took care of the housework, made dinner and made many sacrifices so that I could keep focused on writing. I could not have completed this without her beside me. Her love and understanding in me never changed.

I would also like to dedicate this to my parents. They have always encouraged me to do my best and reach for the stars. Additionally, I would like to dedicate this to my children, Tessa and Alex. I hope that my work inspires them to continue to learn and grow in their lives to achieve success.

Finally, I would like to dedicate this to all my colleagues in the school system for their constant support and encouragement. Also, I wish to dedicate this to Superintendent of Schools, Sandra "Sam" Himmel and Assistant Superintendent, Michael Mullen for believing in me and leading by example. You always inspire me and encourage me in my work. Last, but not least, I would like to dedicate this to Nancy Simon for her willingness to provide me with her candid opinions and professional expertise. I also thank her school staff for their willingness to participate in interviews, participate in focus groups, and provide me with other documents for to use in my study.

ABSTRACT

The researcher has developed a case study using a qualitative research methodology to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics. A Nation At Risk is a report that spawned a reform agenda that challenged teacher effectiveness through the quality of education that students received in public schools. The report revealed that there was a decline in the achievement of students in the United States and concerns with curriculum and teaching (National Commission on Excellence in Education, 1983, April). This study has attempted to uncover the knowledge principals need regarding structures, systems, and practices to best support learning so that they can ensure all teachers, experienced and inexperienced, access these structures and systems. The following research question has been used to guide the study: What leadership practices exist with an elementary principal as those practices influence mathematics instructional techniques and student achievement in a small rural school district? A qualitative case study methodology has been chosen for this study. The research focuses on the organization and processes, not on recording the life stories of the individuals (Yin, 2014). This study provided evidence and support to understand what qualities, skills, and strategies need to be developed with leaders as they work in schools to increase achievement in mathematics. The principal is at the center of directing the operation and function of a school. Marshalling resources, garnering support, and empowering teachers are all part of the daily work of a principal. This will be the work that needs to be done as we continue to look at leadership and its impact on improving the instructional program in mathematics.

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CHAPTER ONE INTRODUCTION

Introduction

"The United States system of public education must lay the foundation for developing a workforce that is literate in mathematics and science" (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2007, p.112). As a nation, there will be an increased need for a highly skilled labor force that is proficient in science and mathematics (Rutkowski, Rutkowski, & Plucker, 2012). Data from the United States Bureau of Labor Statistics is projecting that there will be an increase in the number of occupations in STEM (science, technology, engineering, and mathematics) by more than 9 million between 2012 and 2022 (Vilorio, 2014). Internationally, the global competition will increase for a specialized workforce with background and experience in mathematics (Rutkowski, Rutkowski, & Plucker, 2012). Therefore, students having a strong foundation with mathematical skills will make them more competitive in the global marketplace.

Mastery of math concepts is paramount in educating students today for the world of tomorrow. Data from the Programme for International Student Assessment (PISA) in 2015, which measures the math ability of 15-year-old students in developed and developing countries, found that the United States was 38th out of 71 countries. The Trends in International Mathematics and Science Study (TIMMS) in 2015, which tests students in fourth and eighth grade math, reported that 10 countries out of 48 had a statistically higher score than the United States in fourth grade and seven out of 37 countries in eighth grade. The National Assessment of Educational Progress (NAEP) data from 2015 showed that 40% of the students scored at or above the proficient level, which was only 1% more than the data from 2013. Increasing

achievement in mathematics is an area that needs to be addressed, as it is crucial in developing a strong future workforce.

As a district leader, it is critical to have strong student performance in mathematics so that students obtain quality education and are prepared for careers in the community. The stagnant scores in mathematics are concerning when looking at supports that are needed for schools in leadership, curriculum, and teaching strategies. School leaders must continue to look for which methods are effective and can equip them as they implement change designed to increase student achievement.

The quality of a school is affected by how the internal processes work to improve student achievement as well as instructional strategies in the area of mathematics (Lochmiller, Huggins, & Acker-Hocevar, 2012). One such internal process involves structures constructed by school leadership to support teachers (Youngs, 2007). Feedback, professional development, and collaboration are key components used to support teachers in improving their instructional craft (See Figure 1).
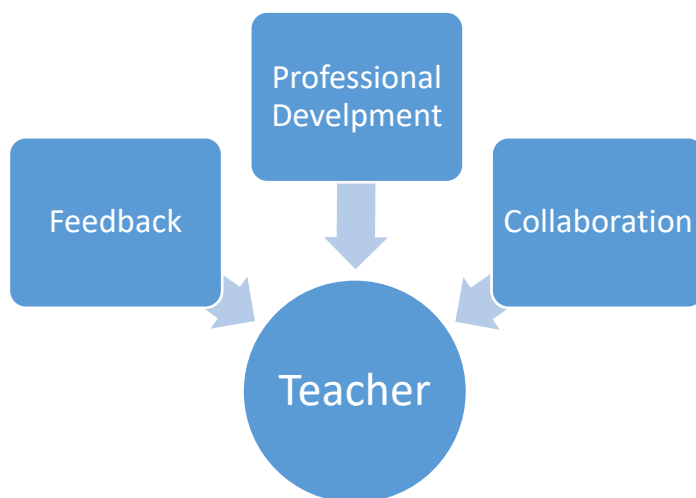
Figure 1
Internal processes to support teachers

Professional development continues to be the fundamental structure to improve the process of teaching and learning mathematical concepts (Polly, Neale, & Pugalee, 2014). Quality professional development as a tool for improving student achievement, and subsequently future generations of workforce, is paramount in the current responsibilities of educational leaders (Mangin, 2007).

Feedback is another key area that supports teacher knowledge and understanding of mathematics content. Leadership focused on providing teachers with authentic feedback regarding instructional strategies is vital (Burch & Spillane, 2003). Leaders that use this in their daily work provide teachers with information about practices that they should keep and those they need to discard. Respectively, feedback can help the teacher be more reflective, one who will improve himself or herself (Sebastian & Allensworth, 2012).

Support and training provided to schools needs to encourage collaborative efforts. Leaders must be aware of their actions and the influence they have on all stakeholders within the educational community (Garrett-Staib & Maninger, 2012). The individuals that work together are under the direction of the principal who works to form a coherent direction for the team (Elias, 2013). Responsible leaders act through building relationships and promoting a democratic community. The theory behind the research is that the leader is a weaver that connects the parts of the organization, not from the center, or by building individual power of the individuals, but rather with a focus on relationships (Stone-Johnson, 2014). The shift of this type of leadership comes from not who is at the center, but what is at the center (Stone-Johnson, 2014).

Providing all stakeholders with a role in supporting the school structure is an essential element of responsible leadership. Working together towards success occurs through collaboration with others towards a common goal. Collaboration with all parties interested in making significant changes to the school community must occur systematically with definite goals and involvement from all parties. Involving everyone in the process and using strengths of the group was part of the reasons for their success (Stone-Johnson, 2014).

The school principal serves as the instructional leader, the primary individual who clarifies the mission and vision of the school to the community and other stakeholders (Mitchell & Castle, 2005). The principal oversees curriculum and instruction and facilitates teachers' professional development to support best practices as well as advocates for a positive learning environment for students (Youngs & King, 2002). School leaders need to become familiar with leadership as a discipline to practice, learn their strengths and weaknesses, and infuse themselves with best practice so they can provide leadership that best fits circumstances that will sustain improvement in schools (Shouppe & Pate, 2010).

Leaders have a direct correlation to the creation of students that are successful and productive members of society (Garrett-Staib & Maninger, 2012). Different problems require different solutions and the leader must be able to make decisions that are connected to what is best for the school community (Larsen & Hunter, 2014). Making meaningful decisions based on mandates occurs by the school principal when attempting to create a balance that is committed to their own core values (Larsen & Hunter, 2014). Following school policy is more than just knowing rules and following them; it is also being aware of the impact on society and those connected to the organization (Hightower & Klinker, 2012). Schools are complex organizations that are challenged with situations that require leaders to understand school needs and make

purposeful plans (Larsen & Hunter, 2014). Schools with the necessary leadership components

such as facilitating school culture, developing teacher leaders, and creating a professional

learning environment are necessary to improve student achievement within a school and support

the internal structures created within the building (Hoppey & McLeskey, 2010).

Theoretical Framework

This research study will use the theoretical framework based on the work of Leithwood

and Louis (2012) which looks at leadership practices and the relationship between the leader

setting direction for the school, the leader developing people, the leader refining the

organization, and the leader improving the instructional program (See Figure 2).

Figure 2
Conceptual framework regarding leadership practices

Factors impacting change

Today's accountability system challenged school leaders to re-examine strategies for improving individual student performance (Shouppe & Pate, 2010). National and state policies have created a focus for schools to improve the educational system (Hopkins, Spillane, Jakopovic, & Heaton, 2013). The No Child Left Behind Act of 2001 (NCLB) initiated a myriad of requirements that focus on accountability through testing and a growing number of reporting documents (Daly, Der-Martirosian, Ong-Dean, Park, & Wishard-Guerra, 2011). NCLB requires all state-level educators to establish academic standards and a state testing system that will meet federal requirements. Mandated laws such as NCLB hold educators, specifically the school principal, more accountable for all students achieving academic success (Shouppe & Pate, 2010). These laws and requirements have significantly increased the pressure to improve student achievement (Burch & Spillane, 2003).

K-12 Educators (especially those working in struggling schools) often feel troubled by what seem to be uncontrollable constraints and stifling demands for accountability coupled with historically being left out of conversations and decisions about change (Schoen & Fusarelli, 2008). Developing a sustainable structure is an essential component for school principals (Winterman, 2008). At the center of this system is the understanding that diversity and alternative approaches to tackling new situations is vital (Edwards, 2010). As principals negotiate methods to improve the K-12 education system, they must hire effective teachers and utilize a shared approach to leading school change (Fisher, 2011). It is understood that this type of change takes time to implement as new teachers are hired to fill vacancies either through attrition or through replacing staff members who are ineffective. Teachers who can create

learning environments that stimulate students to think and increase their desire to learn will have a great effect on developing students to want to learn more (Gardner, 2004).

Changing schools to better meet the educational needs of young people requires not only a change in the core technology of schools-i.e., instructional practice-but all of the subsystems that impact teaching and learning (e.g., school structures and procedures, relationships and ways of working together, leadership, beliefs) (Fisher, 2011). Recognizing that human beings have different values and skills under various circumstances is also important (Gardner, 2004). Current federal priorities continue to be geared toward creating effective schools and emphasize practices such as the use of data to evaluate teacher, leader, and school performance (Grissom, Loeb, & Master, 2013). While the leader influences changes at the school level, they must keep a focus on raising student achievement while balancing national, state, and district policies (Youngs & King, 2002). A leader needs to accept the conditions and recognize how to make change that will be meaningful and long lasting (Fullan, 2001).

The pressure for schools to demonstrate their effectiveness by helping all students achieve proficiency has intensified over the last decade (Daly, Der-Martirosian, Ong-Dean, Park, & Wishard-Guerra, 2011). School leaders and teachers are held accountable for improving student achievement and important to realize is the fact that they are being pulled in a variety of directions as they interpret the mandates and directives being asked of them (Schoen & Fusarelli, 2008). The increased focus on results has prompted an emphasis on the role of teachers in leading school change efforts (Green & Etheridge, 2001). Therefore, school leaders must work collaboratively with teachers and staff to create sustainable change (Shouppe & Pate, 2010). When teachers work collaboratively with others, effective change efforts can occur. Employing empowering strategies to engage teachers in working collaboratively for the betterment of the

school can affect change over time (Fink & Brayman, 2006). Using a comprehensive strategy of influence is most effective over a long-term period of time (Edwards, 2010).

Problem Statement

Over time in the United States, the K-12 public educational system has been under a great deal of scrutiny regarding effective instructional practices of teachers as well as the leaders who evaluate them. Due to changes in the world and the requirements of work, there is a need for higher levels of educational achievement in the areas of science, technology, engineering, and mathematics (William, 2016). A Nation At Risk is a report that spawned a reform agenda that challenged teacher effectiveness through the quality of education that students received in public schools. The report revealed that there was a decline in the achievement of students in the United States and concerns with curriculum and teaching (National Commission on Excellence in Education, 1983, April). The No Child Left Behind (NCLB) Act of 2001 was reform legislation focused on improved student learning through the effectiveness of teachers and leaders. NCLB focused on holding key stakeholders accountable for student academic success.

In 2002, the No Child Left Behind (NCLB) Act offered financial incentives to states that administered annual achievement tests to students in grades 3-8 (Levine & Levine, 2013). These assessments would initially be used to determine how well students were mastering the standards in reading and mathematics. Many tests are given annually to students in an attempt to verify what learning had taken place. How a student performs on a standardized test on a particular day, no matter how demanding the test, can only provide a snapshot of a student's potential. The American Recovery and Reinvestment Act of 2009 signed into law by President Barack Obama on February 17, 2009 provided $4.35 billion for the Race to the Top (RTTT) fund- a competitive grant program designed to encourage and reward states that were creating the conditions for

education reform (USDOE, 2009, p.2). As states began to create policies to receive funding, the face of teacher evaluation began changing. The states' departments of education placed an enormous amount of trust in the assertion that high-stakes test results were accurate portrayals for determining the success of schools and teachers in raising the achievement level of students.

Evaluating teachers should be designed for two purposes: measuring teacher competence and fostering professional growth (Weems & Rogers, 2010). In looking at the functions of an effective evaluation system, it is critical to ensure that a high-quality system is in place that measures what it is supposed to measure. Originally, a teacher could be deemed successful based on the years of experience in teaching, number of degrees that were acquired, and the number of professional development courses that the teacher participated in over the years (Weems & Rogers, 2010). Consequently, the goal of accountability is to improve the educational system and subsequently have a direct impact on teaching and learning and student achievement. (Opfer, Henry, & Mashburn, 2008).

States have moved toward standards-driven accountability systems based on student performance at an unprecedented level, while at the same time restructuring efforts have gained momentum and driven leaders toward vast change. Leaders are looking at ways to improve teaching and learning with a focus on not only what is happening in the classroom, but also how learning is taking place. Understanding what instructional practices need to be evident in math and science classrooms are also part of a leader's quest for improving classroom instruction (Lochmiller, Huggins, & Acker-Hocevar, 2012). Standardized testing in the United States has served different purposes. These include evaluating and improving educational quality (Brookhart, 2013). The focus is connecting the assessment to the quality of teaching that is occurring in the classroom. Some high-stakes tests provided information annually and cannot

sufficiently serve as a sole source for all assessment purposes. These tests did not and could not inform moment-to-moment, day-to-day, and week-to-week instructional decisions faced by students, teachers, and parents.

One area that has been targeted by policy makers and educators is mathematics. This is true in all schools, including those in rural and urban areas that serve students living in poverty. Mathematics scores in the United States lag internationally and the US Department of Education and state agencies have called for increased achievement in mathematics. The Program for International Student Assessment (PISA) results indicate that the United States ranks in the bottom half of mathematics achievement of the 72 nations and regions that participate. The National Assessment of Education Progress (NAEP) also showed a downward trend in mathematics scores of the 4th and 8th graders who too this test.

Elementary principals in rural elementary schools with high levels of poverty continue to look for research regarding how to support their schools (Rutkowski, Rutkowski, & Plucker, 2012). It is important to review and understand what constructs are in place for building level principals to support teachers in schools. As standards in mathematics become more rigorous, it is necessary for the leader to understand how to influence the developing structures to support school teams.

School leaders need to know how to support teachers, not only to continue to improve student achievement in mathematics, but also to sustain high levels of learning. It is a worthwhile endeavor to evaluate what support systems are in place for teachers, and what appear to be most effective. Schools that create support systems for students in mathematics are more likely to see higher student achievement in mathematics. Improving the educational

performance of schools through effective leadership practices is necessary for creating

improvement practices. (Grissom, Loeb, & Master, 2013)

Understanding how to negotiate leadership strategies, professional development for

teachers, and building school capacity for teaching and learning will be a challenge that needs to

be addressed (Youngs & King, 2002). Principals need to have a knowledge base of structures,

systems, and practices to best support learning so that they can ensure all teachers, experienced

and inexperienced, access these structures and systems.

Conceptual Framework

The conceptual framework of Leithwood and Louis (2012), sets the foundation for

understanding how each of the components work together to support teaching and learning

(Figure 3). This figure is used to show the relationship of the conceptual framework to the

leadership structures and practices that are examined in the study. Each of the components of the

framework will be discussed below to assist in seeing the connection between how each of the

components in the framework interact with each other.
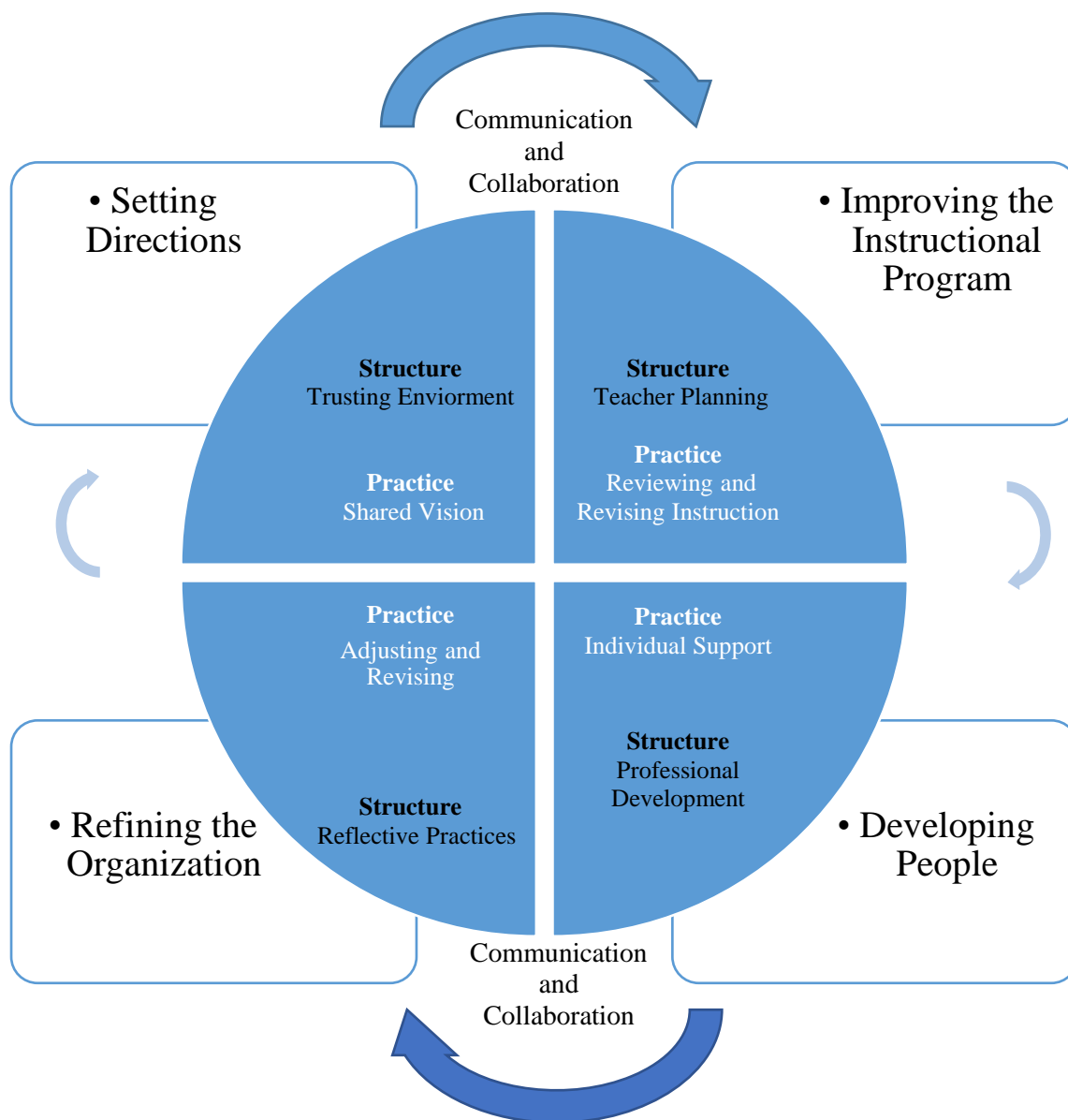
Figure 3
Conceptual framework and the relationship to leadership structures and practices

Structures created by school leaders to support teaching and learning are a trusting

environment, professional development, common teacher planning, and encouraging reflective

practice (Youngs & King, 2002). These are embedded as a part of each core leadership practice

and work in tandem with the others under the leadership of the principal. The simultaneous actions occur and are carried out through direction from the school principal (Giles, 2007).

Communication and collaboration are essential elements that occur concurrently within the flow of the organization (Youngs & King, 2002). For schools to be successful, changes must take place in the structure of how decisions are made, in the instructional strategies used as well as collaboration among stakeholders. Teachers indicate the importance of their role as a way to support the culture of learning in the schools and to develop their skills in communication, collaboration, and instructional expertise (Stumbo & McWalters, 2011).

Principals understanding effective instructional practices and conveying their knowledge to staff is a fundamental practice in schools (Katterfeld, 2013). It is certain that principals are searching for ways to assist teachers with improving teaching and learning. Providing teachers with feedback is another component used by school leaders to support teaching and learning (Grissom, Loeb, & Master, 2013). Feedback provided to the teacher is an important component that should occur to communicate strategies and support regarding the teaching practices that are observed. Providing a common vision and integration and alignment of resources supports shifting teacher beliefs about mathematics towards the adopted curriculum (Hopkins, Spillane, Jakopovic, & Heaton, 2013).

Setting direction, improving the instructional program, developing people, and refining the organization are the guiding principles that are used to frame the concept of leadership. Leithwood and Louis (2012) describe these core ideas as necessary in achieving the school targets. These core ideas will be used to develop the design of school leadership and the relationship to mathematics achievement.

Consequently, it is necessary to identify what these structures and practices are, and how they are implemented. Schools and districts across the nation are looking for ways to improve mathematics teaching and learning (Campbell & Malkus, 2011). When creating change within a school, the principal is a critical component of implementing and sustaining change over time (Shouppe & Pate, 2010). The problem to address is understanding what design structures are used to increase student achievement in the area of mathematics. For this reason, the purpose of this qualitative case study is to understand the behaviors, actions, and systems a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

Purpose

The purpose of this study is to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics. The impact a principal has on a school is significant and can have a profound impact on setting direction, developing people, improving the instructional program, and refining the organization. A review of research suggests the principal of the school has significant impact on improving student achievement (McGuigan & Hoy, 2006). Therefore, it is critical to understand the behaviors, actions, and systems a principal has utilized to develop instructional capacity and a culture for high achievement in mathematics.

The leader is defined by his or her attributes, knowledge, and skill, while leadership is the influence of the leader on the organization (Dinham, 2007). Instructional leadership can be defined as leadership actions that support the classroom teacher and student learning (Grissom, Loeb, & Master, 2013). The principal allocates and protects instructional time with school policies and procedures and works with teachers to coordinate the curriculum through aligning

school goals and objectives with standards, assessments, and district curriculum. Finally, the relationship between principal leadership and instruction to school climate and student achievement shows direct influences through providing support to teachers in classrooms and indirect influences such as improving the professional capacity of the staff or creating a positive school climate (Sebastian & Allensworth, 2012).

According to Leithwood & Louis (2012), principals guide and support the teaching and learning at a school so there is improvement of teaching practices. School leaders have the responsibility to make certain that math instruction is happening in classrooms routinely (Burch & Spillane, 2003). The emphasis of a leader's efforts in a school is to ensure that the staff understands the priorities and is willing to work towards the goals defined by the school team and school leadership. Taylor & LaCava (2011) found that effective principals in Title 1 schools have a focus on targeted changes and monitoring, which is believed to be the reason for improvement of student achievement.   It is necessary for school leaders to not only demand high standards but respond to the differing needs of the school staff.

Therefore, a framework to increase learning requires strong leadership. Specifically, schools must look to the school leader, the principal, as the person responsible for overseeing teaching and learning. In essence, school principals must create environments where effective instructional strategies are implemented as part of daily teaching practices. A close look at the leadership practices that are evident in the school structure will help provide understanding of what these practices are and how they impact mathematics achievement at a rural elementary school in Florida. The purpose of this study is to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

Significance of the Study

With new academic standards and a more rigorous assessment, teachers and leaders have a very challenging, demanding job ahead of them. Technology provides systems and resources for accessing and acquiring up-to-date knowledge, tools, and processes for communicating mathematics. The need to not only understand the complexities of mathematics, but how to use mathematics will continue to emerge, both in the classroom and in the workplace. Throughout the last one hundred years, mathematics education has been a subject area that has most resisted coherence (Kilpatrick, Swafford, & Findell, 2001). While teachers cannot build this consensus alone, their intimate knowledge of the needs of the students gives their teaching groups the best chance at resolving conflict. Understanding how students learn and master mathematical concepts provides a vehicle for supporting teaching and learning (Turner, Warzon, & Christensen, 2011). Equally important is the fact that school leaders must have knowledge of effective teaching of mathematics and be able to know what instructional support needs to be provided (Ketterlin-Geller, Chard, & Fien, 2008).

Through interactions of leaders and classroom teachers, new perspectives about necessary improvements in curriculum can be explored (Burch & Spillane, 2003). A research study from Koellner (2011), reported that mathematics instruction and professional development have been at the forefront of educational reform efforts to significantly improve student achievement. Planning and preparing high-quality lessons is seen as an integral part of the preparation for instruction in mathematics. It is important to understand how principals determine what areas to focus on within their school buildings and how to use strategies to significantly impact student achievement (Mangin, 2007). With this in mind, school leaders understand the need to build specific learning structures that focus on teaching and learning

(Mitchell & Castle, 2005). These structures serve as an anchor for the learning activities that take place in the classroom (Mitchell & Castle, 2005). Youngs and Bruce (2002) support the belief that in order to increase student performance the entire teaching staff must work collectively.

Understanding how principals determine support for teachers and the role they play in supporting the school structure is important to study. School level policies and procedures are also important to study in building the capacity of school teams to improve student achievement. School leaders must support their efforts by clarifying each school's vision for the well-educated child and marshaling the school's resources towards that goal. The use of practical leadership practices contributes to an impact on mathematics achievement (Shatzer, Caldarella, Hallam, & Brown, 2014). Meeting with teachers to discuss student needs, organizing the school day to limit interruptions into the classroom, providing clear expectations for teachers, and recognizing students for academic achievement are a few examples of how leadership strategies can be leveraged in a school setting (Shatzer, Caldarella, Hallam, & Brown, 2014).

Principals and other educators must continue to research which methods are effective and equip others as they implement change designed to increase student achievement. School leaders are under an educational microscope since they are held accountable for the schools' meeting established performance standards. The role of the principal is ever changing and understanding how leaders influence mathematics instruction is important to address.

Setting

This school was chosen as it faces challenges common to many schools, yet still has high performance. The setting for this study is a high-performing school with a relatively inexperienced staff and a high population of students on free and reduced lunch. According to

the Florida Department of Education (2017) the school has maintained achievement in

mathematics that is above the district and state averages for the past five years. This particular

school has also been designated an "A" since the school opened in 2008 according to the school

accountability report (Florida Department of Education, 2017). At this school, they have hired

an average of 11 new teachers per year and currently have 33 teachers with three years'

experience or less out of 56 total teachers in the school. The number of students on free and

reduced lunch has increased from 60.2% in 2013 to 65.1% in 2015. (Florida Department of

Education, 2017)   The principal was selected to open the school in 2008 and she designed the

structures and procedures with the staff that she had the autonomy to hire. The organizational

structure, programs, and teacher strategies were analyzed as they relate to the leadership

strategies used by the principal at the school.

Research Questions

The purpose for this study is to understand the practices a principal in an elementary

school in rural Florida has utilized to develop instructional capacity and a culture for high

achievement in mathematics.

Overarching Question: What leadership practices exist with an elementary principal as

those practices influence mathematics instructional techniques and student achievement in a

small rural school district? The following sub-questions were used to answer the overarching

question.

1. What leadership practices are exhibited by an elementary school principal in setting

direction to design curriculum in mathematics?

2. What leadership practices are exhibited by an elementary school principal in

improving the instructional program in mathematics?

3. What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

4. What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?

Definition of Terms

Belief Systems

Belief Systems are structures and processes that shape the environment which are based on the teacher's background and knowledge (McGuigan & Hoy, 2006).

Distributed Leadership

Distributed leadership is the "allocation and sharing of leadership tasks by principals" with staff members (Leithwood & Louis, 2012).

Instructional Leadership

Day, Gu, & Sammons (2016) stated that "instructional leadership is said to emphasize above all else the importance of establishing clear educational goals, planning the curriculum, and evaluating teachers and teaching."

Mathematical Proficiency

Mathematical Proficiency is comprised of five components that are "interwoven and interdependent" which include adaptive reasoning, strategic competence, conceptual understanding, productive disposition, and procedural fluency (Kilpatrick, Swafford, & Findell, 2001).

School Improvement

School improvement is the process of educational change focused on providing an objective for improved professional practice (Mitchell & Castle, 2005).

Transformational Leadership

Day, Gu, & Sammons (2016) define transformational leadership as "an emphasis on vision and inspiration, focus on establishing structures and cultures that enhance the quality of teaching and learning, setting directions, developing people, and (re)designing the organization.

Summary

Both federal and state mandates are guiding educational strategies and decisions made daily by school leaders. Virtually all states, including Florida, are not only setting more demanding expectations, but also changing the focus from input to results. A Nation at Risk (1983) was published by the National Commission on Excellence in Education. This federal report sounded an alarm that demanded rapid improvements in public education. Secondly, Goals 2000: Education America Act (1994) was passed, heralding the standards movement. No Child Left Behind Act (2001) was enacted, extending the standards movement to include federal accountability for schools. Finally, Race to the Top created a focus on teacher accountability as it related to student achievement. It is imperative that students have equitable access to a quality education necessary for them to be successful adults and ready for the world of work.

Chapter 2 provides the research based on the theoretical framework of Leithwood and Louis (2012). Each section describes in detail the research practices that are evident in each component of the framework. Setting direction, developing people, refining the organization, and improving the instructional program are the components that are embedded within the framework. A thorough discussion of each component of the framework was explored.

CHAPTER TWO LITERATURE REVIEW

Chapter 2 provides an extensive review of the literature and research related to the practices a principal uses to develop instructional capacity and a culture for high achievement in mathematics. The conceptual framework of leadership practices based on the work of Leithwood and Louis (2012) provides the foundation for each area to be discussed. The first section provides an overview of how a leader sets the direction for a school in designing curriculum to meet the needs of the organization. The second section focuses on improving the instructional program through describing research and best practices related to mathematics instruction. The third section describes how leaders develop people within the organization. The final section describes how leaders refine the organization and create efforts for change.

Setting Direction

Setting direction for the school is significant for leaders as they construct vision and mission with staff and monitor the focus as part of their leadership practice (Leithwood, Patten, & Jantzi, 2010). Understanding how to mediate staff, parents, and community members towards a common focus is a skill needed to ensure the aim of the institution (Fisher, 2011). Alignment of the school's vision to the culture and shaping the environment to maximize staff potential are critical components of how leaders provide direction and focus for a school (Winterman, 2008). The areas of vision, culture, leadership, distributed leadership, and collaboration were discussed as they relate to setting direction.

Vision

As a leader of a school, it is important to set the direction of the school and align the school's context with the vision (Winterman, 2008; McGuigan & Hoy, 2006). A well-developed vision provides teachers with the aptitude of how to implement school-based expectations.

(Katterfeld, 2013) Finding ways to ensure the people within the organization have a strong sense

of trust, creating structures that promote teaching and learning, and connecting staff with

effective training are essential tasks for leaders (Youngs & King, 2002). Leaders create a shared

vision with staff to facilitate a climate of change (Shatzer, Caldarella, Hallam, & Brown, 2014).

Moreover, "structure and conditions can strongly shape new teachers' experiences' as well as

provide the necessary learning climate for all students (Youngs & King, 2002. p.665; Sebastian

& Allensworth, 2012).

When leaders clearly communicated expectations for mathematics instruction, teachers

understood the expectations and could see the correlation with instruction and district initiatives

(Katterfeld, 2013). Katterfeld's research suggested that the influence of the leader is beneficial

in providing a guide towards teacher effectiveness. The principal has the responsibility of

improving teacher effectiveness and instructional methods that focuses on the principal

supporting their staff to lead trainings and support change efforts (Winterman, 2008). Setting the

direction is a fundamental component used by the principal to guide the school for success

(McGuigan & Hoy, 2006). It is necessary for leaders to communicate the purpose and plan of

the organization (Fullan, 2005).

One author who identified essential elements for creating a learning organization is Peter

Senge (2006). Senge's The Fifth Discipline influenced thinking about teacher collaboration

because it described the necessary ingredients for creating the "learning organization", an

organization in which workers are committed to the vision. Senge emphasized that commitment

is a choice that all workers—in this case, teachers--should and would make individually. The

reason that they would choose to support the school's shared vision is because their very

existence as a teacher is tied up with the fulfillment of that vision. Ultimately, they believed that

the school's mission was worth their total personal dedication. Senge added, however, that the methods that an organization followed to achieve that mission were also critical to gaining the employees' commitment. Developing a common vision with staff for improving mathematics instruction is a collaborative process that will have a significant effect on student achievement (Shatzer, Caldarella, Hallam, & Brown, 2014).

Culture

School culture is set by the principal through articulating goals and expectations (Leithwood, Patten, & Jantzi, 2010). Strong leadership in schools is more likely to create a culture of a strong learning environment for students (Sebastian & Allensworth, 2012; McGuigan & Hoy, 2006). The varying needs of the school, interests from outside agencies, and other influences create the climate of the school (Fisher, 2011). Evidence also points to the fact that schools with strong learning climates are more likely to have high quality instruction (Sebastian & Allensworth, 2012).

Belief systems focused on increasing student achievement are correlated to strong leadership within a school (Burch & Spillane, 2003; Mitchell & Castle, 2005; Sebastian & Allensworth, 2012; Shouppe & Pate, 2010). Focusing the culture on students that achieve at high levels is a critical element when implementing high expectations for students and staff (McGuigan & Hoy, 2006; Taylor & La Cava, 2011;). Building a culture of teaching and learning is an important standard, which places responsibility on principals for developing, advocating, and nurturing a culture that is conducive to student learning and staff professional growth (Donaldson, 2013; Katterfeld, 2013). As noted by Shouppe & Pate (2010), there is a strong correlation between principal openness and school climate. Principal openness refers to an environment, which allows for collegial staff relationships and a lack of principal restrictiveness.

Understanding the influence of school climate continues today due to the significant impact it can have on those learning and working within a school (Shouppe & Pate, 2010).

Creating effective school culture is one of the tools leaders might utilize to impact curriculum change (Winterman, 2008). There are a multitude of effects of school leadership on student achievement and the impact on school culture (Kythreotis, Pashiardis, & Kyriakides, 2010). One dimension that is directly correlated to student achievement is the ability of principals to clearly indicate expectations and provide rewards for teachers when those are met. The complex and ever-changing school environment provides its own set of challenges when trying to meet the needs of the staff and create a high-quality learning situation for students. (Shatzer, Caldarella, Hallam, & Brown, 2014)

School cultures are different depending on the culture in the building, and it truly depends on the structures that the leader sets for the school and the expectations that the leader lays out to the staff. A unified framework of a faculty has the capability to strengthen student performance that can be described as school organizational capacity. Focusing initiatives within school parameters on the individual needs of the students within the building gives teachers an opportunity to work collaboratively toward improving the quality of their classrooms. (Youngs & King, 2002).

Leadership

Principals influence the school staff by providing leadership to guide efforts in improving student achievement (Winterman, 2008). According to the research by Sebastian & Allensworth (2012), there is a direct effect of leadership behaviors on student achievement. Leaders that they provide one-on-one classroom support and modeling of lessons and develop teachers within the school will increase student achievement. Through monitoring instruction and assessments

during the year, leaders were personally invested in the change. A closer, direct effect on achievement may be achieved by principals who supervise and support teaching and learning within the classroom. (Taylor & La Cava, 2011)

Building capacity in an organization's people not only includes increasing their knowledge and skills, but also includes nurturing their ability to apply those skills in new and challenging circumstances. Principals leverage their ability to impact teachers by providing leadership opportunities in curriculum development. (Urick & Bowers, 2014) Leaders must be able to listen carefully to teachers and understand the support they need with regards to mathematics instruction (Burch & Spillane, 2003). Nelson (2010) confirmed that it matters what principals know and believe about mathematics relative to how it is learned and how it should be taught. Successful leaders clearly, confidently, and passionately visualize the results they intend to achieve before they attempt to lead others forward.

Principal leadership is connected with a focus on improving instruction and looking at student outcomes to determine increased student achievement (Sebastian & Allensworth, 2012). Principals are responsible for the overall operation of the building. Duties and responsibilities of the principal have changed over the course of time; however, the role of principal has always been and continues to be crucial to the effectiveness of schools.

Principal leadership is connected to the principals' area of expertise and understanding of leadership strategies (Sebastian & Allensworth, 2012). Sebastian and Allensworth (2012) also found that principals had a certain set of beliefs or ideas that helped guide the day-to-day operations of the school. This means that work must be done towards closing the achievement gap of student learning, treating people with respect, and continuing to contribute to the social environment or school structures (Bush, 2011). The findings also suggested that the leaders in

these schools created a sense of vision and purpose that was focused on high student achievement (Nash, 2010). Creating teams consisting of parents, teachers, and administrators working together collaboratively to guide the direction of the school will address the meeting of student needs (Winterman, 2008). The role of the principal as a leader is so complex that it would be impossible to carry out without employing research-based strategies in their daily work with staff.

Distributed Leadership

There is a need to distribute leadership practices and create a sustained focus on strategies for improvement of teaching and learning (Heck & Hallinger, 2009). Distributed leadership can be defined as how the principal, teachers, and members of the school improvement team work together to develop the school. The principal, first of all, must communicate the vision of how distributed leadership clearly ties the work of the staff together. He or she must explain how a specific classroom teacher's analysis of data is, for example, connected to the work that the assistant principal and a guidance counselor do to set goals for individual students.

Distributed leadership and collaboration efforts among staff incorporated into the daily operation of a school are crucial components for school leaders to use (Heck & Hallinger, 2009; Shatzer, Caldarella, Hallam, & Brown, 2014). The principal must also know the staff well enough to take advantage of the specific expertise that they have or individual relationships that they have with the students. Just as importantly, staff may see themselves as impacting the group, making important curriculum decisions which will, in turn, strengthen their teaching skills (Youngs & King, 2002). As a group, they also pool their expertise, strengthening the rigor of the discussion.

When people perceive stronger distributed leadership, then schools are able to improve their academic capacity (Heck & Hallinger, 2009). Creating a sustained focus on strategies through the use of distributed leadership is also found to be effective (Heck & Hallinger, 2009). As schools build improvement plans in mathematics and create focus areas, it is necessary to ensure that leadership is distributed so that everyone has a vested interest in improvement. As a result of the study, Heck and Hallinger (2009), found that principal stability showed a small, but statistically significant positive effect on teachers' perceptions of changes. As schools evolve, it is important to recognize the need for school leadership teams to have time to implement planned change. Involvement of varied school leaders can reconcile the efforts of reforms in mathematics instruction through including leaders beyond those in traditional leadership positions (Burch & Spillane, 2003). If a leader expects his or her organization to produce acceptable results, he or she must take a thorough and critical look at the design of the organization for which he or she is responsible and make structural changes, which will maximize the environment and its workings to ensure involvement of others. Efforts to build leadership capacity are shown through distributing leadership responsibility and providing time for groups of educators to meet. (Vale, et al., 2010)

Collaboration

There are many demands placed on schools today, but the ability for leaders to provide opportunities to share and collaborate is crucial in increasing student achievement (Yager & Yager, 2011). It is the leader's skill to influence, guide, and set expectations for teachers within the school. Creating this type of atmosphere will nurture the learning community within the school structure. Facilitation techniques by the principal and school leaders are imperative in

working with staff to provide collaboration for developing instructional strategies. (Yager &
Yager, 2011)

Building collaborative structures to enable networking, collaboration, and staff learning
can strengthen school culture (Sun & Leithwood, 2012). Research from Vale, et al (2010)
confirmed that the collective efforts of all stakeholders to develop collaborative structures to
support the implementation of effective teaching practices in mathematics were effective (Vale,
et al., 2010). Providing structures for collaboration and reflection of practices by teachers
through coordination of the school leadership team is used to build the capacity of the teaching
staff (Heck & Hallinger, 2009; Youngs & King, 2002). Creating time for teachers to problem
solve and learn from each other is another essential element of collaboration (Turner, Warzon, &
Christensen, 2011).

Sebastian and Allensworth (2012) report that teachers that work collaboratively with
other faculty members and engage in reflective dialogue with their colleagues have higher
academic demands. The implications for developing a collaborative work environment are noted
as to specifically how a leader is to balance the expectations of the state-mandated testing and
accountability measures and ensuring that quality instruction is occurring in classrooms
(Dinham, 2007). When the faculty works together to focus on increasing student achievement,
there is a more unified sense of efficacy (McGuigan & Hoy, 2006). Creating opportunities for
teams to collaborate and work together is significant for school success (Winterman, 2008).

Improving the Instructional Program

The instructional program is focused on the core processes of teaching and learning
(Leithwood & Louis, 2012). It is necessary to have an understanding regarding the research
connecting ways to improve instruction. Understanding instructional practices can inform and

guide decisions that leaders make in schools (Katterfeld, 2013). It is important to realize the fact that leaders involved in reform activities related to mathematics can assist the faculty to understand methods for improvement (Burch & Spillane, 2003). Instructional leadership, building teachers knowledge, and school improvement are elements that will be defined as they relate to improving the instructional program.

Instructional Leadership

Instructional leadership behaviors have significant impact on the technical core of the school. Instructional leadership is comprised of what it is theorized that principals need to concentrate on to ensure high academic achievement. Inherent in the concept of instructional leadership is the notion that learning should have top priority while everything else revolves around the enhancement of learning. Effective principals must know what is going on in the classroom and understand how to make improvements within the school structure (Mitchell & Castle, 2005). The expectations that principals place on teachers is directly correlated to how teacher effectiveness is increased (Donaldson, 2013). They also take the initiative, anticipate and recognize changes in their organizational environment, and begin to explore possible courses of action to respond to those changes. In fact, an aim on student gains in achievement is a focus for leaders in districts and schools (Taylor & La Cava, 2011). Better performing schools develop structures that provide principals with time to support teachers on instructional practices as part of their daily work (Burch & Spillane, 2003; Grissom, Loeb, & Master, 2013; Mitchell & Castle, 2005;).

Instructional leadership provides the basis for the specific practices that administrators not only need to think about, but specifically need to perform (Shatzer, Caldarella, Hallam, & Brown, 2014). The instructional leader needs to work collaboratively with staff to define shared

goals for the school year. The leader needs to monitor and provide feedback on the teaching and learning process as it relates to the specified, shared goals (Grissom, Loeb, & Master, 2013). Finally, it is the instructional leaders' responsibility to provide resources and professional development opportunities that help the staff reach goals.

The instructional leader's repertoire of instructional practices and classroom supervision offers teachers the needed resources to provide students with opportunities to succeed and improve the instructional program. The leader helps teachers use current research in best practices and instructional strategies to reach school goals for student performance through coaching and content support in mathematics (Campbell & Malkus, 2011; Mangin, 2007; Hopkins, Spillane, Jakopovic, & Heaton, 2013). School leaders that focus on the use of instructional strategies and providing feedback to teachers have increased student achievement (Donaldson, 2013; Grissom, Loeb, & Master, 2013). In the current research, characteristics of instructional leadership include, but are not limited to, providing incentives for students and staff, maintaining visibility, and protecting classroom instructional time (Shatzer, Caldarella, Hallam, & Brown, 2014). With schools facing increased pressure to improve teaching and learning, effective principals must accept responsibility for practices that improve student achievement with a focus on teaching and learning with their staff (Mitchell & Castle, 2005).

Building Teachers Knowledge

Principals can reinforce teachers' knowledge and skills by connecting teachers to independent expertise, creating opportunities for staff to share their expertise, and developing trusting relationships (Youngs & King, 2002). Mathematical learning is an issue that needs to be addressed with teachers in understanding the content they are teaching, but at a much deeper level (Burch & Spillane, 2003; Sheldon, Epstein, & Galindo, 2010). There is a strong correlation

between teachers' content knowledge and the mathematical practices (Polly, Neale, & Pugalee, 2014; Puchner, Taylor, O'Donnell, & Fick, 2008; Wilkins, 2008;).

As school leaders work with the staff providing feedback and support, this would assist with changing a teacher's knowledge regarding mathematics instruction. Providing staff with training on implementing mathematics skills and techniques are integral parts of building teacher's knowledge (Burch & Spillane, 2003). Teachers also need to have an understanding of how to help students solve problems not just memorize facts (Stein & Kaufman, 2010). Research has also shown that teacher learning related to mathematical knowledge for teaching and pedagogies revealed a significant increase in the use of cognitively-demanding tasks (Polly, Neale, & Pugalee, 2014)

School Improvement

The phrase "school improvement leadership" is directly related to the cause-effect relationship between a leader's strategies, school activities, teacher practices, and growth in student achievement (Heck & Hallinger, 2009).   These components fit together to provide a cohesive system that promotes a deep understanding of effective mathematics instruction. Research studies indicate that student discourse in mathematics builds students understanding of mathematical concepts (Katterfeld, 2013; Puchner, Taylor, O'Donnell, & Fick, 2008). Furthermore, it has been noted that the use of student talk in a lesson can increase mathematical knowledge and understanding (Franke, et al., 2009).

The following instructional strategies have been noted to be effective with students: visual and graphic depictions, systematic and explicit instruction, student think-alouds, and peer-assisted learning (Ketterlin-Geller, Chard, & Fien, 2008). In a study about leadership content knowledge in regard to improving mathematics teaching, there was a direct effect on principals'

goals for mathematics instruction and the approach to the supervision of teachers (Nelson, 2010; Shatzer, Caldarella, Hallam, & Brown, 2014). In effect, there is congruence between the administrators' understanding of mathematics instruction and the teachers' perceptions in terms of leaders understanding what content is expected at each grade level and promoting and supporting change that improves teaching and learning (Grissom, Loeb, & Master, 2013).

Teaching that supports the development of mathematically proficient students implies the need for frameworks and guidance for teachers to provide standards-based instruction to students (Katterfeld, 2013). Teachers need to see a picture of high-quality instruction and how to implement such instruction (Kretlow, Cooke, & Wood, 2012). Teacher planning to implement this type of instruction is an essential component that needs to occur. Key elements of high-quality instruction emphasize the need for developmentally appropriate mathematics goals, activities that engage students with the mathematics content, and a learning environment that supports and challenges students with attention to appropriate questioning and sense-making.

The principal's role as a leader in the area of instruction, engaged in school improvement, has changed into one in which everyone is empowered to participate in the learning process (Bloom & Owens, 2013). It is important that the principal sets the course for the school to follow and that the actions of the staff are supported along the way. Principals who showed greater student achievement at their school sites were noted as allowing teachers flexibility in being creative and innovative in their approaches to teaching and learning. They also were able to inspire others to help set goals and close the achievement gaps that existed. The principals also found it was necessary to set high expectations for the low socioeconomic and minority students. (Nash, 2010) Research states that in order to be a leader today, administrators need to

empower staff to create a climate that is conducive to learning and achievement (Sheldon, Epstein, & Galindo, 2010; Heck & Hallinger, 2009; Winterman, 2008).

Developing People

Providing support and developing skills in people to accomplish goals for the school are key components of capacity building (Leithwood & Louis, 2012). As such, equipping people with knowledge, skills, and dispositions can lead to sustained improvement (Youngs & King, 2002). School leaders have the ability to improve teaching and learning through strategic professional development and training (Donaldson, 2013). Transformational leadership, professional development, learning community, and feedback will be explained in regard to how to develop people within an organization.

Transformational Leadership

Transformational leadership can be defined by how a principal communicates mission, encourages development with staff, and creates community through teacher empowerment (Urick & Bowers, 2014). A leader has the ability to directly influence people within a school community. Developing transformational leadership capacity within a school has shown gains in student learning and changes in teacher practice. Specifically, the importance of setting high expectations for students and staff, communicating a clear vision, and developing the school culture were considered important findings from this study. (Vale, et al., 2010)

Transformational leadership may or may not bring about second order change (Taylor & La Cava, 2011). Second-order change can be defined as major changes in organization, structure, school culture, curriculum and instruction, and assessment. Second-order change involves a complete change in the way one acts. Unlike first-order change in which one may attest to a need to change, a second-order change occurs when a new behavior replaces the old

behavior. In the case of transforming the staff of a school from a group of individuals to a

learning community, second-order change must occur.

Transformational leaders create a common vision, establish consensus, and inspire others

to follow the vision (Shatzer, Caldarella, Hallam, & Brown, 2014). These leaders build on a

need for meaning among followers in the workplace. Transformational leaders think mainly of

the mission and strategies of the organization and how to achieve them. A school administrator

who strives to be a transformational leader fosters growth of the stakeholders and enhances their

goals. This approach helps to bring about greater professionalism and an appropriate attitude of

responsibility within the school. A school leadership team can impact transformational efforts

through outlining clear expectations and defining practices (Yager & Yager, 2011). According

to Bush (2011), when these efforts work well, they can have the potential for all stakeholders to

be vested towards the aim of student achievement.

Some of the research reviewed investigated how the role of the principal has changed

over time from that of a manager, then to an instructional leader, and finally to the

transformational leader (Kythreotis, Pashiardis, & Kyriakides, 2010). According to Bush (2011),

transformational leadership is similar to the collegial model as it assumes that leadership at the

school and staff share values and common interests. Most of the information written about

transformational leadership includes at least the dimension of charisma (Sun & Leithwood,

2012). Providing the school staff with inspiration and motivation are key components of how

charisma is evident. These leaders use this dimension to help lead and guide the staff. Equally

important is the fact that the principal operates the school in a way that teachers perceive as

enabling their work, understanding the demands placed on the staff and having concern for staff

(McGuigan & Hoy, 2006). An effective principal's role is so complex that it would be

impossible to carry it out successfully without employing newer practices of leadership. Research on transformational leadership as it relates to student achievement was reviewed by Bush (2010) who states that this model of leadership focuses on the process that leaders use to influence school outcomes.

General Professional Development

Koellner, Jacobs & Borko (2011) stated the importance for schools to have an explicit plan for professional development that will build both leadership skills and teacher capacity. A resolve to focus professional development on instruction should affect teacher practice that will ultimately impact student learning (Polly, Neale, & Pugalee, 2014). Districts often invest a considerable amount of time and money into professional development because they believe that as a result of the training, quality teaching will occur in the classrooms and ultimately students will benefit.

It is through research-based professional development practices that changes to instructional practices will occur (McGuigan & Hoy, 2006). Polly, Neale and Pugalee (2014) confirmed that the desired outcome of effective professional development is to increase student learning especially when teachers take what they have learned and apply it to their classroom practice. The teaching staff must be competent in curriculum, pedagogy, and assessment and garner this knowledge through targeted professional development (Youngs & King, 2002).

Principals identify and assist with professional development needs of the school staff as well as find ways to provide opportunities for staff members to collaborate and to enhance learning opportunities for students (Koellner, Jacobs, & Borko, 2011; Leithwood, Patten, & Jantzi, 2010; Sun & Leithwood, 2012; Yager & Yager, 2011). Research indicates that a way in which principals shape a school's teaching practices and conditions is by their position and

actions regarding professional development (Youngs & King, 2002). Principals must have knowledge of the content they want teachers to understand and plan their professional development accordingly.

Individual Professional Development

Providing teachers with opportunities to self-select professional development that would meet their individual needs was considered a necessary part of how a school should coordinate training for staff (Donaldson, 2013; Yager & Yager, 2011; Youngs & King, 2002). As the research looks at professional development, it is noted that it should be organized around teachers' needs and be monitored by the school leadership team (Yager & Yager, 2011). Continuing professional development allows principals to influence the teachers' behavior toward achieving the same desired goal since it creates an atmosphere in which intellectual stimulation and collective support for teachers are provided. Therefore, when teachers view the principal as a member of the leadership team who will support and monitor initiatives, the depth of implementation is increased (Yager & Yager, 2011). As policy makers and others involved in improving education look at teachers' learning new skills and content, professional development should be relevant to them (Hill, 2004).

Math Specific Professional Development

In regard to professional development with teaching of mathematical concepts, teachers involved with an activity that could be used later in the classroom received positive feedback on the training session (Hill, 2004). A review of data determined that professional development had a meaningful impact on increasing teachers' mathematical knowledge, increasing student-centered math practices and influencing teachers' beliefs about mathematics (Polly, Neale, & Pugalee, 2014). Polly, Neale & Pugalee (2014) reported that professional development in the

area of mathematics was effective. Professional development should build capacity of an organization by causing a change in teacher practice

Professional development is a complex undertaking in which there are many facets to be investigated. As professional development is created, it is imperative that standards are focused on subject matter content and developing strategies to improve student learning. (Hill, 2004)

Learning Community

The literature suggests that fostering a professional learning community, developing teachers' mathematical knowledge for teaching, and adapting professional development to support local goals and interests are key to effective training needs for a school (Burch & Spillane, 2003; Donaldson, 2013; Koellner, Jacobs, & Borko, 2011; Mangin, 2007; Polly, Neale, & Pugalee, 2014; Sebastian & Allensworth, 2012; Stein & Kaufman, 2010;). Through involvement of leaders chairing work groups, team teaching, and reviewing student work, they were able to gain a distinct perspective about teaching of mathematics (Burch & Spillane, 2003). The teacher's role is critical in implementing effective school reform and in sustaining its efforts and allowing choice in determining professional development needs (Hill, 2004).

Developing leadership capacity through the structure of bringing leaders and teachers together with common interests and goals has been used in various schools and districts (Vale, et al., 2010). This type of structure provides staff opportunities to work collaboratively on projects and goals to further gain insight into effective teaching practices. Monthly meetings with teachers provided opportunities for teachers to problem solve and learn from each other (Turner, Warzon, & Christensen, 2011). In order to create a culture of professional learning with staff, the school principal can impact the work of school teams to develop highly engaging lessons (Mitchell & Castle, 2005).

Building collaborative structures and providing individualized support are also considered to be a set of practices that can influence student achievement (Sun & Leithwood, 2012; Youngs & King, 2002). In this culture, there are opportunities for collaborative learning as well as an environment, which promotes respect for everyone. Furthermore, in the interest of being able to make substantive changes, school leaders must shape the environment to maximize the potential of the staff (Winterman, 2008). Opportunities for staff to participate in collaborative learning structures and creating an atmosphere of collegiality is a relevant component of the school structure.

Feedback

The ability to lead teachers in understanding effective instructional techniques comes from the principal's behaviors and attitudes (Bloom & Owens, 2013). As principals work with their staff, it is necessary for them to provide feedback in a positive manner. The research conducted by Leithwood and Louis (2012) states that high scoring principals provided frequent observations in classrooms for short periods of time. Improving instruction through feedback is an important part of an administrator's daily work.

Although the research does not provide a significant relationship between time spent on instructional activities and a school's effectiveness, there was a positive association on achievement gains when classroom walkthroughs were used in a coaching manner (Grissom, Loeb, & Master, 2013). Classroom walk-through observations gave administrators a chance to see what content was being taught in the classrooms as well as the interaction of the students and the teacher. The quality of classroom instruction is what matters most for student learning (Sebastian & Allensworth, 2012). Feedback from the classroom mathematics coaches can have a positive impact on the teacher, one who will work to improve himself or herself (Campbell &

Malkus, 2011). If the purpose of a walkthrough is to coach teachers and provide feedback on instructional practices, then this might be an area to explore in directly improving student achievement in schools (Yager & Yager, 2011). Teachers and administrators need to work in a collaborative manner to provide a feeling of support through genuine help and assistance.

Refining the Organization

As leaders distribute leadership responsibilities, they must also stay connected to the needs of the organization and focus on how to refine efforts for change. As noted in research, incoming principals must be understanding about the norms and values of the staff prior to making any significant changes (Youngs & King, 2002). One style of leadership at one school may not work the same way at a different school (Shouppe & Pate, 2010). Determining how to adjust changes in the structure and function of the school are areas that are part of refining the organization and will be reviewed as they relate to teacher content knowledge, curriculum, mathematical proficiency, student thinking, and belief systems.

Teacher Content Knowledge

Successful school leaders respond productively to the opportunities and challenges of understanding and building the capacity of content knowledge within the school. Teachers must take the initiative, based on their own convictions, about how mathematics is taught effectively in their classrooms and provide students with student-centered activities that are noted in research to increase student achievement (Gningue, Peach, & Schroder, 2013; Polly, Neale, & Pugalee, 2014; Sheldon, Epstein, & Galindo, 2010). In order to develop this self-confident and responsible attitude, teachers must engage each other with hard questions about their practices and subsequently make changes in their teaching when appropriate.

One goal of learning is the construction of mastering and developing understanding of new concepts. That is, learning is evidenced by the ability of the student to connect a newly encountered mathematical concept into an existing schema in such a way that the concept is relationally understood. Hence, mathematics becomes a connected field of interrelated schema that is characterized by both cohesiveness and adaptable flexibility (Mangin, 2007; Youngs & King, 2002). In a study by Nelson (2010), the content knowledge about mathematics affects the different kinds of support provided to teachers. Nelson reported that teachers also need expertise in helping students develop an understanding of that content not only through external experts, but with internal experts as well.

Teachers need to know how students typically think about distinct mathematics concepts, how to determine what a particular student or group of students thinks about those ideas, and how to help students deepen their understanding through appropriate selection of curriculum materials that will promote mathematical thinking and problem-solving skills (Gningue, Peach, & Schroder, 2013; Mangin, 2007). Likewise, equipping staff with the tools and skills to understand instructional content through coaching activities has shown a positive effect on student achievement (Grissom, Loeb, & Master, 2013).

Curriculum

Refining lessons and modifying plans to meet student needs are important components of curriculum review and lesson planning. Design principles related to modifying the curriculum to meet student needs through teacher's reviewing curriculum as it relates to the state standards are incorporated into daily routines with teaching teams (Koellner, Jacobs, & Borko, 2011). It is important to provide teachers with opportunities to review curriculum materials and make instructional decisions that meet student needs (Stein & Kaufman, 2010). Au (2012) defines

curriculum as how we see and understand the world. Teachers must take time to help students make connections with the content and the real world and determine the curriculum that is most effective (Puchner, Taylor, O'Donnell, & Fick, 2008).

The research by Stein and Kaufman (2012) defines an exemplary lesson as one that begins with a high-level task and continues the rigor throughout the lesson. Providing this type of instruction is imperative in improving student achievement. Mathematics teachers frequently make decisions about how to proceed towards instructional goals through reviewing data and targeting instruction as it connects to the curriculum (Ketterlin-Geller, Chard, & Fien, 2008). Educational activities are constructed by the teacher and a lesson plan is created which shows actions carried out in the classroom.

A criticism that is made regarding using traditional teaching guides is that they guide students to solve problems using procedural roles instead of allowing students to develop their own problem-solving skills (Hsing-Wen, Walker, & Wei-Ying, 2013). To learn, students need access to high-quality instruction and a well-crafted curriculum. It is important to keep in mind that the curriculum serves as a tool for shaping how knowledge is accessed (Au, 2012).

Mathematical Proficiency

As teachers plan for lessons they should look for ways in which mathematical concepts can be unlocked during instruction. As children make connections with their experiences and develop mathematical thinking, concepts must be revisited and clarified. Providing opportunities for students to think metacognitively or giving them opportunities to reflect on their own thinking, were considered important components of teacher training. (Koellner, Jacobs, & Borko, 2011) The strands of mathematical proficiency provide the conceptual framework for the basis of knowledge of students relative to understanding mathematics (Kilpatrick, Swafford, & Findell,

2001). The idea that these strands of competence must be interwoven in order to be useful

reflects the thought that having a deep understanding of mathematics requires students to connect

pieces of knowledge. The connection is a key factor in whether students can use what they know

in order to solve problems. As school leaders consider curriculum materials, it is essential that

they consider the extent to which teachers can locate and understand the big mathematical ideas

in a lesson. (Stein & Kaufman, 2010) Providing students' time to work collaboratively and share

learning is a key component of classroom instruction.

  In the postmodern classroom, teachers guide instruction and provide learning experiences

for students (Slattery, 2013). As students solve problems in the classroom, they should be

encouraged to make connections in math, draw upon their mathematical thinking, and learn to

apply mathematics in their daily life. One of the implications of the research is that using the

probing question method helps a student correct his or own misunderstandings about

mathematics. (Franke, et al., 2009) This type of questioning involves the teacher asking a

specific sequence of questions regarding a topic. Franke, et al. (2009) found that this strategy

provided students a thorough understanding of the concept.

  Teachers need to anticipate what students might think about a concept and be able to

navigate student thinking around questions or connections students might make during the lesson

(Stein & Kaufman, 2010). As students talk about problem solving, they become aware of their

own understanding and can better monitor their own strategies. The goal is for students to

completely monitor their own comprehension and ask themselves questions that will help to

modify and refine their thinking. (Stein & Kaufman, 2010)

  Providing students the opportunity to control their own learning is important in a

mathematics classroom. Students have a deeper understanding of math when they are given

opportunities to think critically (Polly, et al., 2014). Also, connecting teacher questions to student responses provided a connection for students in understanding mathematical concepts (Franke, et al., 2009). According to Slattery (2013), curriculum development in the postmodern era encourages students to reflect, explain, and defend their responses in multiple ways. In the era of postmodernism, students and teachers will find ways to use open dialogue and class discussions. The research also supports students monitoring their thinking relative to mathematics.

Visualizing and describing, two habits of mind, were used with a lesson conducted by pre-service teachers. (Hsing-Wen, Walker, & Wei-Ying, 2013) When students are empowered, the type of work they produce improves (Slattery, 2013). Turner, Warzon, and Christenson (2010) gleaned from their research, through teachers' comments, that students showed an increased motivation to learn math and that this was related to better learning.

Student Thinking

Another important facet of teaching mathematics is attending to students' thinking (Stein & Kaufman, 2010). The authors of the study indicate that there needs to be more focus on student learning and thinking through conceptual understanding (Stein & Kaufman, 2010). It is necessary for students to have the capacity to think, reason, and problem solve. As teachers begin to understand how a student solves problems, they are then able to align their instruction to meet the individual student's needs. The emphasis is placed upon the connectedness of mathematical content. The role of the teacher in such a classroom is one of instructor: pointing out the integration of the subject matter, demonstrating the logical necessity of various results, and displaying to the novice student how things work in mathematics (Youngs & King, 2002).

Memorization of procedures is not as important as understanding mathematical concepts (Puchner, Taylor, O'Donnell, & Fick, 2008). This is true in regard to helping students think about their thinking relative to learning new concepts and developing a deeper understanding of mathematics. Pertaining to manipulative use, it is critical that teachers receive assistance in understanding how to use manipulatives, but more importantly to help teachers and students think about mathematical ideas more critically. (Puchner, Taylor, O'Donnell, & Fick, 2008)

Belief Systems

It is critical for teachers to have an understanding of their beliefs surrounding mathematics as this will shape their instructional practice (Wilkins, 2008). Teacher capacity is the teachers' experience and knowledge relative to their understanding of mathematics (Stein & Kaufman, 2010). Teachers and administrators need to work in a collaborative capacity that provides a feeling of support through genuine help and assistance in understanding how to refine the school organization (Youngs, 2007). In a study by Polly, Neale & Pugalee (2014), teacher beliefs about mathematics changed from their idea of originally seeing mathematics as a static subject to seeing it as a changing body of knowledge in which learners come to know and make connections between concepts.

Teachers might be interested in changing how they teach mathematics if there is a belief that students can be mathematical thinkers (Turner, Warzon, & Christensen, 2011). Teachers' awareness of their own beliefs and the level of self-reflection upon their practice of teaching mathematics also influence the enactment of their own beliefs. Recognizing teachers' need to understand content knowledge is as equally important as the leaders' knowledge. In other words, the leader needs to have a firm understanding of mathematical knowledge so the leader can

provide meaningful feedback and support to the teacher. (Burch & Spillane, 2003; Hsing-Wen, Walker, & Wei-Ying, 2013; Franke, et al., 2009; Puchner, Taylor, O'Donnell, & Fick, 2008)

Collective teacher efficacy is the confidence a group of teachers feels about an organization (Leithwood, Patten, & Jantzi, 2010). Schools considered to have high efficacy have teachers that embrace responsibility for student learning (Leithwood, Patten, & Jantzi, 2010). Additionally, principals who clarify goals and provide direction based on expectations for their school can also influence student achievement and are evident in these types of schools (Leithwood, Patten, & Jantzi, 2010). These types of systems provide support for the belief systems that are embedded in the school culture.

Summary

The role of the principal is multifaceted and described in a variety of ways. The principal sets the direction for the school with a focus on academic success and provides the structures for teams to work collaboratively. (McGuigan & Hoy, 2006; Winterman, 2008). School cultures supporting improving teaching practices are guided by the leadership and support teachers in improving their teaching practices (Youngs, 2007). Each aspect of the principal's leadership skills, knowledge, and style can control the functioning of a school and serve as the catalyst to improve the instructional program. The principal serves as the focal point for assisting with providing the instructional leadership for the school (Mangin, 2007).

Improving the instructional program is another component that leaders are responsible for in creating structures in schools. Principals are responsible and accountable for teaching and learning within the constructs of a school (Yager & Yager, 2011). They must also possess skills as an instructional leader, model best practices, and work to shape teachers and build the capacity of their staff to align with the mission and vision of their school (Winterman, 2008;

Sebastian & Allensworth, 2012). Consequently, during one school year, teachers may work under a leader who encourages them to be innovative risk takers, creative thinkers, to set clear goals, inspire, collaborate, and participate with others in professional development programs designed to enhance their own leadership skills (Yager & Yager, 2011; Winterman, 2008).

Leaders have the capacity to develop people to improve the instructional capacity in the school setting. The construct of developing people builds the capacity for staff to strengthen their knowledge and skills (Mangin, 2007). Building the capacity for staff to become proficient in the area of work provides the motivation for their success (Leithwood & Louis, 2012). Professional development for staff is connected to improving teaching practices (Youngs & King, 2002) and serves as the "primary vehicle to trigger the increase of standards-based pedagogies in mathematics classrooms" (Polly, Neale, & Pugalee, 2014). The school leadership team is a critical piece in providing teachers with knowledge and skills in mathematics (Katterfeld, 2013). The interactions of teachers developing mathematics improvement techniques with school leaders were directly correlated to school improvement efforts (Burch & Spillane, 2003).

Reviewing processes and procedures is used to refine the organization. Internal structures created by the principal are significant when connected to promoting teaching practices (Youngs & King, 2002). It is necessary for schools to have a system that supports teachers becoming mathematically proficient (Kilpatrick, Swafford, & Findell, 2001). Teacher belief systems are directly related to providing environments focused on improved mathematics teaching (Sebastian & Allensworth, 2012).

The collaborative efforts of all those involved create a system in which everyone works together for the goal of improving student achievement. Many attributes are needed for an effective leader and it is important to know and understand the impact that this can have on

student achievement in mathematics. A point that must be remembered is the fact that the

principal's vision for a school is a fundamental factor in predicting expectations relative to

standards-based instructional practices in mathematics (Katterfeld, 2013).

 "Successful leaders improve learning in their schools in many ways" (Leithwood, Patten,

& Jantzi, 2010, p. 698). As leaders influence sustained achievement or growth, it will be critical

for schools to stay focused on the expectations and create environments of success. The pursuit

of sustainability is a core challenge that continues to be important as we look to the future of

leadership in supporting mathematics instruction.   Different leadership styles must be learned

and used in different situations (Fullan, 2001). Understanding the skills needed to support a

school staff in improving mathematics achievement is still an area that needs to be explored.

CHAPTER THREE METHODOLOGY

Introduction

This chapter presents the methodology used in this study. This chapter will provide information on the research questions, context, research design, data collection, archival documents, surveys, interviews, data analysis, positionality statement, limitations, and delimitations.

The Nation at Risk report revealed that there was a decline in the achievement of students in the United States and concerns with curriculum and teaching (National Commission on Excellence in Education, 1983, April). The Program for International Student Assessment (PISA) results indicate that the United States ranks in the bottom half of mathematics achievement of the 72 nations and regions that participate. The National Assessment of Education Progress (NAEP) in 2015 also showed a downward trend in mathematics scores of the 4th and 8th graders who take this test. As reform initiatives continue to be implemented, there is a question of what is needed to improve performance of students in schools (Burch & Spillane, 2003; Shouppe & Pate, 2010). Therefore, this study provided information regarding improving leadership specifically in the area of mathematics at the elementary level. The purpose of this study was to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

Research Questions

Overarching Question: What leadership practices exist with an elementary principal as those practices influence mathematics instructional techniques and student achievement in a small rural school district? The following sub-questions were used to answer the overarching question.

1. What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?

2. What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?

3. What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

4. What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?

Context

The elementary school being studied is located in north central Florida in a rural location with an enrollment of approximately 750 students from grades pre-kindergarten to grade five. The administrative structure at elementary schools within the district consists of a principal, assistant principal, guidance counselor, exceptional student education specialist, and teacher on special assignment for curriculum. The principal of the school is an experienced principal with over 30 years of experience as a leader within the school district. The current principal opened the school in 2008 and has been a consistent member of the school leadership team. At this school, they have hired, on average, 11 new teachers per year, and currently have 33 teachers with three years' experience or less out of 56 total teachers in the school (Florida Department of Education, 2017). The leadership team, under the direction of the principal, has also changed over the past several years. Assistant Principals from other schools in the district have been assigned to work at the school so as to provide them experience with this particular leader. Of the five Assistant Principals that were assigned to the school, three have been promoted to Principals within the school district. Of interest is this leader's willingness to work with

potential leaders and provide them with leadership experiences relative to improving student

achievement and maintaining staff expectations for teaching and learning.

Since the school opened in 2008, it has maintained a high level of academic achievement

of students as evidenced by scores on the Florida Comprehensive Assessment Test and Florida

Standards Assessment that are above the district and state averages in mathematics. The school

has also ranked in the top 10% of all Title 1 schools in Florida in English Language Arts,

Science and Mathematics. Over the past three years this school has been one of the top three

performing schools in the district in all three subject areas- English Language Arts, Science, and

Mathematics. It is the only school in the district that has accomplished this feat each year over

the three-year time period. Additionally, the number of students on free and reduced lunch at the

school has increased from 60.2% in 2013 to 65.1% in 2015 (Florida Department of Education,

2017) This number is slightly higher than the district average of 64.6%. This particular school

was chosen for this case study due to the fact that despite an increased number of students in

poverty, and the turnover of assistant principals and teachers, students at the school continue to

excel academically in mathematics.

Research Design

Based on the research questions, qualitative case study methodology has been chosen for

this study. According to Creswell (2013), this type of research is based on a review of current

real-life systems reviewed by collecting data through multiple sources. The research focused on

the organization and processes, not on recording the life stories of the individuals (Yin, 2014).

The core features of case study research were based on identification of a specific case to review

(Yin, 2014; Creswell, 2013). Using this method also provided in-depth understanding of the

case being studied. The case study is an appropriate method to use because the goal of the

research is not to make broad generalizations regarding the organization in general, but to focus on the process leaders use to develop instructional capacity and a culture for high achievement in mathematics (Creswell, 2013). The population of the study included the principal, leadership team, and instructional staff of the school. The researcher examined the qualitative data by surveying the instructional staff, interviewing members of the leadership team, interviewing the principal, interviewing teachers who volunteer to participate in the focus group, and reviewing school artifacts to make meaning and describe the participants' lived experiences. Case study research is characterized using interviews, focus groups, surveys, and document analysis (Creswell, 2013).

Data Collection

Creswell, p.97 (2013) defines a case study as one that "researchers study current, real-life cases that are in progress so that they can gather accurate information." In the interests of obtaining and describing first-hand information about the school in the most viable way, semi-structured interviews, review of archival data, and focus group interviews will be used as methods of data collection. Using multiple sources of data collection, such as field notes and other documents will contribute to a deeper understanding of the case being studied. Prior to beginning the study, the researcher met with the school principal to gather background information and determine the exact logistics for the individual interviews and focus group interview. The researcher established the room location and ensured that it was a location appropriate for interviews. A face-to-face meeting was offered with the participants and researcher to review the process and answer any questions they may have.

Preliminary information regarding the school was acquired through the principal of the school. Gaining access to emails, staff newsletters, professional development calendars, and

other information was provided through the school administrator to the researcher. Interviews

with the principal and leadership team was digitally recorded and transcribed. Permission to

arrange and conduct interviews with the instructional staff was attained through the principal.

<div align="center">**Archival Documents**</div>

Archival documents were collected by the researcher prior to the school visit via

accessing the school website and through the school district resources and the items and was

confirmed with the school principal during the interview process. This includes such documents

as charts, handbooks, policy manuals, newsletters, bulletins, newspaper articles, brochures, and

special events programs and other related documents. The structural details of these documents

helped build a framework to understand the foundations and principles at the school.   It is

necessary to ensure the accuracy of the documents and relevancy as it relates to the study (Yin,

2014). They also provided the catalyst for generating questions to further explore program

processes and other aspects of the school.   This information was reviewed using the archival

document review worksheet (APPENDIX A).

Using archival documents provides the opportunity for the researcher to validate the

information gleaned from other sources (Yin, 2014). Information from archival documents was

coded to provide evidence related to the research questions posed by the researcher. The data

collected should be relevant and related to the case study and support a central fact related to the

ideas collected (Yin, 2014). These methods provided an opportunity for the researcher to

triangulate the archival data and connect the results to the other data that is collected to look for

common themes related to the researcher's questions.

The four areas of leadership practices will be used as a framework to review the

documents through triangulation of data as it connects to setting direction, developing people,

refining the organization, and improving the instructional program. Table 1 shows the relationship of the data collection instruments to the research questions.

The question number for each document listed in Table 1 is correlated directly to the research question for the study in the chart and indicates how and where the information for the template will be collected. The researcher used the chart to sort the data and begin to make conjectures regarding the results. By triangulating data from multiple sources, the researcher was able to increase the reliability and validity of the study (Creswell, 2013). It also provided evidence for the researcher to review data from multiple sources and substantiate the claim being made (Yin, 2014).

Table 1: Triangulating Across Data Collection Instruments

	Archival Documents	Teacher Surveys	Focus Group Interview	Leadership Team Interview	Principal Interview
Research Question 1: What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?	8	6, 7, 8	1, 2, 14, 15	1, 2, 14, 16c, 16d	1, 4 18c, 19d
Research Question 2: What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?	4	9, 11, 13, 16	3, 6, 8, 13	3, 6, 8, 12, 15, 16a	2, 7, 11, 15, 18, 19a
Research Question 3: What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?	5	5, 12, 14	5, 9, 10, 11, 12, 17	5, 9, 10, 11, 13, 16b, 16e, 16g, 17	5, 8, 9, 12, 13, 14, 16, 19b, 19e, 19g
Research Question 4: What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?	6, 7	10, 15, 17	4, 7, 16	4, 7, 16f	3, 6, 9, 10, 13, 16, 17, 19f

Surveys

The researcher emailed the staff at the school soliciting their participation in the study (APPENDIX B). Included in the initial email to staff, a voluntary survey (APPENDIX C) comprised of 19 Likert-scale questions, was made available to all members of the instructional staff at the school site through the district managed email system with an invitation to participate in a follow-up focus group with the researcher. The survey was designed by the researcher and the questions were based on the research questions and the theoretical framework of the study. The survey was also reviewed and modified based on feedback from two experts in survey design. This Likert method provided information from the participants regarding their opinions (Fitzpatrick, Sanders, & Worthen, 2011) of the school and structure as it relates to mathematics. The survey served as a part of the case study and provided evidence for review (Yin, 2014). The data from the survey was triangulated to determine patterns and themes as they related to the researcher's framework of setting direction, developing people, refining the organization, and improving the instructional program.

Interviews

Interviews were conducted on the school site in a small conference room either before, during, or after school hours. The principal of the school was interviewed first using the principal interview questions (APPENDIX D). The study used open-ended questions in a semi-structured way. Questions are designed to provide the principal the opportunity to go in-depth regarding responses. Questions have been pre-determined, and there were additional questions posed to provide for clarification and to add additional information. The principal interview was audiotaped digitally with consent of the interviewee and sent to a transcription service. The researcher allowed approximately 60 minutes for the interview with an additional 30-minute

follow-up interview session for additional information and clarification. The copy of the interview transcript was provided to the principal following the transcription process for clarification or additional comments.

Following the interview of the principal, there was a focus group interview with the school leadership team. The interviews took place at the school site in a comfortable location with minimal noise and free from distractions for the interviewees. The focus group interview protocol (APPENDIX E) was used in order to ensure consistency of the process. Members of the leadership team consisted of the assistant principal, guidance counselor, exceptional student education specialist, and the teacher on special assignment for curriculum. The focus group interview questions for the leadership team (APPENDIX F) were used. This semi-structured format provided team members an opportunity to respond to questions and also give the researcher an opportunity to ask additional questions based on responses from the team. The focus group interview was audiotaped digitally with consent of the interviewees and sent to a transcription service. The researcher allowed approximately 60 minutes for the leadership team focus group interview. The copy of the focus group interview transcript was provided to the participants following the transcription process for clarification or additional comments.

After the focus interviews with the leadership team were completed, the researcher set up a time to meet with teachers. Teachers who completed the survey and agreed to participate were given the opportunity to sign up for a time that is convenient for their individual schedules. With participant permission, the focus group interviews, involving no more than five teachers at a time, were recorded using a digital recorder and the researcher took notes during the focus group discussion. Due to the interest of the staff, there was a need to conduct multiple focus group interviews. Groups of no more than five teachers were able to participate in the focus group

interview. Teacher focus groups were organized based on grade level teaching assignment or area of expertise if not a classroom teacher. The focus group interview protocol (APPENDIX E) for the interviews was used with each group involved. The interviews took place at the school site in a comfortable setting with minimal noise and at a time that was convenient for the interviewees. The focus group interview questions (APPENDIX G) were used to guide the interview process and the researcher also allowed for participants to provide additional information. Two main purposes of the case study are to gather descriptions and interpretations of the participants (Yin, 2014).

The focus group interviews were audiotaped digitally with consent of the interviewees and sent to a transcription service. The researcher allowed approximately 60 minutes per focus group interview. The copy of the focus group interview transcript was also provided to the participants following the transcription process for clarification or additional comments. Creswell (2013) stated that collecting data from participants most directly involved with the research experience provided valuable data to the research project. The proposed purpose is to gather information through means of the interview protocol process, reviewing documents, and data analysis to determine if a connection exists between effective instructional leadership and student performance in the area of mathematics.

Each participant was provided with the results of the transcription to provide feedback and validate their responses. These were completed following each focus group interview to allow for participant's affirmation and response on data and its analysis. These checks were coordinated through emails to participants throughout the study and with notes taken by the researcher. Providing verification of information from participants and gathering feedback is a

method noted as member checking (Maxwell, 2013). This is a necessary way to ensure that data is interpreted accurately.

After all of the teacher focus groups have been interviewed, the researcher set up a time to meet again with the principal of the school. The interview gave the principal an opportunity to add any additional information or provide clarification based on the interviews that were conducted with the leadership team and focus group of teachers. The interview will take place at the school site free from distractions and interruptions at a time that is convenient to the principal. The interview was recorded digitally and transcribed. The principal had the opportunity to elaborate or provide additional details.

Each interview afforded participants the opportunity to share in their own words what happens at the school. The researcher listened to responses to hear from participants about what is there and what is not there. It was critical for the researcher to listen and ask clarifying questions to deepen the understanding of the lived experiences at the school. There were some minor adjustments made to the focus interview questions throughout the process.

Data Analysis

A review of the data was conducted to determine major and minor themes that are relevant at the school. Surveys were utilized through Google Forms when sent to participants. They were assured that their names will be kept confidential and that the data was destroyed at the end of the study. The data was stored on the researcher's home computer in a password-protected format. Survey participation was voluntary and there were not any repercussions if they chose to not participate. Participants received an informed consent form (Appendix H) prior to conducting the research. The surveys that have been created allow for Likert-type scale items and open-ended responses.

Creswell (2013) also explained the importance of triangulating data "through locating evidence to document a code or theme in different sources of data." This method of data analysis is utilized in order for the researcher to avoid personal biases, draw reliable conclusions, and present the accurate and valid facts of the case. Corroboration between sources of interviews, perceptions of participants, and written documents is essential in helping the researcher arrive at a true picture of the case study. Since the researcher is seeking to gain an understanding of leadership, a case study of qualitative inquiry using surveys designed by the researcher, focus group interviews, individual interviews and archival document analysis was developed. The researcher reviewed the data and followed Creswell's process of analysis by looking for patterns and themes after reading and rereading each piece of data collected.

Data analysis in qualitative research consists of preparing and organizing data by reducing data into themes through open coding. Creswell, p.184 (2013) describes the coding process as a way that "involves aggregating the text or visual data into small categories of information." Analysis of the data was conducted by the researcher to understand trends, patterns, and behaviors that exist within the school setting being studied. The data from the interviews, surveys, and other sources of information were coded in a similar manner so that the researcher was able to make inferences regarding the information being presented in the study. Codes were assigned to meaningful words and phrases with the focus on the research questions and the relationship to the theoretical framework. Emerging patterns and chunks were identified through reading and rereading the information and evaluating the data, codes, and chunks of information. The data was clustered into chunks and connected together with themes and patterns that emerged through the review of the information. The use of surveys, interviews,

triangulation of data, document review, and member checks were conducted to ensure the reader that an accurate, fair picture of the organization.

The case study methodology was used to understand the meaning of individuals through their lived experiences (Creswell, 2013). This research design was effective in understanding the processes, procedures, and structures that were in place at the school site.

Positionality Statement

A piece of background information important to this study is my role with the district and relationship to the principal of the school. As an Executive Director within the school district, I have insider knowledge and understanding of the organization and its processes. I have worked in the district for 27 years as a teacher, guidance counselor, and administrator. Also, I am a professional colleague with the principal of the school and I currently oversee the educational services department at the district office. In my current role, I coordinate the educational services department within the district and provide guidance and support to school leadership teams regarding curriculum, professional development, data, student services, exceptional student education, technology, and other types of support systems. The principal of the school that I will be working with and I have an open and trusting relationship.

I am aware of my biases and will moderate them throughout the process. Although I have a unique perspective due to my relationship with the school staff and school administration, I will accurately repeat the words and phrases used by the participants in the study to gain a clear picture of the organization being studied.

Limitations

1. Information for this study was conducted in an economically challenged school district with minimal ethnic diversity and may not generalize to districts of different size and geographic location.

2. The researcher may have knowledge of this school in comparison to other schools in the district.

3. The researcher is an employee of the district in which the study is being conducted and this may cause biases.

4. Data is self-reported by participants and may not accurately reflect things going on or may be indicative of one person's perspective.

5. Participants in the study are self-selected. They may have differing opinions on their school or the study or differing motivations for participation.

Delimitations

1. The study will only look at leadership practices relative to mathematics.

2. The study is constrained to one site in the Southeast United States.

Summary

The literature clearly shows that schools that demonstrate high standards of achievement in academics also have a culture characterized by a well-defined set of goals that all stakeholders value and promote (Sun & Leithwood, 2012). School leaders cannot make effective decisions, either individually or collectively without first establishing, fostering, and sustaining positive school cultures. A school that is led by an effective principal and encompasses the components of a positive culture will be a place where students enjoy coming every day, a place where the

staff feels respected and included, and a place where parents show appreciation, gratitude, and a source of pride for the community in general (Shatzer, Caldarella, Hallam, & Brown, 2014).

School culture has been defined as having a focus on student and teacher motivation, job satisfaction, commitment, and collaboration within a school building. Learning culture within a school building can be measured using a set of perceptions, thoughts, and beliefs. These can have an impact on student learning (Kythreotis, Pashiardis, & Kyriakides, 2010). Additionally, research has been conducted on the impact of academic optimism, which is a shared belief among faculty that academic achievement can be defined as the confidence that the school community has concerning students being successful (McGuigan & Hoy, 2006). This idea sets the framework for understanding how schools operate in order to provide successful constructs for school success.

Effective schools depend on a strong sense of purpose and leadership. Administrators must lead their students, faculty, and staff in a common direction. Increasing academic optimism of a school can occur by setting the tone for success, fostering teachers' collective efficacy, and nurturing teachers' trust in students and parents (McGuigan & Hoy, 2006). Fullan (2005) states that "working together can be powerful, but only when high-demand elements are in place." This highlights the fact that principals who have guided or provoked their organizations to change recognize that these individuals begin with a vision, develop a shared vision with their coworkers, and value all stakeholders in an effort to increase student achievement.

The proposed study will first look at what combination of leadership factors are in place at this high performing school, and then how the leader at the school develops proficiency and maintains academic achievement with staff so they continue to perform at the same level each

year. Additionally, in this high-performing school, is there something that needs to be done

differently with teachers that are inexperienced as compared to those that have experience?

CHAPTER FOUR FINDINGS

This chapter will provide a review and discussion of the data and findings of the qualitative case study research.   Data that was collected from surveys, interviews, and archival documents was examined. The four areas of leadership practices that served as the framework for the review of the data were setting direction, developing people, refining the organization, and improving the instructional program. The purpose of this study was to understand the practices a principal in an elementary school in rural Florida utilized to develop instructional capacity and a culture for high achievement in mathematics.

Research Questions

Overarching Question: What leadership practices exist with an elementary principal as those practices influence mathematics instructional techniques and student achievement in a small rural school district? The following sub-questions were used to answer the overarching question.

1. What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?

2. What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?

3. What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

4. What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?

Survey Response Rate

Fifty-one instructional staff members, which includes Pre-Kindergarten through grade 5 classroom teachers, exceptional student education teachers, Title 1 intervention teachers, art teacher, music teacher, physical education teacher, gifted teacher, technology specialist, media specialist, teacher on special assignment, guidance counselor, and exceptional student education specialist, were sent an email through the school district managed email system asking for them to participate in a voluntary survey (APPENDIX C) that was comprised of 19 Likert-scale questions with an invitation to participate in a follow-up focus group with the researcher. Two email reminders were sent to staff requesting their participation in completing the survey. Thirty instructional staff members responded to the survey, which resulted in a response rate of 59%. All staff members that completed the survey were given the opportunity to participate in a focus group interview. Of the 30 staff members who completed the survey, 16 staff members agreed to participate in a focus group interview, which resulted in a response rate of 53% for the focus group interviews. This reflects 31% of the total staff participating in focus group interviews. Actual participation in the focus group interview was 29%, as one staff member was unable to participate due to illness.

Population

Instructional staff members who agreed to participate in the survey completed it online through Google Forms by using a link sent through the district managed email system from the researcher. Out of 30 teachers that completed the survey, there was representation from among teachers in pre-kindergarten through grade five, two content area interventionists, two special area teachers (which includes art, music, physical education, media, and technology), and three teachers serving as part of the leadership team with one serving in the capacity of guidance

counselor, one as the exceptional student education specialist, and one as the teacher on special

assignment.

Figure 4 represents the number of years the participants who completed the survey

worked at the school. The data shows that 60% of the participants who completed the survey

have been working at the school less than seven years while 40% have been working seven or

more years at the school.
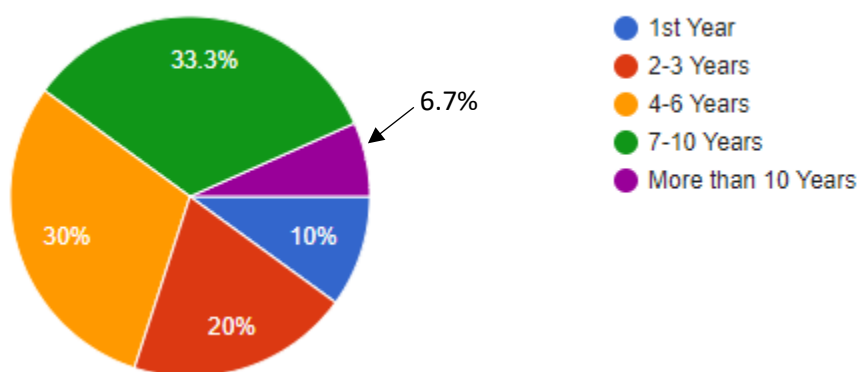
Figure 4
Length of time survey participants worked at school

Additionally, 26.7% of the teachers who completed the survey were in their first year in

that grade level with 33.3% only teaching between two and three years in the grade level. This

indicates 60% of the teachers surveyed are only in their first three years of teaching at the grade

level. Figure 5 represents the length of time survey participants have been teaching in their

current grade level.
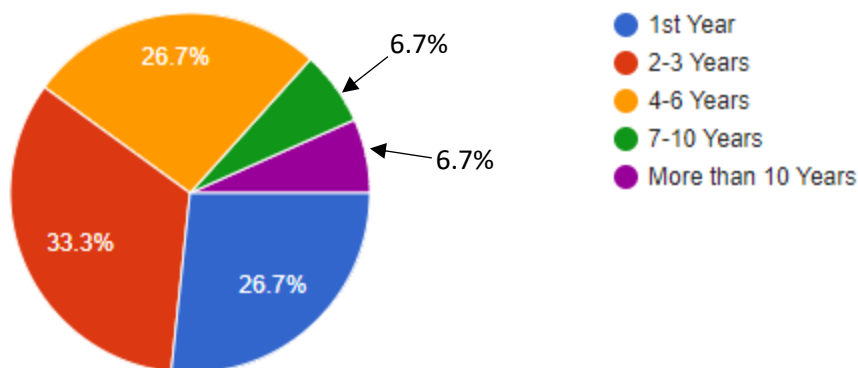
Figure 5
Length of time survey participants have been teaching in their current grade level.

Instructional staff members who completed the survey indicated their current level of education. 86.7% of the staff members indicated that they had a Bachelor's degree while 13.3% had a Master's degree. No participants had a Specialist's degree or a Doctorate degree. Figure 6 shows the breakdown of survey participants level of education.
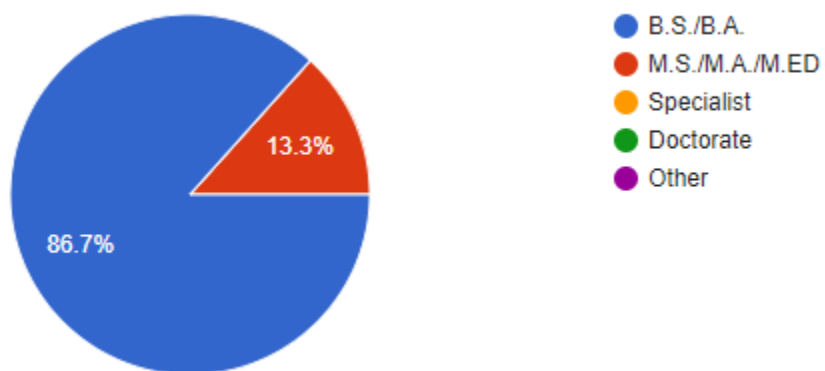
Figure 6
Level of education.

Summary of Results

Once the staff survey was completed, the data was reviewed and interviews were arranged with the principal, leadership team, and staff members who agreed to participate in a

focus group interview. An interview protocol was developed and reviewed by four college

faculty prior to conducting the interviews. All interviews were conducted in a conference room

at the school. The only interview not carried out in this room was the one with the principal.

The principal interview took place in the principal's office. Table 2 provides information about

the population of the interview participants. All participants were female and 86% were

Caucasian, 6% African American, and 6% Hispanic. The participants experience in their current

position ranged from 1 year to fifteen. The total years of experience for each participant ranged

from 3 years to twenty-eight.

Table 2: Focus Group Interview Population

Participant	Gender	Race	Current Position	Years in Position	Total Years Teaching
Leadership Team A	Female	Caucasian	Teacher on Special Assignment	1	8
Leadership Team B	Female	Caucasian	Assistant Principal	6	24
Leadership Team C	Female	Caucasian	Guidance Counselor	3	28
Leadership Team D	Female	Caucasian	Exceptional Student Education Specialist	10	14
Teacher E	Female	Caucasian	4th Grade Teacher	10	10
Teacher F	Female	Caucasian	5th Grade Exceptional Student Education Teacher	8	8
Teacher G	Female	Hispanic	3rd Grade Teacher	4	17
Teacher H	Female	Caucasian	3rd Grade Exceptional Student Education Teacher	2	4
Teacher I	Female	Caucasian	Pre-Kindergarten	3	16
Teacher J	Female	African American	Kindergarten	4	7
Teacher K	Female	Caucasian	Gifted Education	15	26
Teacher L	Female	Caucasian	4th Grade	2	6
Teacher M	Female	Caucasian	4th Grade	2	6
Teacher N	Female	Caucasian	3rd Grade	1	3
Teacher O	Female	Caucasian	5th Grade	10	11
Teacher P	Female	Caucasian	Kindergarten	2	3

At the beginning of the interview, each participant signed an informed consent form (Appendix H) allowing the session to be digitally recorded and transcribed for data analysis. The researcher and participants were the only people present in the room during the interview process. The interviews lasted anywhere from 45 minutes to 90 minutes. When an interview was concluded, the transcription of the interview was emailed to the participants for member checking and validation of responses.

Furthermore, the principal provided archival documents. These documents included information such as newspaper articles, staff and parent newsletters, and professional development workshops offered to staff. These documents were collected and analyzed. After each focus group interview, each participant was asked if they were willing to share any feedback that they received from the principal at the school regarding mathematics instruction. Eight out of fifteen participants agreed to provide feedback from the principal. This was a 53% response rate to the request for feedback from the principal regarding mathematics instruction.

Detailed Analysis

The primary sources of data for this study were survey results, interviews, archival documents, and feedback from the principal to voluntary participants. This section provides a detailed analysis of the data as it relates to the research questions posed within the study using Table 1. The question number for each document listed in Table 1 is correlated directly to the research question for the study in the chart and indicates how and where the information for the template will be collected. I used the chart to sort the data and begin to make conjectures regarding the results.

Following each interview, a digital file was sent to a transcription service. Within 24 hours of sending the file, a text document was emailed back. The transcript was sent to the interviewees for review and feedback. Data from the teacher survey and archival documents were included as part of the coding process. The open coding process involves assembling the data into categories and searching for meaning from the information being reviewed (Creswell, 2013). Data was labeled, and categories emerged through rereading and arranging the data. All the data was printed out and cut into strips. The data was then categorized into themes and manipulated by reading through each statement and determining which category it would fall into. The data was reviewed multiple times to continue to narrow down the broad themes. Multiple readings of the data occurred to determine if the category was needed in the process.

Following several reviews of the data, the data had been reduced to manageable topics and themes that could easily be reviewed. During the process of reviewing the data, the investigator kept a list of ideas, words, and phrases that kept coming up throughout the reading of the text. There were some themes that were not used at all and there was some data that needed a new category created because the data did not fit in any of the predetermined categories. All data was reviewed as it related to the research questions through note taking and drawing conclusions. The following themes emerged from a review of the data as indicated in Table 3. This section provides a detailed analysis of the data and is organized according to the research questions.

Table 3: Theme Development

Research Question 1: What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?			
Expectations	**Culture**	**Visibility**	**Communication**
Clear and consistent goals Accountability Standards-focused	Systematic routines Collaboration Teamwork	Classroom walkthroughs Teacher behaviors Support	Developing teachers Constructive feedback Research-based strategies
Research Question 2: What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?			
Quality Instruction	**Deep Understanding**	**Developing Teachers**	**Mathematical Practices**
Essential question Differentiation Reflection	Number sense Metacognition Misconceptions	Training Support Walkthroughs	Purpose Structure Application
Research Question 3: What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?			
Purpose	**Environment**	**Process**	**Professional Learning**
Mindset Goal setting Persistence	Peer support Structured collaboration Community of Learners	Belief systems Expectations Teacher leadership	School focused Peer to peer Self-directed
Research Question 4: What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?			
Acknowledge	**Interpretation**	**Balance**	**Opportunity**
Fear Misconceptions	Standards Mathematical Practices	Time Expectations	Observation Communication

Research Question 1: What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?

Data review from teacher surveys, archival documents, and interviews was used to determine themes that emerged regarding leadership practices exhibited by an elementary principal in setting direction to design curriculum in mathematics. The themes that emerged provided the framework for analysis and discussion. The following four themes emerged through a re-reading of the data and listening to digital transcripts: expectations, culture, visibility, and communication. These themes will be discussed in further detail as they relate to the research question. The teacher survey data in Figure 7 indicates that 70% of teachers strongly agreed that the vision and mission of the school is focused on increasing student achievement in mathematics. Agreed was marked by 26.7% of the teachers surveyed and 3.3% of the teachers surveyed indicated they were undecided. This data substantiates the data from teacher interviews that there is a clear vision and mission towards improving mathematics instruction.
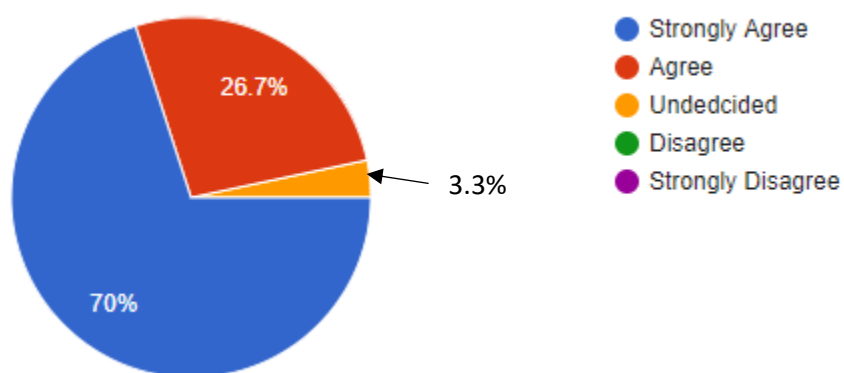
Figure 7
Vision and mission of the school is focused on increasing student achievement in mathematics.

Theme: Expectations.

Developing clear and consistent goals within the school is something that was evident in a review of the data. Teacher N stated, "The principal values mathematics instruction and demonstrates this through clearly communicated expectations and feedback." At the beginning of the school year the principal indicated that the first day back with teachers is "all about setting the purpose, rolling out our theme, being excited about what we're about to do." Teacher E reported "There is no ambiguity. You know exactly what she is looking for." Providing teachers with clear and explicit expectations is evident not only through interviews with staff, but staff newsletters provided this evidence as well. Consistency for instruction is considered an essential component at the school not only within grade levels, but also across grade levels. The principal wants teachers to begin implementing strategies even if they are not fully comfortable at that time. The principal was emphatic about the following, "We can't wait for them to understand it fully, or for them to teach it to the children because we can't have 18 to 25 kids not getting something that everyone else has taught." She believes that common teaching strategies must be pervasive on her campus.

Evidence of the mathematical practices are not only expected, but teachers are held accountable to show they are using them through a monthly newsletter that is sent out to staff. The use of anchor charts and essential question journals are daily requirements at the school. Teachers and students are expected to show student learning and provide student evidence of thinking using these tools. Leadership team member B indicated "There's no cut and dry, if we notice something either is not happening or is happening in the classroom you know we address that and make sure that it is happening." One of the key statements that was made throughout the interview process with each group is that the principal inspects what she expects. She is

constantly monitoring what is happening. Teacher D stated, "The principal plays a tremendous role in helping with math instruction." Leadership team member C said, "She is willing to provide support and resources in using manipulatives with students, understanding how to incorporate math talk into daily lessons, and ensuring that precise math language is part of the classroom environment."

The school's monthly newsletter provided evidence for holding teachers accountable to use standards in their daily instruction. Leadership team member A also said, "We don't ever want to be stagnant, even when we're reaching the standards that we've set we want to keep pushing those high standards." Several interviewees echoed the fact that the school is standards-driven. Using strategies and teaching practices that are aligned to the standards are pervasive in the school. Another piece of evidence that showcases the connection to the standards is the fact that the administrative team meets with all the third, fourth, and fifth grade students to review student personal goals for meeting state testing requirements. Leadership team member A stated, "She's a leader of academics, that's definitely what I would say."

Theme: Culture

The teacher survey data in Figure 8 on providing direction to the school through the principal and leadership team indicated that 53.3% of the teachers strongly agreed with the statement. Additionally, 40% of the staff agreed with the statement while 3.3% were undecided and 3.3% disagreed. These statements are evident in the interview data with the staff regarding the systematic routines at the school, collaboration and teamwork. Leadership team member A stated, "I think one of our strengths is that we do things very systematically and very school wide." Also noted was the fact that targeted instruction and tracking data was necessary for teachers to use to support student learning in mathematics. The leadership team has

conversations with teachers to discuss how the student is learning and what is being done to help the student understand the concepts being taught to them. Teacher P stated, "We are mathematicians. Look at us go." This is a part of what is expected in all classrooms relative to teaching mathematics.
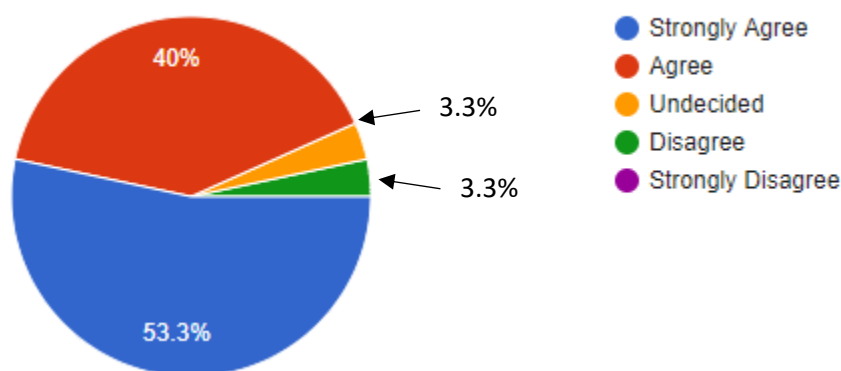
Figure 8

School-based leadership team provides direction for understanding mathematics instruction.

The structure at the school is designed for teachers to support each other through collaboration. Monthly share sessions and professional development in using the mathematical practices are an integral part of the school structure. Leadership team member B indicated the following, "How can we help you get there, just that constant support, that collaboration and that sharing, the share sessions, the learning lesson, it all goes hand in hand." Teacher N indicated, "It all goes back to the collaboration piece. Your experienced teachers are reaching out to new teachers." The principal emphasizes the importance of collaboration through monthly newsletters in which teachers answer an essential question and provide evidence to support the question posed. One of the newsletters reviewed in the archival document review had the following essential question posed to the staff: What benefits are you seeing from using small

group math as your instructional model? These processes are part of the routines that are used within the school to support student learning in mathematics.

Teamwork is another area where evidence points to the support and structures provided to the school team. "The principal instills feelings of teamwork, a desire to help one another," as stated teacher N. When new teachers are hired at the school they "catch the excitement" as noted by teacher P. Taking time for collaboration and discussion with the leadership team and staff is an important component of the school structure. Providing opportunities for teachers to work together in grade level teams and through the inclusion model at the school sends a clear message for everyone to work towards a common goal. The principal stated that it is important for the teachers to have the "confidence and mindset that they can do it." The idea that everyone is in this together is evident and pervasive throughout the school.

Theme: Visibility

Being visible in classrooms is a theme that was evident through a review of the data. Teacher E noted that the principal conducted classroom walkthroughs so that the she can get a sense if teaching is happening in the classroom all the time. The principal stated, "I try to spend as much time in the classrooms as I can, and I think that breaks down to probably a total of two to four hours a day." She also said, "I try to avoid the front office, I typically will come to the front doors, but will go around the front office when I'm crossing from one part of the building to another to avoid getting caught up in something." Teacher M stated the following, "The principal is in my classroom every single day." The purpose for the principal being in the classroom as stated by teacher P was, "so she would know that we are on task, we are doing what we are supposed to be doing."

Awareness of teacher behaviors is important for the principal and assistant principal to know what is happening with instruction. "The principal is visible and available. She is supposed to witness the teaching in action," stated teacher M. The principal stated that "My goal is always to get into every one of them and what I do change sometimes is where I start, so that I see something, so I try to see something different." Connecting with staff and understanding the needs of the school are evident through leadership involvement in classroom instruction. Having the leader around and knowing she is supportive is important as noted by one of the interviewees. One of the activities the principal completes is the coding of teacher behaviors and narratives. Leadership team member A had this to say about the daily work of the principal, "She believes that providing feedback to teachers is an essential part of her daily routine."

The support provided to teachers was noted as a key part of the principal's job at the school. The principal stated, "I consider my walkthroughs and my daily visits, probably key in seeing those patterns and I address any misconceptions or errors or concerns right away in math, because I find that very often as adults, so many adults were not comfortable with math." Providing this support to teachers is an integral part of the work done by not only the principal, but the leadership team as well. Leadership team member D indicated the following, "It's not just the principal and assistant principal you know, if we see something we may ask the teacher on special assignment to go in and say hey what are you seeing…" The principal sets the tone for the expectations leadership team member B stated the following, "She's in the classrooms daily, as much as she can be, by making sure that we as a school believe to be the best practices, making sure those are carried out in the classroom and if not, then providing support to those teachers if the support is needed."

Theme: Communication

Communication was a theme that evolved from the data. Developing teachers' capacity to understand how to teach mathematics was noted as a part of the communication methods. Teacher H stated, "She is a very hands-on principal and that her knowledge of the tools and techniques in the classroom only add to her value." This was reiterated leadership team member C that said, "To hear her talking and definitely she knows if they're where they should be for that day or that week or she's just very, if they're not where they should be then she's going to talk with them and keep them moving along." The principal emphasized this point in her statement, "My focus and my goal is to focus on instruction and developing the teachers to be the very best instructional leaders they can so then they in turn will cause student success." She continued, "We are constantly supporting and training new teachers." She firmly believes that, "the actions that I take are supporting the development of teachers in their understanding and ability to teach mathematics." In terms of communication it was reiterated by teacher M, "I'm comfortable going to the principal to tell her something I don't know how to do something, and she is right there with me." A review of the archival documents confirmed communication methods used by the principal, particularly the monthly staff newsletter which poses a question for staff to respond to and provide evidence of how they are meeting that particular skill to launch in their classrooms.

Providing constructive feedback was also found to be evident within the structure of the school. Teacher O stated, "She will actually give us feedback that is constructive." Also related to feedback teacher P said, "Whenever we get observations, I know that my feedback is always very specific." The principal can recognize when teachers are struggling and address the situation. Teacher M stated, "You feel safe going to somebody about how my math delivery can

be better." A common theme that came emerged was that teachers feel supported and receive constant feedback from the principal.

Another point related to communication is providing information to staff on the use of research-based techniques in mathematics. Teacher L had this to say, "She is there to help you find the resources that you need if you are struggling or not understanding something." The principal emphasized the point by further stating, "We focus on precise math language, following the mathematical practices, the math-talk and using manipulatives and our focus is building that foundation, a strong foundation for math because without that strong foundation it's hard to build upon it." Her knowledge of not only what is important to share but also finding the resources to share with staff came through when reviewing the transcripts. Leadership team member A felt that she knew what was necessary to share in her statement, "She's shared strategies from Doctor Nikki Newton and gathered the team together and said here is some good strategies that I feel like would be helpful in your grade level." This type of understanding of mathematics instruction and knowing what works with students is a key component of the leadership at this school. In working to build the capacity of the staff, the principal will incorporate book studies to promote what she would like to see happening in the math classrooms. Teachers work in grade level teams to review the content of the text and then implement those strategies in their classrooms.

Research Question 2: What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?

Review of data from teacher surveys, archival documents, and interviews was used to determine themes that emerged regarding leadership practices exhibited by an elementary principal in improving the instructional program in mathematics. The themes that emerged

provided the framework for analysis and discussion. The following four themes emerged

through a re-reading of the data and listening to digital transcripts: quality instruction, deep

understanding, developing teachers, and mathematical practices. These themes will be discussed

in further detail as they related to the research question.

Theme: Quality Instruction

Providing quality instruction for students was a theme that emerged through a review of

the data. The principal stated that the use of the essential question is an expectation that should

be evident in all classrooms when a lesson is launched. Teacher G responded with the

explanation of what that looks like in the classroom by saying, "I use it as a guide to introduce

quickly what skills are going to be taught…" Teacher P that was interviewed confirmed this

through her explanation stating, "We always start with an essential question, which helps the

students understand what they're learning." This was also further explained by teacher H saying,

"I think it's really important to see where your students are going so that you can get them there.

You need to know where they are expected to go." Additionally, the teachers in the focus group

made it clear that it is an expectation in the school and it is just part of what happens on a daily

basis within the classrooms. The leadership team described how teachers use the standards to

guide instruction within the classroom. Textbooks and other supplementary materials are

resources, but the standards provide the focus for what is happening in the classroom. Using

essential questions is expected in classrooms and is part of the daily work for teachers in

preparing their lessons.

According to the teacher survey data in Figure 9, 75.9% of the staff surveyed strongly

agreed that the implementation of teaching methods to varied learners is encouraged while

20.7% agreed with the statement and 3.4% were undecided. This use of teaching strategies for

varied learners is evident based on the following statement made by teacher G: "We have a variety of manipulatives just you know, showing different strategies on how to gain the same response you know, even though everybody's a different learner. So, we must show different ways of teaching the material."
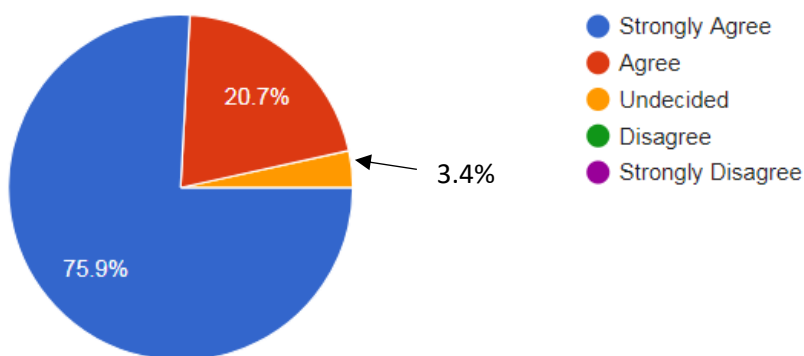
Figure 9
Implementation of teaching methods to varied learners is encouraged.

The principal stated, "I would expect to see manipulatives, I would expect to see perhaps models and then abstract representation depending upon where they are in the development of the concept. I would expect to see a gradual release of it and I would expect to see small group instruction, small group to fill in those gaps, to continue to work with manipulatives because they aren't quite there yet."   Teacher P described the differences between classrooms by saying, "Every classroom does look different. In my specific classroom, you are going to walk in, you'll see small groups. We differentiate, multiple levels, sometimes it's more than three groups. We'll practices as a class, I can use a whiteboard, just manipulatives, working with a partner, and then they come to my table, and we'll work in a small group, and they work independently to practice the skill." The teachers understand the importance of meeting individual needs because of this statement made by teacher O, "I put a lot of small group, turn and talks, student

involvement, and hands-on in my lessons." The leadership team echoed the importance of differentiation by saying that following a whole group lesson the teacher should definitely break into small groups and provide differentiation.

Along with differentiation, reflection is a common practice used within the structure of the school. Teachers have students respond in a reflective journal a response to the essential question that is posed at the beginning of the lesson. Teacher G stated, "The student's able to understand what they're learning and why they're learning it in the form of an essential question journal." Requiring students to reflect on the essential question is considered an expectation from the leadership at the school to be a part of daily lessons. Teacher G indicated that "it is basically a reflection of the essential question, what was my lesson asking of you and what do you know if it." Anchor charts are also part of the daily work at the school to aide students in reflecting on their work. Teacher E said, "I will say the anchor charts are expected of us, a lot of times somebody, when they walk by, they see your anchor chart, it sparks something. Then they come in, that can instigate conversation in the classroom too." The principal provided the following statement regarding reflection with students, "they know the students and know where they are and have conversations with teachers about how each student is learning, what are we doing to help this student." There are standard practices that teachers follow, but teachers have freedom to make adjustments or modifications in their lessons to meet student needs.

Theme: Deep Understanding

Based on the teacher survey data in Figure 10, 46.7% of the teachers surveyed strongly agree that teachers understand the elements to be included in a math lesson, while 46.7% agree with the statement. Also, 6.7% are undecided on whether teachers understand the elements to be included in a mathematics lesson. The principal stated, "Well I think it goes back to the teachers,

teachers who love math and have knowledge of math concepts as well as the skills to teach it and I think it goes to the leadership as well and our focus on it and our belief of its importance and our passion for and our vision for it." The leadership team expressed the idea of building a high quality, high performing staff begins with teachers having a deep understanding of quality instructional practices.
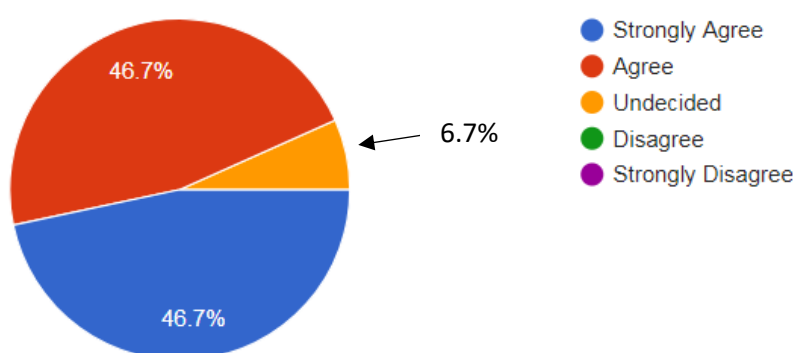
Figure 10
Teachers understand the essential elements in a mathematics lesson.

Another key understanding that evolved through interviews with teachers was for students to understand number sense. Teacher L stated, "It is just so essential to really getting understanding math later in life." Even though there are many other skills for students to learn and master, number sense kept coming up as an essential skill for students. Teacher E shared the following regarding number sense: "I think it's getting them comfortable with numbers, being able to break them apart, put them together, not feeling like they're going to break them. I think that number sense and confidence is important."

A member of the leadership team stated that as the curriculum has changed it is necessary to have students understand what they are doing and be able to explain their thinking. Teacher N interviewed said, "We're bringing metacognition into math." Giving students opportunities to

explain their thinking and understand the math concepts happens through student collaboration and conversation. This was considered a critical component with the school and emphasized by school leadership. Teacher I interviewed stated that "having students work in groups and pairs and explain their thinking helps teachers be able to pinpoint where they are having difficulties. Students often are able to come up with different ways and methods for solving problems." Thinking metacognitively gives students an opportunity, as stated by teacher J, "a way to justify thinking and listening and make sense of other people's thinking."

Uncovering misconceptions was another subtheme that emerged from the data analysis. One teacher H stated, "It is important to do an analysis of errors and misconceptions in math because I think that's where students go wrong is they start to do something that's wrong and then they get in the habit of continuing to do it wrong." Teacher I reiterated this by saying, "I think errors need to be addressed quickly and misconceptions need to be shown to them and then told how to avoid those." The principal considers it an essential part of her day to "inspect what we expect and that we correct the misconception of mathematical concepts within our adults." She is comfortable addressing teacher's misconceptions and informing them of what was wrong and then offering solutions for working with the students in the classroom.

Theme: Developing Teachers

Developing teachers was another theme that developed through a careful analysis of the data. The leadership team described the importance of professional development and the role the leadership team plays in creating and determining what training staff needs at the school. Teacher P stated, "I would say that my role in improving the mathematics instruction in the school is to constantly be attending professional development, making sure we are implementing what we're being taught, being familiar with the standards." Teacher O felt it was important to

be involved in looking at research-based strategies when she said, "And we also need to be doing research as to strategies that are working and trying different things." One way that the leadership team was involved in providing professional development to teachers was to be a mentor to teachers and provide support for teaching strategies for different students in order to help them be successful.

Providing support to teachers was considered another component that was evident within the school. The definition of support came in many different fashions. Collaboration among peers was just one way that teachers were provided support. Teacher O provided an analysis of the share sessions that are embedded as part of the monthly school processes when she stated, "I think when we share out with our colleagues, it does allow us to be open-minded, so you can see the strategy looks like this." Share sessions are collaborative gatherings of the school staff designed by the administrative team to allow teachers the opportunity to showcase strategies and activities that are used in the classroom. These sessions occur once a month for 45 minutes at the beginning of the school day prior to students arriving on campus.

The principal also sees the teacher's role in providing support through walk-throughs in classrooms, so she can coordinate teachers to assist each other with instructional strategies or techniques. She stated the following, "Spending time in classrooms helps me to see if we can help analyze what's happening in the classroom." Teachers in the school collaborate and support each other throughout the day as indicated by the following statement made by teacher P, "We're always talking, and I think that's a huge thing about teaching, you always have to ask questions, you always have to be willing to learn and grow." Teacher E stated, "I think having taught as long as I have, I share a lot with my colleagues, my team members"

Classroom visitations by the leadership team was another area that emerged from the data review to support teacher development. The principal stated, "My priorities are getting in the classroom and getting into every classroom, every day." The staff understands her role and has indicated that she provides feedback to them not only through classroom visits, but also through other forms of communication. Teacher I responded in the interview regarding purposeful feedback from the principal by saying, "She'll send a reminder to say you should be launching a particular mathematical practice and then she will come to your room to make sure it is happening and leave feedback regarding what was witnessed during the walkthrough." The leadership team members also participate in classroom walkthroughs and can provide feedback to teachers. Leadership team member B indicated through the interview the following statement, "My role would be you know, going into the classroom and through observations and through walkthroughs seeing if there is any weakness and if there are weaknesses, how are we going to address those areas of weakness." Once again, the principal stated, "My goal is always to get into every one of them and what I do change sometimes is where I start, so that I see something, I try to see something different." The principal is an instructional leader and the focus is on providing staff with expertise in instructional strategies and content knowledge.

Theme: Mathematical Practices

There is clear evidence from the staff survey data that the staff embeds the mathematical practices as part of the instructional practices at the school. The eight mathematical practices have been advocated by the Florida Department of Education and are delineated in Table 4.

Table 4: Mathematical Practices

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

The data in Figure 11 shows that 70% of the staff strongly agree with the statement and 30% of the staff agree with the statement. The principal believes it is necessary for staff to use precise math language when working with students. Leadership team member C stated, "I just think it's important, even as a counselor, when you are discussing with students or teachers that you understand the mathematical practices and what they're doing in the classroom." Providing students with the purpose for the lesson through a clear understanding of the mathematical practices is considered essential. Leadership team member C indicated the following, "If they know the mathematical practices and put those in play then they pretty much guide themselves through learning." Leadership team member A emphasized the following point, "if a student is proficient in the 8 mathematical practices, it really doesn't matter what specific skill they're learning in math, they can apply it."
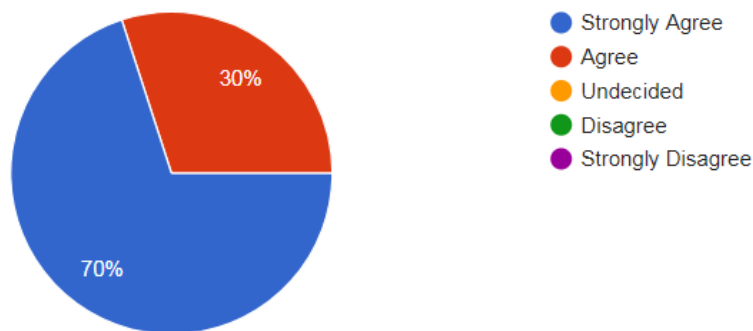
Figure 11
Mathematical practices are evident in daily instruction

The teaching staff that was interviewed also sees the value in the use of the mathematical practices and the connection to other grade levels. Teacher H stated, "The universal language in math in our school is really beneficial and our practices make sure that we are using that language so that it can stay fluid." The practices are a part of everything that takes place at the school as it relates to math and is summed it by a teacher E saying, "Mathematical practices. They permeate everything."

Although there is a focus on the use of the mathematical practices, the principal stated the following, "the mathematical practices are not comfortably pervasive in our school." The leadership team shared a structure that is in place to provide teachers with support and understanding of how to effectively implement and use the mathematical practices. The archival documents that were reviewed provided evidence of trainings and professional development activities that occurred throughout the year in a systematic way to help teachers understand the mathematical practices and support on how to implement them. Teacher E shared how the climate of her classroom was impacted based on the use of the mathematical practices. She stated, "I think the mathematical practices, being immersed in them also made it where I liked it when a child made a mistake. Because one there is an error, we can as a class talk through and

say, how do you fix this? It made it a little bit more of a relaxed atmosphere, where children, weren't afraid to make a mistake, which made it more relaxed and easier to learn I think."

Application of the mathematical practices is another sub theme that emerged from the data. Teacher P stated this about the mathematical practices, "the mathematical practices, does help the student's stop and think it almost gives them steps and processes to solve math problems." The principal stated, "we develop concepts through a concrete method, is it the essential learnings that we know that we apply and how we apply those learnings in the real world and where will see those again." The importance of providing students with an understanding of how to apply mathematical concepts into their own life was reiterated by teachers in the interviews. There was a belief about the consistency of the mathematical practices within the school. "The math language that is consistent across the grade levels. They need it and I hear kids using it," as stated by teacher O.

Research Question 3: What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

Review of data from teacher surveys, archival documents, and interviews was used to determine themes that emerged regarding leadership practices exhibited by an elementary principal in developing people to improve the instructional program in mathematics. The themes that emerged provided the framework for analysis and discussion. The following four themes emerged through a re-reading of the data and listening to digital transcripts: purpose, process, environment, and professional development. These themes were discussed in further detail as they related to the research question.

Theme: Purpose

Setting the purpose for the school year emerged as theme related to developing people within the organization. The principal stated, "I think it goes to the leadership as well and our focus on it and our belief of its importance and our passion for it and our vision for it." This statement is clear from leadership team member C that stated, "We've really been hammering growth mindset and making students aware that no matter where you are, you can always get better." The focus on mindset is a part of how the school operates based on a statement from a teacher E, "I think the willingness of everyone to follow what's expected and to embrace when even on the onset we think something is crazy, we will do it." The principal also described the idea, "Sometimes with teachers I think they don't believe in themselves, that they didn't have good experiences with math and therefore they don't feel confident." It was apparent through the interviews with staff and leadership team that the principal provides encouragement to staff.

As teachers are encouraged to focus on mathematics there is a need for the school to value mathematics instruction and a sense of urgency to achieve this goal. Teacher N stated, "We're constantly asked to evaluate what we're doing and how it contributes to student growth." Understanding the standards and knowing how to execute instruction to meet the standards is part of what is expected at the school. Teacher H said the following about goal setting, "I think it's really important to see where your students are going so that you can get them there." Leadership team member A stated, "Goal setting creates a positive influence because its talking about no matter where they are you know, we can still see progress and so it's the positive outlook of where you want to be and how are we going to get you there."

Teachers use multiple methods to work with students in mathematics to develop persistence. This is a focus for the school and expectation that student learning occurs and how

to encourage them to explore multiple ways of thinking. Teacher O said, "It is important to be able to anticipate how they're going to think incorrectly about a problem, what their mistakes are going to be, and then how to activate that prior schema and then lead their thinking." Another teacher interviewed indicated that her strength was to challenge her students to go further with problem solving and communicating those problems. Teachers at the school are focused on learning and using different strategies and understand that there is a need for students to keep moving forward and working through difficult problems.

Theme: Environment

The evidence from the staff survey in Figure 12 indicates that 66.7% strongly agreed and 30% agreed with the statement while 3.3% indicated they were undecided about this statement. This data indicates that the environment is characteristic of collaboration and support.
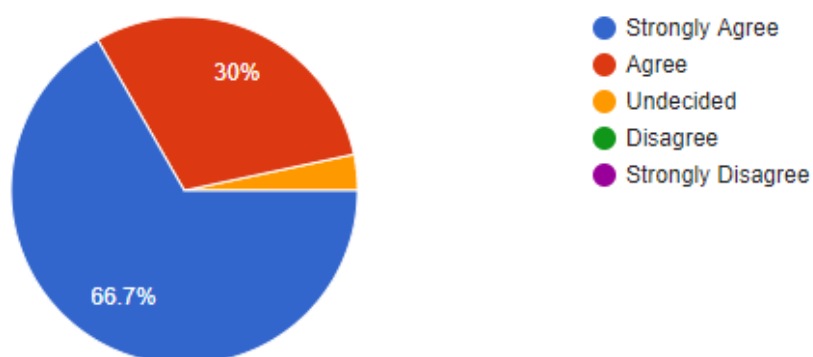
Figure 12
Collaboration of staff in improving math instruction is encouraged.

Teacher E that was interviewed stated, "I also know that there are some teachers that will go into other classes if a teacher is having a hard time, so they can model for a newer teacher what it looks like." This support is further clarified by an explanation from teacher E of the mentors that are in place at the school, "There's a mentor in place so new teachers, if they feel like they're floundering, they have a mentor they can go to." Another example of how the principal of the

school supports teachers through mentoring is when she described a conversation she had with a new teacher to the school, "A teacher came on board last year, was not new to teaching, but made it very clear that math was not her strength personally. She struggled with it and it made her nervous to teach 5th grade math and my words of wisdom to her was do whatever the mentor teacher tells you to do, that high impact teacher, do whatever she tells, you to do and you will be ok. When the data was released from the State the teacher that struggled with math had 82% of her students earn a level 3 or higher in math and had 80% of her students make a year's growth in learning."

Structured collaboration is designed at the school through monthly share sessions with the staff. Teachers indicated through the interview process that this type of collaboration occurs with all teachers at the school. The format is designed so that everyone has an opportunity to learn from each other and it does not matter the grade level taught or content area there is always something that can be used within the classroom. Teacher G stated, "Just that spark and say ok, well I can do this, but I can just add to it so that it can apply to my grade level." Teacher N described the share session in this way, "During share sessions, which is for the same mathematical practices, it's structured, because we're expected to be there, and we have to bring our proof and explain what we did and how it worked for our students." These sessions are just one component of the environment at the school.

Developing a community of learners is considered an essential part of the design that occurs at the school. The principal stated the following about how learning communities operate by saying, "Some of our teams quite honestly spend a whole lot of time together outside of school and my guess is that even their outside school meeting times look like a learning community." Teacher M described how the school operated they made the following statement,

"I might just literally go across the hall to another teacher and say, look. Something did not go right today. I need to hit it again tomorrow. How did it go in your room?" Teachers described this process as a fluid one that is part of how the school functions. As stated by teacher L, "I feel like we come up with some our best lessons or ideas just in a five-minute conversation for the next day or in the morning." Leadership team member C described how the school works as a community of learners by saying this," I think you have a lot of collaboration with the grade level and with it among the teachers."

Theme: Process

Processes are in place to provide teachers with opportunities to confirm their belief system as it relates to the overarching theme of the school. The principal sets the tone for the school and provides the leadership for the school with what is important and indicated that through the following statement, "If it's not a good use of our time, we don't have time for it." The understanding of that concept also funnels down to the leadership team with regards to the staff share sessions leadership team member A said, "It's just kind of built into the culture of the school." Teacher O described the connection to math: "We recognize that one of the foundational problems that our kids were having is that they didn't have a strong number sense. We brought in numeracy strategies and the mathematical practices to help students contextualize numbers." These belief systems are part of how the school operates to support students and work together.

The principal sets the expectations for the staff. She stated the following, "We always preach one of the things that we say a lot is that we cannot afford to have 18 kids, 22 kids, 25 kids not get what the rest of the school is getting." This type of leadership and consistent expectations for staff regarding the teaching of students is evident by the following statement

made by teacher H, "You have to effectively teach the math lessons to make sure they are understanding how to solve problems." She also stated, "we have school-wide problem-solving techniques." Teacher L echoed this sentiment by saying "I just think having consistent strategies that they see their entire elementary school lives is helpful."

Furthermore, using teacher leaders is a part of the processes evident in the school structure. The principal reported that the teacher leaders do their piece to support teachers. She stated this, "I have to be a part of it as well, but I don't' think I can do it alone. I don't believe that I could do it without those teacher leaders." Leadership team member C described the essential aspects of the teacher leaders by saying, "We use teacher leaders to introduce the mathematical practices to the new teachers. A teacher who's using it and you know, not just somebody standing up there saying this is what you do, and this is what I do, and it makes a difference I think." Teacher N interviewed also said, "Teacher leaders, who are confident in their teaching of math and passionate about helping others, can provide formal training presentations to teachers, and then individual assistance to teachers that are looking for ways to be more effective in the area of math, making sure they have passion for teaching mathematics, which can spark passion for math in other teachers." The principal summed up teacher leadership at her school in this way, "You don't have to, but you are given opportunities to step up to the plate to become a teacher leader and I think we have a reputation for growing teacher leaders."

Theme: Professional Learning

Teachers are provided with many opportunities at the school for professional learning in mathematics. Teacher G stated the following as it relates to training and professional development, "I mean there are learning sessions about the reading strategies, there's learning

sessions about the mathematical practices and then there's sharing sessions." Trainings for

teachers are made available to them in a constant and consistent manner. Leadership team

member A described how the school determines professional development by saying, "We

always look at each individual strand in specific areas so that if we're noticing trends in a

specific area we can make sure to provide professional development within that." The data in

Figure 13 showed 50% of the staff surveyed strongly agree and 33.3% agree, while 16.7% are

undecided about teachers being provided with professional development in the area of
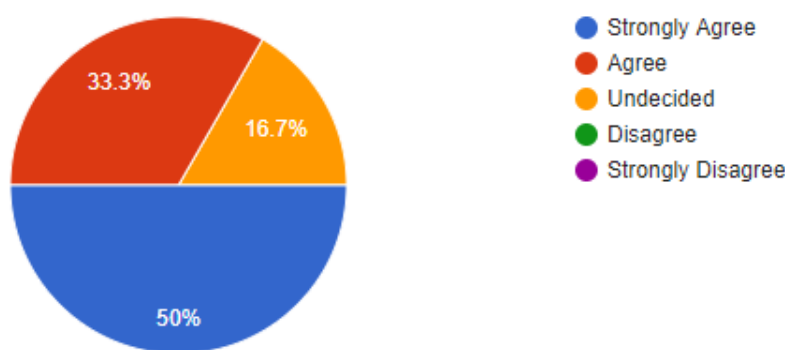
mathematics.

Figure 13
Teachers are provided professional development in the area of mathematics.

In conjunction with school-focused professional development there is also peer to peer

training. The principal described the peer to peer support through share sessions that are

conducted by teachers at the school. She described how the sessions help teachers have

conversations about the data and strategies that are implemented in the classroom. A member of

the leadership team described that the share sessions allow teachers to see how something is

being done and gives them ideas on how they might implement it in their classroom. Further

explained was the process for systematically launching the mathematical practices and then

supporting them with teachers sharing best practices with each other monthly.

Teachers also can participate in their own learning. Individual professional development plans are created by each teacher in the building in which a teacher can create their own individual plan for learning and growing as a teacher. One of the leadership team members described her role in looking for new strategies to share with teachers through reviewing video clips of effective teaching strategies on the internet to reading books about effective teaching strategies. There are many professional development opportunities that are available to teachers over the summer as well as during the school year. Teachers can choose what trainings are relevant to their needs. Teacher G described a summer training she attended by saying, "We went to a summer training, using egg cartons for fractions and just different kinds of ways that they presented manipulatives to us was like wow you know, that was really an eye opener for me." Allowing teachers to individualize professional development is part of the learning culture structure.

Research Question 4: What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?

Review of data from teacher surveys, archival documents, and interviews was used to determine themes that emerged systems utilized by an elementary principal in refining the organization to improve the instructional program in mathematics. The themes that emerged provided the framework for analysis and discussion. The following four themes emerged through a re-reading of the data and listening to digital transcripts: fear, misconceptions, interpretation, and balance. These themes will be discussed in further detail as they related to the research question.

Theme: Fear

One of the key issues that emerged from the data in this area was a sense of fear. First there was fear from parents regarding their support for students in mathematics. Teachers are responsible for communicating to parents about the expectations in the classroom and understanding the standards that are being taught. Teacher O responded with the following statement, "I think the more we communicate with them and get them on board and change their thinking, the better the support might be at home." As the leader refines the organization it is imperative that fear is addressed with parents. Leadership team member C was quoted by saying, "I still see the fact that parents were still taught math in a completely different way still being a hindrance."

The leadership at the school understands the challenges that they are faced with and conversation continues to occur regarding the challenges in keeping up with the changes and communicating those to families. As the school determines next steps, they understand the importance of acknowledging the fact that there is a fear and are constantly looking for ways to address the issue. Teacher I responded with how the school is addressing this by saying, "I think our school addresses that with the whole growth mindset."

Theme: Misconceptions

Addressing misconceptions is another area that emerged from reviewing the data. The principal indicated that when she sees something in a classroom that is a misconception she addresses it. She stated the following about her daily work by saying, "Well I consider my walkthroughs and my daily visits, probably key in seeing those patterns and I address any misconceptions or errors or concerns right away in math, because I find that very often as adults, so many adults were not comfortable with math." She continued to state the following, "I will

spend time teaching math to our staff in little snippets especially when I see something that it's like well we can't continue to do that we just talked about this before."

The principal firmly believes that her actions support the development of teachers understanding of mathematics. Teacher P stated that the share sessions with the staff are important because there are misconceptions about mathematics and it is important that they are addressed with adults as well as the students. Teacher O stated the following about the faculty share sessions by saying, "The more support we give them, I think the more comfortable they'll feel with teaching it to the kids." Leadership team member B felt that it was important to observe and support teachers by saying, "It's just you know being in the classroom daily and watching teacher and noticing what is happening."

Theme: Interpretation

Teachers understand the need to not only know the standards but be able to interpret what they mean. Teacher P stated, "I would say that my role in improving the mathematics instruction is to make sure we're implementing what we're being taught and being familiar with the standards." Teacher O reiterated this by saying, "I have made it my business to know the standards really well." This idea of taking time to really understand the standards and how to support the students was considered essential when she went on to say, "We need to be familiar with the standards." As teachers continue to delve into the complexity of the standards they are looking for ways to incorporate strategies and ideas into other areas. Teacher G stated this, "I think that's one of my challenges that you know, that as instructors try to face is you know, how can I implement this strategy so that I can kind of get them where they're going with this."

The principal believes that "we must have proper understanding of math as we teach children." She stated the following about teachers, "I think most teachers grew up learning math

through algorithms and not necessarily understanding why an algorithm is structured the way it is, so we've really pushed to go back to the concept to building the understanding of the concept." Teacher G believes that using the mathematical practices is imperative in helping students understand mathematics by saying, "these practices it's research-based that they do work, and they help students develop a better thinking of how they think about math." Refining the organization to meet the needs of students through revisiting the standards and developing a deeper understanding of the mathematical practices is part of the processes as discussed by the interview participants.

Theme: Balance

Balancing time was a theme that was evident from teachers and the leadership team at the school. The principal stated the following about time, "I think the time to teach to the students and time for teacher to become more comfortable with really understanding what and why math operates the way it does." Teacher L reiterated this by saying, "There's never enough time to teach everything they way you want to teach it. So, I think time is a big factor in it as well." Teacher E followed up by saying, "Because when you are trying to get them to do that higher order thinking and that deeper thinking onto a problem, you want them to do their turn and talks, you want them to be able to share ideas and learn from each other, you will run out of time." Through understanding the challenges and working with the staff, the principal has the autonomy to make the adjustments to the schedule with professional development and with instructional time for students.

The second area to balance is expectations. The principal believes that the success of the school is due to the clear processes, systems and non-negotiables that were put into place on day one. A teacher reiterated that they understand what is expected and that she is consistent with

what she wants to see happen in the classroom and how it occurs. The principal is clear that questioning during a lesson is necessary based on the following statement, "The whole questioning piece is one of my passions as equal to math because really, without the basis of good questioning I think all lessons suffer." Teacher F said, "She comes in and monitors your type of questioning. She says your questioning is what leads to higher order lessons, which leads classroom management, it affects everything." The principal understands the need to balance the expectations and provide clear and concise understanding of what is expected.

Theme: Opportunity

Teachers are provided with a multitude of opportunities to observe and learn from each other. Teacher N stated, "I really think the experience and observation of other teachers makes the biggest difference." Another teacher stated that they had the flexibility to go into each other's classroom or another classroom to observe and gather new ideas for teaching a concept or skill. The principal creates the structure within the school to allow for observations with other teachers. She firmly believes it is imperative that the opportunity for observation is given to teachers by saying, "There isn't anything that we won't do to try to make a teacher successful if we can possibly do it and have become more and more creative with how to support teachers." Teacher H had this to say about opportunities to observe, "I think that at our school we're provided with a lot of opportunities to see math lessons, the results of the math lessons in different grade levels and different teachers."

Communication with staff is considered another area that occurs frequently. Teachers stated that they meet regularly and collaborate often regarding curriculum, strategies, and sharing ideas. The process of cross-grade level communication also occurs, and teachers are willing to participate and support each other. The principal relies on teacher leaders to support the vision

and mission of the school through collaborative activities and trainings. Teacher M indicated the following when asked about collaboration and sharing at the school, "We go through a series of share sessions where veteran teachers and new teachers come together to share artifacts of what has been effective in the classroom in hopes that new teachers learn from it or even better when teachers learn from another teachers' lesson." The principal believes in being a curriculum leader and stated the following, "You know we try to minimize non-curriculum activities and as you know, we don't do fundraisers, we don't do field trips, we don't collect money, so we can do curriculum-based focus."

The staff survey data in Figure 14: Clear processes and procedures aimed at improving student achievement in math are evident provided evidence that 53.3% of the staff strongly agreed with the statement, 40% of the staff agreed with the statement, and 6.7% disagreed with the statement. Based on the survey data and the interviews with teachers and the principal, expectations regarding mathematics is clear.
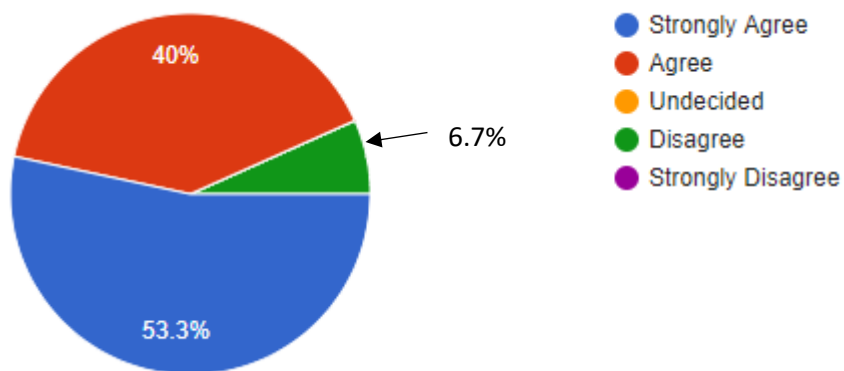
Figure 14

Clear processes and procedures aimed at improving student achievement in mathematics are evident.

Summary

The purpose of this qualitative case study was to understand the behaviors, actions, and systems a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics. The overarching research question regarding leadership practices that exist with an elementary principal as those practices influence mathematics instructional techniques and student achievement in a small rural school district guided the study through a review of archival documents, survey data, and interviews with teachers, the school leadership team, and the principal of the school.

Themes related to the four research questions emerged through open coding and triangulation of data. The following themes emerged through data analysis: expectations, culture, visibility, communication, quality instruction, deep understanding, developing teachers, mathematical practices, purpose, environment, process, professional learning, knowledge, interpretation, balance, and opportunity. A systematic description for each theme as it related to the research questions was developed to assist with the organization of the content collected.

Chapter 5 includes interpretations of findings and a summary of conclusions related to the overarching research question and sub-questions. The discussion includes how the findings from the case study research relate to the central body of research regarding leadership practices. Additionally, the chapter includes a discussion on the significance of the study for other practitioners in the field, implications, and recommendations for further research.

CHAPTER FIVE CONCLUSION

Leaders have a direct impact on the development of students that are successful and productive members of society (Garrett-Staib & Maninger, 2012). Unique problems require different solutions and the leader must be able to make decisions that are best for the school community (Larsen & Hunter, 2014). Leadership components such as, facilitating school culture, developing teacher leaders, and creating a professional learning environment are necessary to improve student achievement (Hoppey & McLeskey, 2010). The work of Leithwood and Louis (2012), which explored leadership practices and the relationships between the leader's goal of setting direction for the school, the leader developing people, the leader refining the organization, and the leader improving the instructional program were utilized as the theoretical framework for this study.

This chapter provides an overview of the problem statement, the purpose of the study, research questions, methodology, and discussion of the results. A summary of the qualitative case study research along with recommendations for further research and implications for professional practice are also included. According to Creswell (2013), case study methodology allows the researcher to gain a deeper understanding regarding a theme or topic.

Problem Statement

Structures created by school leaders to support teaching and learning are a trusting environment, professional development, common teacher planning, and encouraging reflective practice (Youngs & King, 2002). These are embedded as a part of each core leadership practice and work in tandem with the others under the leadership of the principal (Giles, 2007). The simultaneous actions occur and are carried out through direction from the school principal (Giles, 2007).

Communication and collaboration are essential elements that occur concurrently within the flow of the organization (Youngs & King, 2002). For schools to be successful, changes must take place in the structure of how decisions are made, in the instructional strategies used and collaboration among stakeholders. Teachers emphasize the importance of their role as a way to support the culture of learning in the schools and to develop their skills in communication, collaboration, and instructional expertise (Stumbo & McWalters, 2011).

Principals understanding effective instructional practices and conveying their knowledge to staff is a fundamental practice in schools (Katterfeld, 2013). Providing teachers with feedback is another component used by school leaders to support teaching and learning (Grissom, Loeb, & Master, 2013). Developing a common vision and integration and alignment of resources supports shifting teacher beliefs about mathematics (Hopkins, Spillane, Jakopovic, & Heaton, 2013).

Consequently, it is necessary to identify what these structures and practices are, and how they are implemented. Schools and districts across the nation are looking for ways to improve mathematics teaching and learning (Campbell & Malkus, 2011). When creating change within a school, the principal is a critical component of implementing and sustaining change over time (Shouppe & Pate, 2010). The problem to address is understanding what design structures are used to increase student achievement in the area of mathematics. For this reason, the purpose of this qualitative case study is to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

Purpose

Schools are increasingly looking at the principal as an instructional leader, overseeing teaching and learning. In essence, school principals create environments where effective instructional strategies are implemented as part of daily teaching practices. A close look at the teaching practices that are evident in the school structure will help provide understanding of what these practices are and how they impact mathematics achievement at a rural elementary school in Florida. Furthermore, the purpose of this study is to understand the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

Research Questions

Overarching Question: What leadership practices exist with an elementary principal as those practices influence mathematics instructional techniques and student achievement in a small rural school district? The following sub-questions were used to answer the overarching question.

1. What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?

2. What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?

3. What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

4. What systems are utilized by an elementary school principal to refine the organization to improve the instructional program in mathematics?

Methodology

This study was conducted using a qualitative case study methodology. According to Creswell (2013), this type of research is based on a review of current real-life systems reviewed by collecting data through multiple sources. The research study focused on the organization and processes, not on recording the life stories of the individuals (Yin, 2014). The population of the study included the principal, leadership team, and instructional staff of the school. Research techniques included surveys, interviews, and review of archival documents.

The data that was collected uncovered major and minor themes that were relevant at the school. Creswell (2013) explained the importance of triangulating data "through locating evidence to document a code or theme in different sources of data." Since the purpose of this study was seeking to understand leadership, a case study of qualitative inquiry was designed. Surveys, focus group interviews, individual interviews, and an archival document review was developed. Fifteen teachers participated in interviews, which were conducted face-to-face with audio recording. After completing each focus group interview that lasted from 45 to 60 minutes in length, interviews were transcribed, reviewed for accuracy, and coded for themes.

Each interview was analyzed and triangulated with other data collected. The qualitative analysis was conducted by surveying the instructional staff, interviewing members of the leadership team, interviewing the principal, interviewing teachers who volunteered to participate in the focus group, and reviewing school artifacts to make meaning and describe the participants' lived experiences.

Data was prepared and organized into themes through open coding. The data collected from the interviews, surveys, and other sources of information was coded in a similar manner so inferences could be made regarding the information presented in the study. Codes were assigned

to meaningful words and phrases with the focus on research questions and relationship to the theoretical framework.

Findings

Research Question 1: What leadership practices are exhibited by an elementary school principal in setting direction to design curriculum in mathematics?

The following four themes emerged from a review of the qualitative data: expectations, culture, visibility, and communication (Figure 15).

Figure 15
Themes that emerged around setting direction

Setting direction for the school is significant for leaders as they construct vision and mission with staff and monitor the focus as part of their leadership practice (Leithwood, Patten, & Jantzi, 2010). This correlates with the following statement from leadership team member D, "The principal plays a tremendous role in helping with math instruction." The principal sees her role as providing support and direction for the staff. Alignment of the vision and shaping the environment to maximize staff potential are critical components of how leaders provide direction and focus for a school (Winterman, 2008). The practices of setting direction identified by the principal are evident not only through interviews with staff, but also through the staff survey and confirmed through research.

Providing clear expectations was denoted as an important component of the function of a school. The principal indicated that the beginning of the school year is "all about setting the purpose." Teacher N, one of the participants in the case study made the following statement, "The principal values mathematics instruction and demonstrates this through clearly communicated expectations and feedback." The research by Nelson (2010) confirmed that it matters what principals know and believe about mathematics relative to how it is learned and how it should be taught. The teacher survey data also supports this research with 70% of teachers surveyed stating that they strongly agree with the statement that the vision and mission of the school is focused on increasing student achievement in mathematics. A well-developed vision provides teachers with the aptitude of how to implement school-based expectations (Katterfeld, 2013). Leadership team member A said, "She's a leader of academics, that's definitely what I would say."

School culture is another theme that emerged through a review of the data. Finding ways to ensure the people within the organization have a strong sense of trust are essential tasks for

leaders (Youngs & King, 2002). Leadership team member A was interviewed and stated the following, "I think one of our strengths is that we do things very systematically and very school wide." This statement confirms the idea that teachers work together as part of a team. Leadership team member B said, "It all goes back to the collaboration and that sharing, the share sessions, the learning, it all goes hand in hand."

The culture at the school is one that is based on collaboration and sharing among the staff. Building a culture of teaching and learning is an important standard, which places responsibility on principals for developing, advocating, and nurturing a culture that is conducive to student learning and staff professional growth (Donaldson, 2013; Katterfeld, 2013). The principal emphasizes the importance of collaboration and coordinates this through developing and maintaining a learning culture within the school. Evidence also points to the fact that schools with strong learning cultures are more likely to have high quality instruction (Sebastian & Allensworth, 2012). The principal maintains a collaborative learning culture through the proposition that the school is all in this together. Her focus on collaboration is also evidenced through the design and implementation of monthly share sessions. Creating effective school culture is one of the tools leaders might utililze to impact curriculum change (Winterman, 2008). The principal's notion about nurturing a culture of success is important and noted as part of how the school conducts business. Teacher N stated, "The principal instills feelings of teamwork, a desire to help one another."

Visibility of the principal in setting direction is another theme that became evident through a review of the data. Teacher P said that the purpose for the principal being in the classrooms every day was, "so she would know that we are on task, we are doing what we are supposed to be doing." Leaders must be able to listen carefully to teachers and understand the

support they need with mathematics instruction (Burch & Spillane, 2003). Knowing what is

happening in the classrooms and aiding with instructional strategies is an integral part of the

principal's role. Teacher M stated, "The principal is visible and available. She is supposed to

witness teaching in action." The principal expressed the importance of classroom visits by

saying, "My goal is always to get into every one of them." Principals influence school staff

through providing leadership to guide school efforts in improving student achievement

(Winterman, 2008).

Leadership team member A stated, "She believes that providing feedback to teachers is

an essential part of her daily routine." The principal believes that daily visits to classrooms are a

key component of her daily work. Creating and maintaining strong systems focused on

increasing student achievement are correlated to strong leadership (Mitchell & Castle, 2005;

Burch & Spillane, 2003; Sebastian & Allensworth, 2012; Shouppe & Pate, 2010). Providing and

coordinating systems to ensure teachers are using mathematics instructional techniques that meet

student needs are part of the daily work of a principal. This is done through visiting classrooms,

providing feedback and giving support. The principal states that when she conducts

walkthroughs to provide support to teachers because, "I find that very often adults, so many

adults were not comfortable with math."

Visibility is a fundamental component of how a school provides support to teachers.

Teachers that were interviewed indicated that it was important knowing that the leader was

around and supportive. The principal is intricately involved in the daily operation of instruction

in classrooms at the school and understands the needs and support systems that must be created

and maintained. Understanding how to mediate staff towards a common focus is a skill needed to

ensure the intent of the organization (Fisher, 2011). The principal is pivotal in setting direction

for the school and determining what is needed for effective classroom instruction.

Communication became apparent following a review of the data. It is necessary for

leaders to communicate the purpose and plan of the organization (Fullan, 2005). The principal

emphasized the following point, "My focus and my goal is to focus on instruction and

developing teacher to be the very best instructional leaders." This statement supports the fact

that her communication and connection to instruction is a necessary component of her daily

work. Teacher M stated, "I'm comfortable going to the principal to tell her something I don't

know how to do something, and she is right there with me." This type of collaboarative

relationship exists between teachers and the principal at the school.

Providing feedback to teachers on instructional practices in mathematics is an ongoing

practice that occurs at the school. Teacher O stated, "She will actually give us feedback that is

constructive." Facilitation techniques by the principal is vital in working with staff to provide

collaboration for developing instructional strategies (Yager & Yager, 2011). Teacher P

confirmed this statement by saying, "Whenever we get observations, I know that my feedback is

always very specific." These techniques used by the principal to support teaching and learning

are evident and supported by research in improving academic achievement (Shatzer, Caldarella,

Hallam, & Brown, 2014).

Knowing and understanding instructional techniques in mathematics by the principal is

considered important (Nelson, 2010). This is also evidenced by how principals leverage their

ability to impact teachers by providing opportunities for curriculum development (Urick &

Bowers, 2014). The principal concurred with the research by stating, "Our focus is building a

strong foundation, a strong foundation for math because without that strong foundation it's hard

to build upon it." Leadership team member A stated that the principal would meet with grade level teams to share instructional strategies and best practices based on the work of Dr. Nikki Newton. Teacher L had this to say regarding support from the principal, "She is there to help you find the resources that you need if you are struggling or not understanding something." The statements made by teachers and the principal all point to the fact that communication is an essential component in setting direction for designing curriculum in mathematics.

Research Question 2: What leadership practices are exhibited by an elementary school principal in improving the instructional program in mathematics?

The following four themes emerged from a review of the qualitative data: developing quality instruction, creating a deep understanding, sustaining teacher capacity, and understanding the mathematical practices (Figure 16).

Improving the instructional program in mathematics is a practice used by leaders. Leadership at school drives instruction and the building level leadership should be training in what to look for when determining how to design the curriculum to meet the needs of the organization (McGuigan & Hoy, 2006). The leadership team described how teachers use the standards to guide the instruction within the classroom. Textbooks and supplementary materials are resources, but the standards provide the focus for what is happening in the classroom.

Developing quality instruction was a practice used by the principal to improve the instructional program in mathematics. Instructional leadership provides the basis for the specific practices that administrators not only need to think about, but specifically need to perform (Shatzer, Caldarella, Hallam, & Brown, 2014). Providing teachers with specific expectations was evident after a review of the data. The principal expects teachers to use essential questions to guide their daily lessons. Teacher G confirmed the use of the essential question by saying, "I

use it as a guide to introduce quickly what skills are going to be taught…" The focus group interviews from teachers also confirmed the fact that the expectation of using essential questions was how teachers focused lessons and used the standards to guide their daily instruction.

Figure 16
Themes that emerged from improving the instructional program

Another expectation that was revealed through data analysis was providing varied instruction to students. Teacher P described the differences in classrooms by saying, "Every classroom does look different." The principal confirmed this by saying, "I would expect to see

small group instruction, small group to fill in those gaps." The research supports the idea of allowing teachers flexibility in classrooms. Principals who showed greater student achievement at their school sites were noted as allowing teachers flexibility in being creative and innovative in their approaches to teaching and learning (Nash, 2010). In addition to using a variety of teaching strategies, teachers are also expected to use student discourse within lessons. The use of student talk in a lesson can increase mathematical knowledge and understanding (Franke, et al., 2009). Teacher F indicated that she uses small groups, turn and talks, and student involvement in her math lessons. The survey data also confirmed this through 75.9% who strongly agreed indicating that implementation of teaching methods to varied learners is encouraged while 20.7% agreed to the statement. The data collected clearly indicates that the teachers at the school are encouraged to use a variety of strategies with students.

Creating a deep understanding emerged as a practice used by principals to improve the instructional program in mathematics. Teachers need to understand how to help students solve problems, not just memorize facts (Stein & Kaufman, 2010). Using metacognitive strategies in math lessons was reiterated by teacher N by saying, "We're bringing metacognition into math." She further explained how students are expected to explain their thinking as they work through math problems. A critical component of the school is using collaboration and conversation during math lessons. This is supported by research that student discourse in mathematics builds understanding of mathematical concepts (Katterfeld, 2013; Puchner, Taylor, O'Donnell, & Fick, 2008). Providing students with opportunities to explain their thinking and have converstation in math classes is not only expected, but part of the way they do business.

The principal's belief about her role in improving the instructional program is evident through what she says about her daily work to, "inspect what we expect and that we correct the

misconception of mathematical concepts within our adults." The principal explained that she is not afraid to address teacher misconceptions about mathematical concepts and provide support that is needed to improve the mathematics program on her campus. Effective principals must know what is going on in the clasroom and understand how to make improvements (Mitchell & Castle, 2005).

Developing teachers and providing the needed training and support was deemed a key component at the school. Teacher P indicated the following, "I would say that my role in improving mathematics instruction in the school is to constantly be attending professional development." Research states that the leader helps teachers use current research in best practices and instructional strategies to reach school goals for student performance through coaching and content support in mathematics (Mangin, 2007; Campbell & Malkus, 2011; Hopkins, Spillane, Jakopovic, & Heaton, 2013). Teacher P stated that it was important to be involved in reviewing research-based strategies and said, "We also need to be doing research to strategies that are working and trying different things." Providing teachers with the tools necessary is one element that is part of the structure at the school.

School leaders that focus on the use of instructional strategies and provide feedback to teachers have increased student achievement (Donaldson, 2013; Grissom, Loeb, & Master, 2013). The principal sees her role as providing direct support to teachers through classroom walkthroughs. She stated the following, "Spending time in classrooms helps me to see if we can analyze what's happening in the classroom." The principal also understands the need to support teachers understanding not only instructional strategies, but building capacity with content knowledge in mathematics. Teacher O provided evidence through feedback from the principal where the principal indicated that the teacher needed to review a particular concept due to her

lack of explanation during the lesson. The principal referred the teacher to review the mathematical practices and include those in her lesson plans in the future. Connected to this statement is the fact that better performing schools develop structures that provide principals with time to suport teachers on instructional practices as part of their daily work (Grissom, Loeb, & Master, 2013; Mitchell & Castle, 2005; Burch & Spillane, 2003). These structures were clearly evident as a member of the leadership team indicated that their goal is to be in classrooms and provide support to teachers.

Another leadership practice to improve the instructional program is understanding how to implement the mathematical practices as part of the daily instructional techniques at the school. The research states that there is a strong correlation between teachers' content knowledge and the mathematical practices (Polly, Neale, & Pugalee, 2014; Puchner, Taylor, O'Donnell, & Fick, 2008; Wilkins, 2008;). Leadership team member C confirmed the connection with the mathematical practices by saying, "If they know the mathematical practices and put those in play then they pretty much guide themselves through learning." This was also reaffirmed by leadership team member A by stating, "if a student is proficient in the 8 mathematical practices, it really doesn't matter what specific skill they're learning in math, they can apply it."

In regards to building teacher's content knowledge in mathematics, staff training is crucial to building teacher's knowledge (Burch & Spillane, 2003). Developing teachers to understand and implement mathematial practices in the school is achieved through professional development structures as evdienced in the review of the archival documents. The principal also reitierated the fact that concepts with staff are developed through a concrete method. She also stated, "the mathematical practices are not comfortably pervasive in our school." Her focus was to continue to embed training and support in helping teachers understand how to use the

practices in their daily work. The survey data regarding evidence of mathematical practices in the school indicated that 70% of the staff strongly agrees and 30% agree that they are evident in daily instruction. This is confirmed by the research that states the importance of developing mathematically proficient students through standards-based instruction (Katterfeld, 2013).

Research Question 3: What leadership practices are exhibited by an elementary school principal in developing people to improve the instructional program in mathematics?

The following four themes emerged from a review of the qualitative data: creating purpose, nurturing the environment, maintaining processes, and supporting professional learning (Figure 17). The school leader sets the tone and develops people within the school. Hiring high-quality teachers for classroom is an important function of the principal and can have a significant impact on increasing student achievement (Donaldson, 2013). It is not just about choosing the right teacher for the school, but developing the teacher is a fundamental component for leaders in schools which, in turn, can improve academic achievement.

Leaders develop people through creating purpose as they construct teacher readiness and a focus on improving instructional goals. Providing support and developing people to accomplish goals for the school are key components of capacity building (Leithwood & Louis, Louis, 2012). The principal verified the research by stating, "I think it goes to the leadership as well and our focus on it and our belief of its importance and our passion for it and our vision for it." Having a positive mindset about mathematics and working towards this as a goal was noted by many interviewees. The principal described how she emphasizes creating a positive mindset with the staff by saying, "Sometimes with teachers, I think they don't believe in themselves, that they didn't have good experiences with math and therefore they don't feel confident." This

demonstrates how the leader sets the purpose for the school through creating a positive mindset about improving the instructional program.
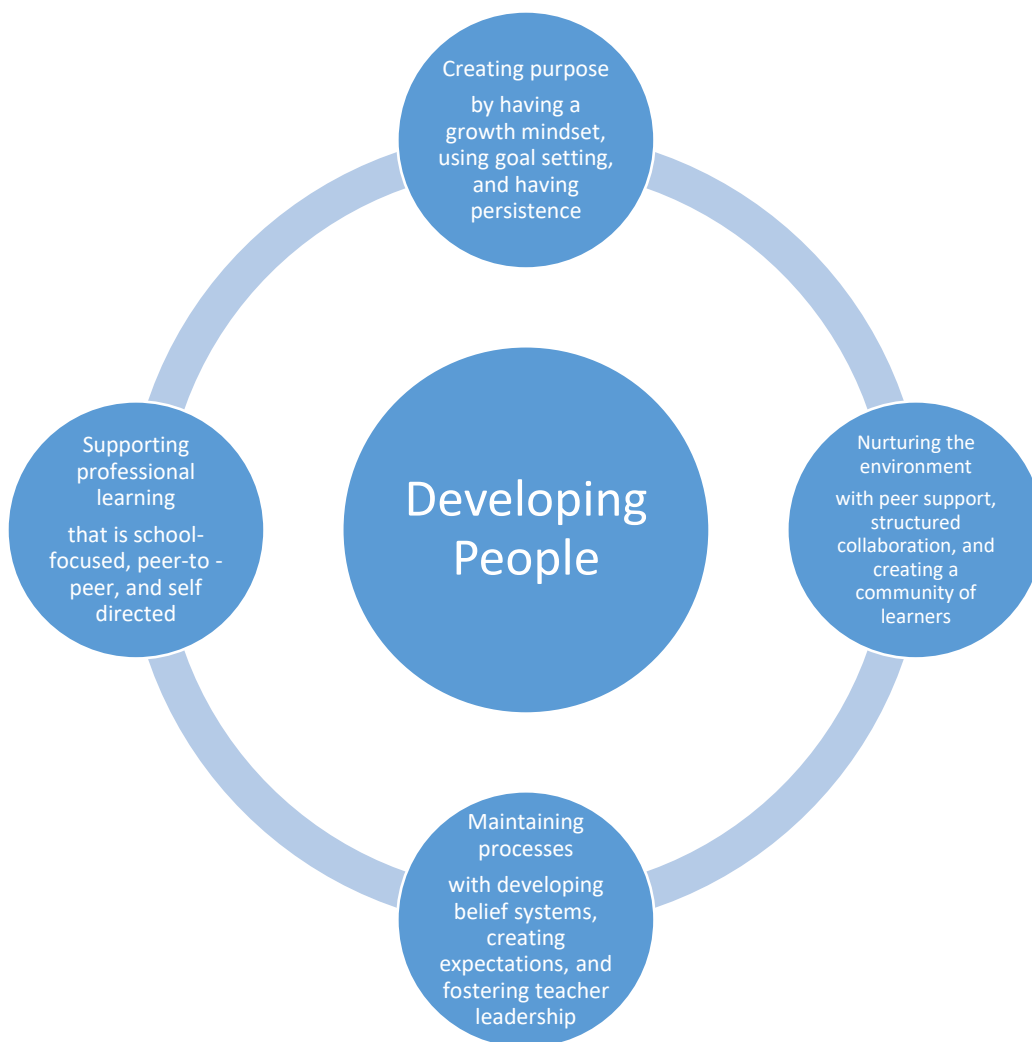
Figure 17
Themes that emerged from developing people

Another study described the importance of setting high expectations for students and staff, communicating a clear vision, and developing a school culture (Vale, et al., 2010). The culture at the school is based on a value of improving instruction and an urgency to achieve the goal. Teacher N stated, "We're constantly asked to evaluate what we're doing and how it contributes to student growth." Leadership team member A further explained this by saying "Goal setting creates a positve influence because its talking about no matter where they are you

know, we can still see progress and so it's the postive outlook of where you want to be and how we are going to get you there." This type of focus and disposition are part of the school culture and create a climate that encouarges teachers to improve their instructional practices.

The environment at the school created by the principal fosters a sense of developing people to improve the instructional program. The literature suggests that fostering a professional learning community and developing teachers' mathematical knowledge for teaching to support goals and interests are key to training needs (Burch & Spillane, 2003; Donaldson, 2013; Koellner, Jacobs, & Borko, 2011; Mangin, 2007; Polly, Neale, & Pugalee, 2014; Sebastian & Allensworth, 2012; Stein & Kaufman, 2010). Teachers at the school work together and support each other as stated by teacher E, "I also know that there are some teachers that will go into other classes if a teacher is having a hard time so they can model for a newer teacher what it looks like." This statement is further clarified by research about building collaborative structures and providing individualized support that is considered to be a set of practices that can influence student acheivement (Sun & Leithwood, 2012; Youngs & King, 2002).

Providing opportunities for staff to collaborate and support each other are part of the structures and support systems that are evident. Teacher N described the share session by saying, "During share sessions, which is for the same mathematical practices, it's structures, because we're expected to be there, and we have to bring our proof and explain what we did and how it worked for students." These types of sessions are established to support teachers in developing their pedagogy. The research is clear about how principals identify and assist with the development of the needs of the school staff as well as find ways to provide opportunities for staff members to collaborate and to enhance learning opportunities for students (Leithwood, Patten, & Jantzi, 2010; Koellner, Jacobs, & Borko, 2011; Sun & Leithwood, 2012; Yager &

Yager, 2011). The principal designs the opportunites for teachers to work together by placement

of their classrooms and structures for teams to meet and share ideas through the professional

development calendar.

Processes within the school configuration are aligned to the vision and mission, which is

connected to increased student achievement. The school principal orchestrates all the

components that a school is involved with to develop people. School leaders must shape the

environment to maximize the potential of the staff (Winterman, 2008). The principal described

her belief about how time is used in the school by saying, "If it's not a good use of our time, we

don't have time for it." A review of the archival documents found a master schedule that

allocates instructional time for the core content areas. This schedule is the basis for how the

school operates and teachers are expected to follow the times listed with regards to instruction.

The principal, leadership team, and staff are focused on increasing student achievement

and the focus is on what strategies and techniques are best for students. These expectations are

considered a fundamental piece of how the school conducts business. The principal purported

the following, "You have to effectively teach the math lessons to make sure they are

understanding how to solve problems." When teachers view the principal as a member of the

leadership team who will support and monitor initiatives, the depth of implementation is

increased (Yager & Yager, 2011). The teachers interviewed confirmed this by stating the

importance of having support from the principal and having consistent expectations to follow

regarding the use of the mathematical practices and manipulatives in the classroom.

Teacher leaders are part of the organizational structure to not only support new teachers,

but also all teachers. The principal indicated that she cannot do the work alone by saying, "I

have to be a part of it as well, but I don't think I can do it alone. I don't believe I could do it

without those teacher leaders." Principals leverage their ability to impact teachers by providing leadership opportunities in curriculum development (Urick & Bowers, 2014). The leadership team further explained the use of teacher leaders to develop staff through training and explanations of the mathematical practices. The involvement of teachers through chairing work groups and reviewing student work provided them with the understanding to be able to gain a district perspective about teaching of mathematics (Burch & Spillane, 2003). Research and data from this study indicate that using teacher leaders to improve mathematics instruction is a pivotal component in developing people to improve the instructional program.

School leaders can improve teaching and learning through purposeful training and professional development (Donaldson, 2013) which can have a meaningful impact on increasing teachers' mathematical knowledge and increasing student-centered math practices (Polly, Neale, & Pugalee, 2014). The survey data supported the research regarding teachers being provided with professional development in mathematics, with 50% of the teachers stating they strongly agree with the statement and 33.3% stating they agree with the statement. The principal described how share sessions are utilized to assist teachers in understanding the mathematical practices and how to most effectively implement the strategies in the classroom.

Teachers create their own path for individualized professional development. These specific plans are developed by teachers through collaboration with the principal in determining areas of need and growth, which is based on a review of student achievement data. Teacher G described a professional development that she attended by saying the following, "We went to a summer training using egg cartons for fractions and just different kinds of ways that they presented manipulatives to us was like wow you know, that was really an eye opener for me."

Research also clearly supports that individual professional development should be organized around teachers' needs (Yager & Yager, 2011).

Research Question 4: What leadership practices are exhibited by an elementary school principal to refine the organization to improve the instructional program in mathematics?

The following four themes emerged from a review of the qualitative data: acknowledging misconceptions and fear, interpreting standards and the mathematical practices, balancing time and expectations, and creating opportunities for observation and communication (Figure 18). Leaders have the capacity to develop systems and processes to refine the organization. Effective principals encourage their staff to reflect and grow with instructional practices and to become risk-takers (Winterman, 2008). Leaders of change guide and provoke their staff to explore options that address the needs of their students while also providing the environment that makes risk-taking safer.

Although the beliefs of teachers have changed over time regarding mathematics instruction (Wilkins, 2008; Bursal & Paznokas, 2006), it is important to address any fears regarding mathematics instruction. Teachers must take the initiative, based on their own convictions, about how mathematics is taught effectively in their classrooms and provide students with student-centered activities that are noted in research to increase student achievement (Gningue, Peach, & Schroder, 2013; Polly, Neale, & Pugalee, 2014; Sheldon, Epstein, & Galindo, 2010). Leadership team member C indicated a barrier with mathematics instruction is how parents were taught math. This team member also discussed the importance of communiciating with parents about how mathematics is taught in schools in order to garner

support from home. Addressing fears with parents was considered an area that needs to be supported.

Figure 18
Themes that emerged from refining the organization

The principal understands the need to refine the organization through addressing misconceptions with instruction through focusing on concerns with teachers during classroom walkthroughs. Several teachers described how changes are made with instructional practices at the school through the collaborative share sessions. The principal described how she will spend time teaching math to the staff to address misconceptions or uncover inaccuracies in instructional

practices. Research is clear about helping teachers and students think about mathematical ideas in a critical manner (Puchner, Taylor, O'Donnell, & Fick, 2008).

Interpretation of the standards is another area that the principal must address in refining the organization. The principal reaffirmed this by saying, "I think most teachers grew up learning math through algorithms and not necessarily understanding why an algorithm is structured that way it is." Teachers need expertise in helping students develop an understanding of the content in mathematics (Mangin, 2007; Youngs & King, 2002). Several teachers that were interviewed indicated that it is important for them to understand the complexity of the standards and to use various instructional strategies in their classroom. Teachers must be able to help students make connections with the content and determine the most effective curriculum to use with the students (Puchner, Taylor, O'Donnell, & Fick, 2008). Teacher G described one of the challenges as, "how can I implement this strategy so that I can kind of get them where they're going with this."

Creating a balance within the school that addresses time and expectations is a key component that emerged from a review of the data as it relates to refining the organization. It is important for the principal to clearly communicate a vision for what mathematics instruction should look like (Katterfeld, 2013). When discussing the success of the school with the principal, she believes it is due to the clear processes, systems and non-negotiables that are evident within the school. Leadership at the school drives instruction (McGuigan & Hoy, 2006), and principals who clarify goals and provide direction based on expectations for their school can also influence student achievement (Leithwood, Patten, & Jantzi, 2010). Providing the expectations and making adjustments as necessary with staff are critical components in providing positive outcomes within a school.

Time is another factor that was considered an area to address in refining the organization. Teacher L stated, "There's never enough time to teach everything you want to teach." The principal also expressed the importance of time by saying, "Time for the teacher to become more comfortable with really understanding what and why math operates the way it does." Providing time for students to question, reflect, investigate, and ponder content is something that should be given to students (Slattery, 2013), as well as providing opportunities for students to think metacognitively, or giving them opportunities to reflect on their own thinking (Koellner, Jacobs, & Borko, 2011). Furthermore, teacher E expressed her ideas that it was necessary for students to be able to "do higher order thinking and deeper thinking onto a problem." Students have a deeper understanding of math when they are given opportunities to think critically (Polly, et al., 2014). Time is an area that the principal of the school can address and refine as necessary to ensure that the instructional strategies are being used to their fullest advantage.

Finally, providing teachers with opportunities to observe and communicate are pieces that should be included when refining the organization. Monthly meetings with teachers provided opportunities for teachers to problem-solve and learn from each other (Turner, Warzon, & Christensen, 2011). Teacher M described the importance of being able to observe other teachers. The principal confirmed this by saying, "There isn't anything that we won't do to make a teacher successful if we can possibly do it." Building collaborative structures within the school setting is considered significant (Sun & Leithwood, 2012). These types of activities create a positive school-wide climate that overflows to other areas within the school. The principal is key in developing practices and collaborative activities with a focus on professional development that creates a positive school-wide climate which is based on a common language and belief systems (Yager & Yager, 2011). As evident in the survey, 53.3% of the staff strongly agree that clear

processes and procedures aimed at improving student achievement in mathematics are evident and 40% agree with the statement. Teachers at the school are involved in collaborative share sessions which involve sharing artifacts of lessons that have been effective. Teacher M stated, "new teachers learn from it or even better when teachers learn from another teacher's lesson." Feedback can have a positive impact on the teacher (Campbell & Malkus, 2011). Refining the orgnization to allow for observation and collaboration is a necessary structure that needs to take place to support teaching and learning.

Significance

This study examined the practices a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics. Understanding what structures are needed and how a principal navigates through the tumultuous waters of educating children today can be challenging. There are many different types of leadership styles that are used in schools and it is necessary to be able to ascertain which style and method works best for schools.   This study examined one school site to determine certain strategies and techniques that a leader used to support teaching and learning in the area of mathematics. Although this was a single case study, the actions and steps taken by the school-based administrator may provide a framework for other practitioners in the field for improving mathematics achievement.

Implications

This study provides practitioners with practices used by an elementary principal to focus on academic achievement in mathematics. The principal is pivotal in guiding and directing the learning that takes place in a school. As schools are looking to support leaders in developing structures and support systems to increase student achievement, the research supports the

conceptual framework which is based on the work of Leithwood and Louis (2012); (Figure 19) with the research findings from the case study showing connections to each component of the framework. The case study exemplars are illustrated through each component on the framework. The research findings of this study contribute to the current literature that supports leadership behaviors and student achievement in mathematics. This study may assist other principals with practices that may have a direct impact on student achievement.

It is important for the leader of the school to set the direction of the school and align the school's context with the vision (McGuigan & Hoy, 2006; Winterman, 2008). The case study research exemplars for setting direction were confirmed through the leader doing the following: providing clear expections, establishing culture, being visible, and maintaining communication with staff. In addition, the case study exemplars for improving the instructional program are developing quality instruction, creating a deep understanding, sustaining teacher capacity, and understanding mathematical practices. Furthermore, in the area of developing people, the exemplars are creating purpose, nurturing the enviornment, maintaining processes, and supporting professional learning. Finally, in the area of refining the organization the examplars noted were acknowledging misconceptions, interpreting standards, balancing time and expectations, and creating opportunites. These actions were reflected throughout the study and confirmed by research.

Case Study Exemplars
Providing clear expectations
Establishing culture
Being visible
Maintaining communication

Case Study Exemplars
Developing quality instruction
Creating a deep understanding
Sustaining teacher capacity
Understanding mathematical practices

Communication and Collaboration

• Setting Direction

• Improving the Instructional Program

Structure
Trusting Enviorment

Structure
Teacher Planning

Practice
Shared Vision

Practice
Reviewing and Revising Instruction

Practice
Adjusting and Revising

Practice
Individual Support

Structure
Professional Development

• Refining the Organization

Structure
Reflective Practices

• Developing People

Communication and Collaboration

Case Study Exemplars
Acknowledging misconceptions
Interpreting standards
Balancing time and expectations
Creating opportunities

Case Study Exemplars
Creating purpose
Nurturing the environment
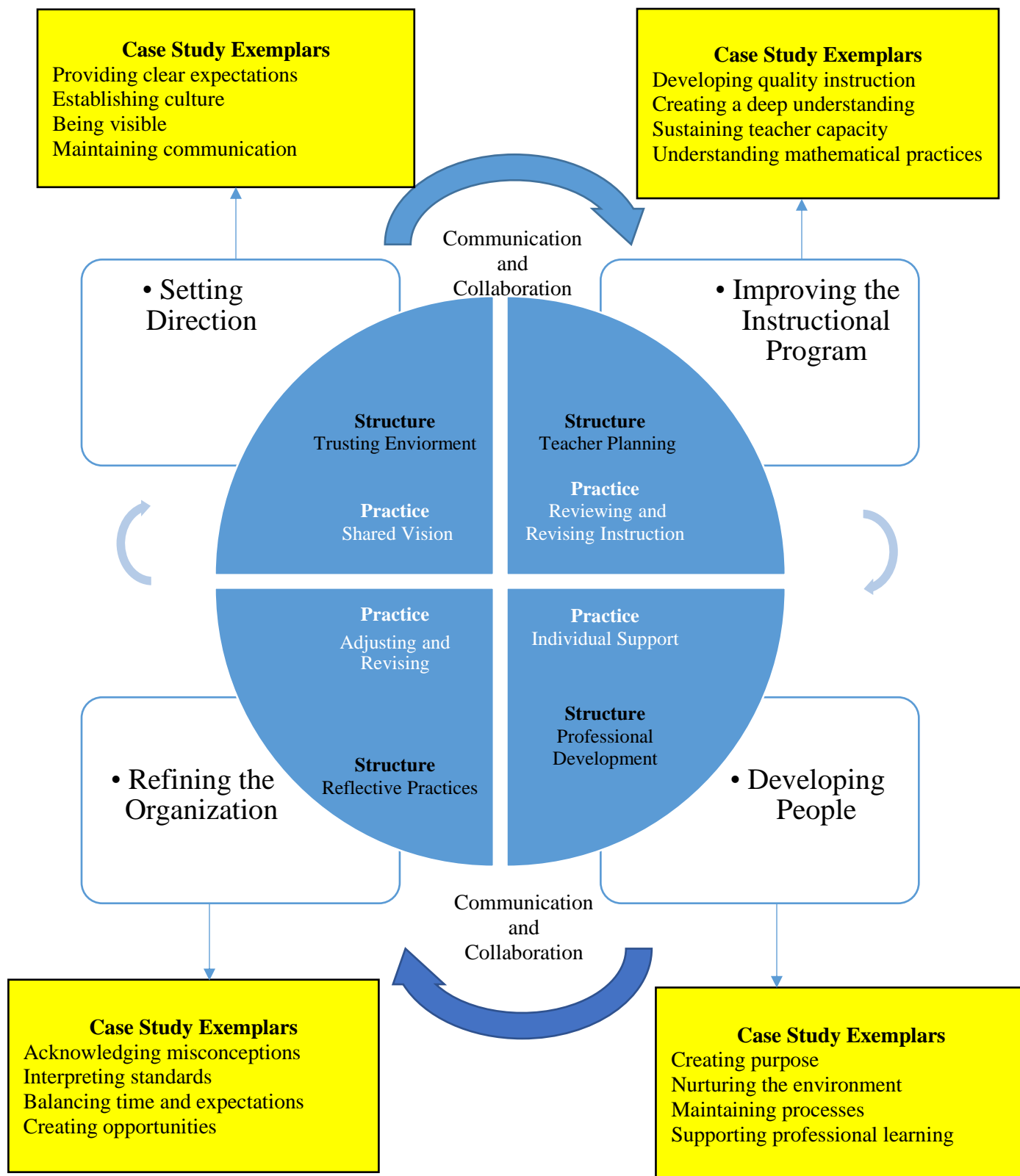Maintaining processes
Supporting professional learning

Figure 19
Conceptual framework connected to practices within the case study

The leader must understand instructional practices and how they inform and guide decisions that are made within the school (Katterfeld, 2013). The exemplars connected to this area of the framework are part of the leader's repertoire such as developing quality instruction, creating a deep understanding, sustaining teacher capacity, and understanding the mathematical practices. It was clear through a review of the data that these processes were embedded throughout the daily work of the school.

Leaders must provide support and develop skills in people to accomplish goals to build capacity with staff (Leithwood & Louis, 2012). It became evident through an analysis of the data that the following exemplars were used by leaders: creating purpose, nurturing the environment, maintaining processes, and supporting professional learning. Developing skills in people were evidenced in the study and supported by interviews with teachers and staff.

Finally, teachers and administrators must work together in a collaborative capacity to refine the organization (Leithwood, Patten, & Jantzi, 2010). All the systems working together are connected to the principal doing the following as evidenced through the case study research exemplars: acknowledging misconceptions, interpreting standards, balancing time and expectations, and creating opportunities for staff.

Recommendations

This case study attempts to add to the body of knowledge within the area of educational leadership literature as it relates to mathematics.

Recommendations for policy makers

- Develop programs to support districts with understanding how to deepen teachers understanding of mathematics instruction.

- Develop training programs for new administrators to understand the complexities of leading a school to improve mathematics instruction.

- Provide funding for professional development and training in understanding the mathematical practices for teachers and administrators.

- Develop a program to support new teachers to develop content knowledge in mathematics.

Recommendations for district administrators

- Develop programs to support new administrators in practices to implement and support teacher collaboration.

- Allow principals autonomy to develop structures and processes for staff to develop lessons and content knowledge.

- Create guidelines for school principals to use for providing feedback to teachers on instructional practices in mathematics.

- Develop a process to select curriculum materials that utilize multiple teaching methods in mathematics.

Recommendations for school-based administrators

- Provide teachers with opportunities for self-selected professional development based on their own individual learning needs.

- Understand the importance of developing a common purpose or vision with a staff.

- Be aware of the barrier of time and look for how teachers can be given more time for collaboration. Protect the time for teachers to teach students.

- Develop collaborative structures within the school setting for teachers to work on lessons and activities.

- Develop teacher leaders through providing opportunities for them to lead professional learning within the school.

Recommendations for future research

One case study of an elementary school in rural Florida cannot possibly address all possible topics regarding leadership practices for high achievement in mathematics. Based on this study, several additional topics may need to be researched further.

1. Would a similar study have similar results at a secondary school?

2. Does the content knowledge of the principal have an impact on the kind of support that can be provided to teachers?

3. This study looked at the overall performance of the school in mathematics. How would this transfer to individual teacher performance?

4. These practices were evident within a school where the principal had the autonomy to hire the staff when the school opened. Would there be similar results if these actions took place in an existing school?

5. How long would a principal need to be at a school in order to create sustained change?

Concluding Thoughts

This study provided evidence and support to understand what qualities, skills, and strategies need to be developed with leaders as they work in schools to increase achievement in mathematics. The research surrounding how a leader sets direction is supported by the current practices that are in place at the school studied. It was clear from the onset that the principal believed in the direction of the school and worked with the staff to implement the mission and vision. The principal was instrumental in developing and maintaining a culture that supported

teachers working together towards a shared goal. She monitored her expectations of herself and the staff through her visibility around the school.

Understanding how a principal improves the instructional program in mathematics is another area that was uncovered during the research study. It is clear through a review of the research study that teachers need to be provided flexibility within their own classroom, so they can use the necessary instructional strategies with students. Although the principal guided teachers in using research-based instructional techniques, she allowed teachers the autonomy to determine which strategies worked best in their own individual classrooms. Additionally, the study lifted out the fact that the principal addressed content knowledge concerns with staff and would develop a plan to follow-up to ensure students were receiving accurate instruction.

Developing people is another component necessary for a leader to orchestrate during the process of improving the instructional program. Teachers have direct impact of teaching and learning within the four walls of the school. The principal needs to be aware of the school's purpose and determine expectations for learning by understanding the needs of the staff. Developing skills and knowledge are critical components that a leader must enact during her daily work. The processes used to develop collaboration and learning of staff are essential in building teachers' knowledge, skills, and expertise with teaching mathematics. It is important to remember that the people in the school are at the heart of the instruction and the principal needs to remember to provide them with what they need.

Refining the organization is led by the principal and involves the staff. It is key for teachers to accept what they know and what they do not know about mathematics when looking at how to modify instruction. Although the research from one case study indicated a fear from parents, there could also be a fear from teachers in how confident they feel about the content they

are teaching. The principal is an integral part of knowing the knowledge of staff and providing

opportunities to address changes and modifications with the program. The idea of balance for

what is expected to teach and time for instruction emerged as areas that need to be addressed

when looking at the overall function of the organization. The principal must find time for

teachers to understand what is expected and allow for teachers to work together to improve their

craft.

The principal is at the center of directing the operation and function of a school.

Marshalling resources, garnering support, and empowering teachers are all part of the daily work

of a principal. The researcher was a former principal and understands the challenges associated

with the daily work needed to build capacity of staff to ensure academic achievement. The

researcher was able to take the experiences gained from the study and make meaning for others

in the field. In looking to the future and navigating the scope of education, it will be important to

be able to use a variety of skills and strategies to support learning in schools. As we look to the

future, the work of leaders involves inviting people with problems to be "solutions shapers"

(Bush, 2011). This will be the work that needs to be done as we continue to look at leadership

and its impact on improving the instructional program in mathematics.

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APPENDIX A: ARCHIVAL DOCUMENT REVIEW WORKSHEET

1. Type of document

Email   Memo   Chart   Brochure   Letter   Photograph

Newspaper Article   Other

2. Creator of document

3. Document content

4. Key features in the document connected to improving the instructional program in mathematics.

5. Key features in the document related to professional development of mathematics for staff.

6. Strengths of the document as related to mathematics.

7. Weaknesses of the document as related to mathematics.

8. Key features of the document focusing on setting direction of mathematics.

APPENDIX B: EMAIL INTRODUCTION TO STAFF

To: Instructional Staff

From: Scott Hebert

Hello, I am enrolled in a doctoral program at Florida Southern College. I am writing to ask for your assistance with a study that I am conducting at your school. The purpose of the study is to understand the behaviors, actions, and systems a principal in an elementary school in rural Florida has utilized to develop instructional capacity and a culture for high achievement in mathematics.

If you choose to participate in the study, you will be asked to complete an online survey that is attached to this email. It should take you approximately 15 minutes to complete. If you choose not to participate, or withdraw from the study at any time, you can do so. The results will be maintained in confidence. There will also be an opportunity for you to sign up to participate in a focus group interview.

Confidentiality of your identity is guaranteed at all times. If information is published, I will use pseudonyms or fake names. The project is for research and educational purposes only.   The identity of all participants, the school, and school district will remain confidential known only to the researcher. All records from the study will be maintained on my computer for a period of three years from the date of the interview after which time they will be destroyed.

Please feel free to contact me at any time if you have questions.

Thank you for your time and assistance.

Please click on the link to access the electronic survey.

APPENDIX C: TEACHER SURVEY

1. **Please indicate your current grade level assignment.**

2. **How long have you worked at the school?**

1st Year   2-3 Years   4-6 Years   7-10 Years   More than 10 Years

3. **What is your current level of education?**

B.S.   M.S.   Doctorate   Other

4. **How long have you been teaching in your current grade level?**

1st Year   2-3 Years   4-6 Years   7-10 Years   More than 10 Years

5. **How confident are you in your math teaching ability?**

High   Moderate   Low

6. **The vision and mission of the school is focused on increased student achievement in mathematics.**

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

7. **The school-based leadership team provides direction for understanding mathematics instruction.**

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

8. **The school has a focus on setting high standards for students in mathematics.**

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

9. **The implementation of teaching methods to reach varied learners in mathematics is encouraged.**

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

10. **Teachers are provided with resources and materials for mathematics instruction.**

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

11. The mathematical practices are evident in daily classroom instruction.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

12. The collaboration of staff in improving mathematics instruction is encouraged.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

13. Teachers are involved in decision-making activities relative to curriculum

    development in mathematics.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

14. Teachers are provided with professional development in the area of mathematics.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

15. Clear processes and procedures aimed at improving student achievement in

    mathematics are evident.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

16. Teachers understand the essential elements to be included in a mathematics lesson.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

17. Teachers are encouraged to lead mathematics training and professional

    development in the school.

Strongly Agree   Agree   Undecided   Disagree   Strongly Disagree

18. Is there anything else that you would like to share?

19. I am willing to participate in a focus group to discuss mathematics instruction.

    Yes   No

If Yes, please type your name in the box (your responses will remain anonymous regardless

of your participating in the interview process).

APPENDIX D: PRINCIPAL INTERVIEW QUESTIONS

Biographical Data:

Gender: Age: Under 30   30-39   40-49   50+

Highest education level:

Total years in education:

Number of years as a teacher:

At what grade levels did you teach?

Years as an elementary principal:

Years in current position:

1. Can you please describe your roles and responsibilities in the building?

2. Walk me through a typical day?

3. As the leader of the building, what are the most important steps or actions you take to

    ensure student learning in mathematics?

4. What would I see at your first day of school in service for teachers?

5. Describe the structures in place for teachers to develop skills in teaching

    mathematics.

6. What are your perceptions about mathematics instruction at your school?

7. What would you expect to see in a classroom during a mathematics lesson?

8. How do your teachers gain knowledge about effective mathematics instruction?

9. What do you primarily attribute the success your school has experienced in

    elementary mathematics achievement?

10. What challenges do you see in improving elementary mathematics instruction?

11. What are the essential teaching practices that are evident in your school as they relate to mathematics instruction?

12. Describe the role teacher leaders play in improving teaching mathematics.

13. Describe the collaboration between elementary teachers in regard to teaching elementary mathematics.

14. Describe professional development activities that are developed relating to mathematics instruction.

15. What are the "essential learnings in mathematics?"

16. What do you believe create the most positive influence to improving mathematics achievement?

17. What processes are in place to ensure that learning takes place in all classrooms?

18. Describe the role the leadership team plays in improving mathematics instruction.

19. Please elaborate on each of the following as it relates to mathematics instruction at your school.

   a. Developing a strong curriculum

   b. Building a high quality, high performing staff

   c. Setting high standards

   d. Raising student achievement

   e. Collaboration for staff

   f. Teacher leadership

   g. Professional development

APPENDIX E: FOCUS INTERVIEW GROUP PROTOCOL

Thank you for taking time to be a part of the interview process today. Each one of you was given a letter and a number so that the data can be transcribed. Our interview will be digitally recorded and later transcribed. I will send you the transcripts to review. You will have the opportunity to verify, add, and comment on the process and make any corrections to the transcripts. As part of the interview, I am interested in finding out about you, your experiences, and beliefs about mathematics instruction.

Confidentiality of your identity is guaranteed at all times. If information is published, I will use pseudonyms or fake names. The project is for research and educational purposes only. The identity of all participants, the school, and school district will remain confidential known only to the researcher. All records from the study will be maintained on my computer for a period of three years from the date of the interview after which time they will be destroyed.

The interview should last no more than 60 minutes. If you feel uncomfortable during the focus group interview, you may choose to not answer and request to stop participating without penalty. Does anyone have any questions? If no one has any questions, then we will begin the interview questions.

The following information will be collected during each focus group interview process.

Date:

Start Time:

End Time:

Total Time (minutes):

Participant	Current Position	Years in Current Position	Years Teaching at Current School	Total Years Teaching

APPENDIX F: LEADERSHIP TEAM FOCUS GROUP

1. Describe the role of the Principal at your school.

2. How does the leadership in the school effect elementary mathematics instruction?

3. What would you expect to see in a classroom during a mathematics lesson?

4. How do you gain knowledge about effective mathematics instruction?

5. What do you primarily attribute to the success your school has experienced in elementary mathematics achievement?

6. What is your role in improving the teaching of mathematics instruction at your school?

7. What challenges do you see in improving elementary mathematics instruction?

8. What are the essential teaching practices that are evident in your school as they relate to mathematics instruction?

9. Describe the role teacher leaders play in improving teaching mathematics.

10. Describe the collaboration between elementary teachers in regard to teaching elementary mathematics.

11. Describe the professional development activities that you are engaged in as they relate to elementary mathematics.

12. What are the "essential learnings in mathematics?"

13. What do you believe creates the most positive influence to improving mathematics achievement?

14. What processes are in place to ensure that learning takes place in all classrooms?

15. What role do you have in your school's mathematics decision making process?

16. Please elaborate on each of the following as it relates to mathematics instruction at your school.

     a. Developing a strong curriculum

     b. Building a high quality, high performing staff

     c. Setting high standards

     d. Raising student achievement

     e. Collaboration for staff

     f. Teacher leadership

     g. Professional development

17. Would you be willing to share any feedback that you received from the principal regarding mathematics instruction?

APPENDIX G: FOCUS GROUP INTERVIEW QUESTIONS

1. Describe the role of the Principal at your school.

2. How does the leadership in the school effect elementary mathematics instruction?

3. What would you expect to see in a classroom during a mathematics lesson?

4. How do you gain knowledge about effective mathematics instruction?

5. What do you primarily attribute to the success your school has experienced in elementary mathematics achievement?

6. What is your role in improving the teaching of mathematics instruction at your school?

7. What challenges do you see in improving elementary mathematics instruction?

8. What are the essential teaching practices that are evident in your school as they relate to mathematics instruction?

9. Describe the role teacher leaders play in improving teaching mathematics.

10. Describe the collaboration between elementary teachers in regard to teaching elementary mathematics.

11. Describe the professional development activities that you are engaged in as they relate to elementary mathematics.

12. What are your strengths and weaknesses as a math teacher?

13. What are the "essential learnings in mathematics?"

14. What do you believe creates the most positive influence to improving mathematics achievement?

15. What processes are in place to ensure that learning takes place in all classrooms?

16. What role do you have in your school's mathematics decision making process?

17. Would you be willing to share any feedback that you received from the principal?

APPENDIX H: INFORMED CONSENT FORM

Project Title: Examining Effective Instructional Leadership in Mathematics: A Case Study

Principal Investigator: Scott Hebert

Phone: 352-464-0583   **E-mail: heberts@citrus.k12.fl.us**

Faculty Sponsor: Dr. Jason LaFrance

Department: Education

I am a Doctorate Student at Florida Southern College. You are being invited to participate in a research study because I want to learn about mathematics instruction and leadership strategies related to mathematics instruction at your school. The purpose of the study is to understand the impact that a leader makes in improving mathematics achievement in an elementary school.

As part of this study, you will be asked to complete a short survey about mathematics instruction. It will take you about 15 minutes to complete the online survey.   I am also looking for volunteers willing to take part in a focus group interview. This will take approximately 60 minutes with a possible 30-minute follow-up interview.

You will/ will not be paid for taking part in this study. Your participation in the study will help in understanding how to support and improve mathematics instruction for the future. There are no anticipated risks to you.

All data will be stored in a secured file on my personal computer. Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the FSC Institutional Review Board may inspect the records from this research project.

The results of this study may be published. However, only group results will be reported. Analysis of the data will be conducted by the researcher to understand trends, patterns, and behaviors that exist within the school setting being studied. The data from the interviews, surveys, and other sources of information will be coded in a similar manner so that the researcher is able to make inferences regarding the information being presented in the study.

The published results will not include your name or any other information that would personally identify you in any way. You will not be given individual results obtained during this study.

Your decision to take part in this study is completely voluntary. You are free to withdraw from the study at any time without penalty. You are free to participate in this research or withdraw at any time. Decision to not participate will not affect your employment status.

If you have any questions about this study, contact the Primary Investigator at the phone number or e-mail at the top of this form. If you have questions about your rights as an individual taking part in a research study, you may contact the Chair of the Florida Southern College Institutional Review Board at (863-680-6205) or the FSC Vice President for Academic Affairs (863-680-4124).

I have read the Informed Consent Form and agree to participate in this study. I understand that I can withdraw from this study at any time without penalty. I understand that I will not receive payment for my participation. Additionally, I understand that this form will be renewed annually for research projects lasting longer than one year.

Name of Participant (please print)_____

Signature of Participant _____ Date_____

Signature of Investigator or Witness _____ Date_____

For research proposals falling under expedited review, the principal investigator or member of the research team may read this consent form to the entire group of participants or class. Participants, should, nonetheless, sign a shortened version of the form giving the title of the project, information on the PI (see top of this form), statement on voluntary consent, and statement on payment (if any). Then the subject should sign and date the consent. For anonymous survey studies, a cover letter explaining the nature of the study, and including the above details should be included. A returned, completed survey indicates implied consent to voluntarily participate. It is not necessary for the participant to return a signed agreement form with the survey.