

## ABSTRACT

Title of Dissertation:           EXPLORING THE RELATIONSHIP BETWEEN  
  SCHOOL LEADERSHIP AND MIDDLE SCHOOL  
  MATHEMATICS ACHIEVEMENT: AN  
  EXAMINATION OF LEADERSHIP PRACTICES  
  OF PRINCIPALS

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This mixed-method study was designed to investigate the extent to which leadership practices differ in middle schools identified as at risk of not meeting state standards in mathematics and in schools identified as meeting state standards in mathematics. This study sought to understand the school leadership practices of middle school principals. The theoretical framework of Powell (2004) guided this research project. Powell (2004) identified five domains of effective principal leadership behaviors and practices. According to Powell, these domains contribute to effective school leadership. The domains include: (1) vision, mission, and culture; (2) curriculum and classroom instruction; (3) collaboration and shared leadership; (4) family and community involvement, and (5) effective management. Powell (2004) designed a survey and interview questions based on the five domains.

These data were gathered through the use of a survey and focus groups to answer the four research questions. A survey instrument was mailed to 33 principals,

33 mathematics resource teachers and 190 teachers from 15 middle schools that made Adequate Yearly Progress (AYP) in mathematics and 18 middle schools at risk of not making AYP in mathematics. The survey was designed to solicit judgments about school leadership behaviors. Focus group interviews were held with principals, mathematics resource teachers and mathematics teachers to identify curricular issues between the two types of schools.

These data provided insight regarding successful leadership practices for schools meeting standards in mathematics. The descriptive and inferential analysis identified few mean differences between principals, mathematics resource teachers, and mathematics teachers across Powell's five domains in the two groups of schools studied. The researcher conducted a one-way analysis of variance within each group of schools. Results showed very few differences between principals, mathematics resource teachers, and mathematics teachers in schools meeting state standards. There were important differences between principals and mathematics teachers in the at-risk schools.

This study has training and practice implications for middle school principals. It provides a shared leadership model for identifying leadership practices in mathematics. It is expected that this research will assist school systems in their efforts to support state accountability efforts.

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AND MIDDLE SCHOOL MATHEMATICS ACHIEVEMENT: AN  
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by

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## DEDICATION

This dissertation is dedicated to my family in loving memory of my father, Nelson McLeod, Sr, for being a true provider to our family; to my mother, Elsie J. McLeod, who always supported my dreams; to my daughter, Naomi, who encouraged me; to my Virginia mother, Freddy T. Davy, for challenging me to think beyond my perspective in life; to my Maryland mother, Wilma Dean, for supporting me as I continue to see endless possibilities in life; and to my aunt and second mother, Jacqueline Addison, for loving me unconditionally.

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## CHAPTER I

### INTRODUCTION

Changes in societal and school demographics require a new type of leadership for 21<sup>st</sup> century schools. Now, administrators must deal with the challenges of increased immigration, growing minority populations, increased achievement gaps among racial groups, and dealing with students of poverty, abuse, and mobility (National Association of Secondary School Principals, 2007). Such conditions present challenges to administrators and underscore the changing role of school leaders.

Scholars acknowledge a paradigm shift in the duties and responsibilities of school principals. No longer is the principal viewed merely as a school manager (Firestone & Riehl, 2005; Hargreaves & Fink, 2006; Patterson & Kellecher, 2007). Levine (2006) contends the principal has now become accountable for human resource management, instructional improvement, staff development, curriculum design, discipline and safety, pupil evaluation, and school-focused decision making. The role also has been expanded to include public relations specialist, security officer and technology consultant (Ferrandino, 2001).

This metamorphosis of the principalship has reflected the increased expectations placed on public schools. In 1983, the National Commission on Excellence in Education published *A Nation at Risk*, which addresses the state of the American education system (Bracey, 2002). *A Nation at Risk* highlighted the need to have effective leaders as school principals. With the publication of this report, policymakers demanded systemic educational reform. Ravitch (2003) warned that American education faces a "rising tide of mediocrity" unless actions are taken to raise both expectations and academic achievement.

A review of effective schools research indicated that the school principal is paramount to a school's success (Edmonds, 1979; Lezotte, 1992; Protheroe, Shellard,

& Turner, 2003). Several decades ago, Edmonds (1979) found effective schools were correlated with six specific leadership behaviors: (a) promoting an orderly atmosphere for learning; (b) frequent monitoring of student progress; (c) requiring staff to take responsibility for instructional effectiveness; (d) setting clear goals and objectives; (e) having a plan for resolving achievement problems; and (f) demonstrating strong leadership, management, and instructional skills.

Thirty years later, scholars continue to believe that the principal is key to addressing the reform movement and creating a professional learning community with high academic performance (DuFour, 2002). Bottoms and O'Neil (2001) characterized the principal as the chief executive officer who assumes the ultimate responsibility for the success of the school. Further, Kouzes and Posner (2002) identified five practices of exemplary leadership. They include individuals who: (a) challenge, (b) take risks, (c) inspire a shared vision with collaboration, (d) model behavior, and (e) encourage passion in their constituents. Senge (2000) described effective leaders as those who encourage people to create an atmosphere "where collective aspiration is set free, and where people are continually learning how to learn together" (p.418).

Much research has been conducted on the impact of principal leadership on student learning (Bell, 2001). Principals must be well versed in the practices that support student achievement. In *Breaking Ranks in the Middle* (NASSP, 2005), the authors set out principles that they assert will lead to concrete and effective strategies for sustaining leadership and change in schools. Under the *No Child Left Behind Act* of 2001, principals are now mandated to serve as the instructional leaders who have the skills necessary to help teachers to teach, and to help students to learn and to meet challenging state achievement standards (Title II, section 2113). Principals now have the responsibility for promoting the successful achievement of all students. As Davis, Darling-Hammond, LaPointe and Myerson (2005) state,

The role of the principal has swelled to include a staggering array of professional tasks and competencies. Principals are expected to be educational visionaries, instructional and curriculum leaders, assessment experts, disciplinarians, community builders, public relations/communication experts, budget analysts, facility managers, special programs administrators, as well as guardians of various legal, contractual, and policy mandates and initiatives. In addition, principals are expected to serve the often conflicting needs and interests of many stakeholders, including students, parents, teachers, district office officials, unions, state and federal agencies. (p.4)

In a study on high-performing schools, Picucci, Brownson, Kahlert, and Sobol (2002) concluded that principals at these schools established tangible goals, held teachers accountable, challenged their staff to improve upon their own successes, and communicated high expectation through dialogue, action, and symbolic gestures. In *Turning Points 2000*, Jackson and Davis (2000) report that "no single individual is more important to initiating and sustaining improvement in middle grade school students' performance than the school principal" (p. 157). Further, Mertens and Flowers (2003) examined the middle school principalship and its relationship to school practices and identified four major findings:

1. What is important to principals is what is likely to get implemented.
2. Parts of the middle level concept get implemented rather than the entire concept.
3. Time allocations tend to reflect priorities.
4. Some principals are limited in their knowledge of middle level programs and experience.

In summary, principal leadership is widely accepted as a major contributor to achieving school improvement. This theme has emerged throughout the literature about school improvement.

In recent years, a number of scholars have contributed to the literature of the leadership environment specific to middle schools. To be effective, principals must be familiar with middle level instructional practices. They must create an environment within the middle school for rigorous instruction that balances the developmental and emotional needs of adolescents. Contemporary middle school principals must also develop standard processes for curriculum monitoring, student and staff support, accountability, and collaboration with parent and community partners (Hargreaves & Fink, 2006). Specifically, middle school leaders need to ensure that middle school students meet or exceed proficiency on state and federal standards.

#### Middle School Mathematics

Middle school principals have responsibility for leading instruction in a wide variety of specific subjects (Cole, 1999; Kilpatrick et al., 2001). Among those subjects, mathematics has probably received as much professional and public scrutiny as any subject, so it makes a particularly interesting venue for studying the effects of principal leadership behavior. Middle school mathematics provides the essential foundation for success in rigorous high school curricula.

Boyer (2002) asserted that the key for making higher level mathematics courses accessible to all high school students is effective middle school instruction. Reyes (1999) points out that middle school mathematics instruction is critical in helping students make the transition from the informal procedural work of elementary school to the more rigorous reasoning and higher order thinking required by high school and, ultimately, college mathematics. Providing middle school students with

access to algebra and geometry courses is often recommended as a promising strategy for enhancing the effect of their mathematical experiences, but that is largely new territory for middle school curricula and teachers (Schmidt, Housang, & Cogan, 2002). Thus, middle school principals have important instructional leadership responsibilities in supporting the transition to new conceptions of middle school mathematics.

At the middle school level, the *No Child Left Behind* Act of 2001 has increased accountability and changed the educational landscape at the federal, state and local levels (NASSP, 2005). For mathematics, the implementation of this law requires that students in schools receiving federal funding be tested annually using standardized tests. The scores on these examinations are used to determine if students are proficient in mathematics and have met federal, state, and local standards.

The standards governing the content of middle school mathematics curricula have been defined by the state or county boards of education and reflect advice from many sectors of the education and mathematics communities. The *Standards* documents published by the National Council of Teachers of Mathematics (1989, 1991, 1995, 2000) had a strong influence on many state and local standard documents. But there are competing views that have led to considerable conflict over standards, again challenging school middle principals to help mathematics department leaders and teachers to find a satisfactory path to reform and improvement of student achievement.

In the state in which this study was conducted, the middle school state standards in mathematics include: number relationships and computation/arithmetic; algebra, patterns, and functions; geometry; measurement; probability; statistics; and problem reasoning, communications, and connections. Also, the state has established an "essential mathematics content that should be taught in every classroom" (State Department of Education, 2006, p. 3). This voluntary state curriculum (VSC) was

developed to support the alignment of curriculum, instruction, and assessment throughout the state.

### Statement of the Problem

Just as societal and school demographics have changed in recent decades, so has the type of leadership needed to successfully lead the rapidly changing middle schools of this century. Now, middle school principals have responsibility for providing instructional leadership in a wide variety of specific subjects (Cole, 1999; Kilpatrick et al., 2001). Among those subjects, mathematics is a particularly important venue to study because of our nation's poor results in state accountability measures. In the state where this study was conducted, all middle schools must meet "Adequate Yearly Progress "(AYP) by the 2013-2014 academic year in mathematics. Students must be tested at least once in mathematical proficiency in grades 6-8. To that end, the research from middle school mathematics provides important direction for increasing success in rigorous high school curricula and post-secondary experiences.

The practices of the principal play an integral part in student achievement. Understanding leadership practices employed by principals and the effect of these practices on achievement of middle school students will create a knowledge base that will enhance our understanding of this relationship and provide the potential to increase student achievement, thus furthering state accountability efforts.

### Purpose of the Study

The purpose of this mixed method study was to use quantitative methodology to contrast the leadership practices of principals in two types of middle schools: those identified as meeting state standards in mathematics and those identified as at risk of not meeting state standards. The practices were studied from the perspective of principals, mathematics resource teachers, and mathematics teachers. The researcher

used Powell's (2004) five domains of effective principal leadership behaviors and practices (e.g., vision, mission, and culture; curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) as lenses through which to view the principals' leadership. Powell's paradigm is discussed more fully in the section on Conceptual Framework.

This study also utilized qualitative methodology (focus group interviews) as a non-directive method to obtain information about principals' leadership behavior and practices that may not be available through general quantitative research methods. The researcher prepared a series of questions to guide the focus group discussions.

### Research Questions and Statistical Hypotheses

Prior to beginning the research, the following research questions were developed to provide the structure for data collection and analysis.

#### *Research Question 1*

From the perspective of middle school principals, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

#### *Statistical Hypothesis 1*

From the perspective of middle school principals, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum

and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 2*

From the perspective of middle school mathematics resource teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Statistical Hypothesis 2*

From the perspective of middle school mathematics resource teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 3*

From the perspective of middle school mathematics teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and

classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Statistical Hypothesis 3*

From the perspective of middle school mathematics teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Research Question 4*

What are the curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who are concerned with providing leadership to students in mathematics? Are there differences in these curricular and instructional issues between middle schools meeting state standards and those not meeting state standards?

### Significance of the Study

This study seeks to fill a gap in the literature by identifying middle school principals' leadership practices that will affect mathematics achievement in middle schools. Sound instructional leadership is needed to implement a strong middle school mathematics program. Earlier studies focused on the elementary principal leadership (Felder, 2006; Hallinger & Heck, 1996; Powell, 2004); however, it is not clear if the

same factors work in the middle school environment. As middle school principals focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.

The study contributes to the research on middle school leadership as it relates to the expanding role of the principal as an instructional leader. This study attempts to provide in-depth information on middle school principals' understanding of this role and the behaviors needed to influence school success. The study results could inform the process by which local principals select and identify practices that promote school improvement and student achievement.

### Conceptual Framework

The conceptual framework of this study focused upon the perspective that the leadership behaviors and practices of principals influence the learning community of the school and are grounded in effective school leadership behaviors. This K-12 principal leadership model is well established in this study and has been proven effective in elementary schools in local districts. With a renewed emphasis on school accountability, especially at the middle and high school levels, this model is now being applied to middle schools.

Powell (2004) developed a conceptual framework regarding effective principal practices and leadership behaviors based on the review of literature and her case study findings. According to Powell, the principal's vision "is crucial and is essential in guiding the school toward success" (p.5). In this framework the vision of the principal is the key element that serves as the overarching domain and is supportive to the other domains (Felder, 2006). Figure 1 outlines the conceptual framework of Powell's model that was used in this study. In this framework, Powell (2004) argued that effective schools are "schools where students master basic skills or meet state or local

standards" (p.14.). Powell identified effective school leadership behaviors and labeled them domains. Based on the literature and the leadership domains, Powell developed a survey and interview questions to assess principals' leadership behaviors and practices in five domains. The five domains include: (1) vision, mission, and culture; (2) curriculum and classroom instruction; (3) collaboration and shared leadership; (4) family and community involvement; and (5) effective management. According to Powell, these domains influence principals' behaviors and practices which are delineated in Table 1. Also, looking at the behaviors and practices in the domains listed above, a theory of how leaders use these behaviors to influence the learning community of a school is presented. Lastly, Powell (2004) and Felder (2006) identified those domains as essential for highly successful principals.

As Felder (2006) reported, Powell hypothesized that all five domains were equal in their influence on effective leadership. However, Powell concluded after her research that the principal's personal vision for a school directly impacts three domains: (1) vision, mission and culture; (2) curriculum and classroom instruction; and (3) collaboration and shared leadership. In turn, those domains influence and also impact the remaining two domains of family and community involvement and effective management. Felder's research (2006) on leadership behaviors in elementary schools with predominately minority enrollment demonstrated that Powell's framework impacts overall school success and student achievement.

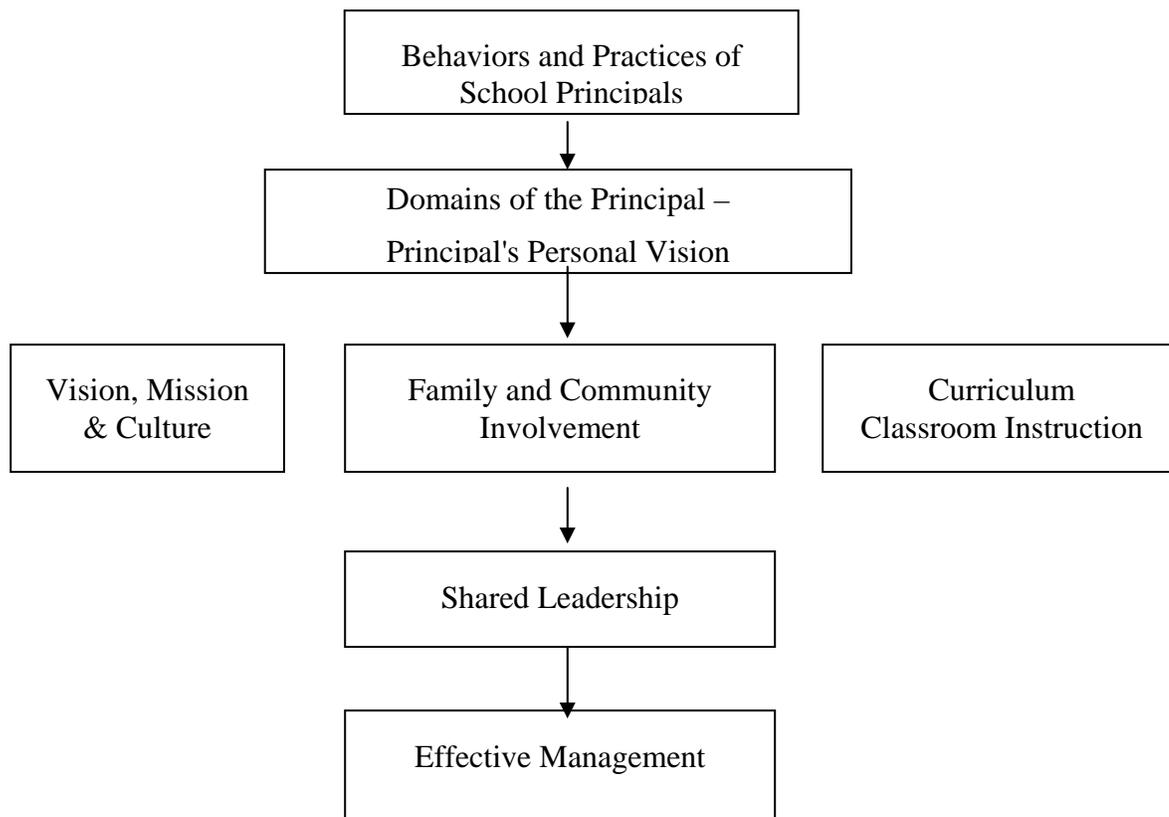


Figure 1. Powell's (2004) Conceptual Framework

Table 1

*Domains and Examples of Principal Leadership Practices*

Domains	Examples of Principals' Leadership Behaviors and Practices
Vision, Mission, Culture	<ul style="list-style-type: none"> <li>▪ Provides a vision that's embraced by others</li> <li>▪ Makes student achievement a high priority/mission of the school</li> <li>▪ Treats staff as professionals</li> <li>▪ Treats all stakeholders with respect</li> <li>▪ Leads ethically</li> <li>▪ Highly visible throughout the school</li> <li>▪ Knows and calls students by name</li> <li>▪ Celebrates successes frequently and openly</li> <li>▪ Visits classrooms regularly</li> <li>▪ Provides a nurturing environment for students and teachers</li> </ul>

Table 1 (continued)

*Domains and Examples of Principal Leadership Practices*

Domains	Examples of Principals' Leadership Practices
Curriculum and Classroom Instruction	<ul style="list-style-type: none"> <li>▪ Teaches lessons in classrooms</li> <li>▪ Makes student learning a high priority</li> <li>▪ Knows curriculum and recognizes good teaching</li> <li>▪ Encourages and provides opportunities for staff development</li> <li>▪ Ensures special programs and resources are in place to meet the needs of all learners</li> <li>▪ Makes academic decisions on his/her own at times</li> </ul>
Collaboration and Shared Leadership	<ul style="list-style-type: none"> <li>▪ Elicits teacher input regarding academic decisions and the purchase of instructional resources</li> <li>▪ Involves staff in analyzing school data and developing the school's improvement plan</li> <li>▪ Ensures teacher participation in the hiring process of new teachers</li> <li>▪ Encourages and supports teacher leadership</li> <li>▪ Encourages teacher participation in the decision-making process</li> </ul>
Family and Community Involvement	<ul style="list-style-type: none"> <li>▪ Hires staff to reflect school's diversity</li> <li>▪ Makes all feel welcome, comfortable and appreciated (i.e., personally greets students and parents as they enter the school or assigns a staff member to do so)</li> <li>▪ Keeps parents informed about student expectations</li> <li>▪ Creates open lines of communication between home and school (i.e., sends home weekly newsletters, meets frequently with parents, provides translators as needed, etc.)</li> <li>▪ Encourages parental and community involvement (i.e., fosters partnerships with local businesses, encourages voluntarism, etc.)</li> <li>▪ Removes barriers to communication (i.e., newsletters in more than one language)</li> </ul>
Effective Management	<ul style="list-style-type: none"> <li>▪ Effectively manages school budget</li> <li>▪ Is resourceful (i.e., acquires funds via grants, businesses, central office, etc.)</li> <li>▪ Remains focused on instruction (i.e., delegates behavioral and social issues)</li> <li>▪ Implements an effective discipline plan</li> <li>▪ Ensures minimal classroom interruptions</li> </ul>

Research Design

This mixed method study uses both quantitative and qualitative research methods as a means to provide relevant insights and potential solutions to the research

questions. Thirty-three middle schools were selected from a county in a mid-Atlantic state. The researcher used 15 middle schools making Adequate Yearly Progress (AYP) in mathematics and 18 middle schools at risk of not making AYP to conduct the study. A total of 33 principals, 33 mathematics resource teachers and 190 teachers were invited to participate in this study.

Middle schools were selected for this study for a variety of reasons. The primary reason for choosing middle schools is because the accountability of No Child Left Behind has the greatest impact on middle school leaders. This is because the cornerstone of the testing of all students in grades 3-8 impacts all middle school grades. Also, as middle school students focus on academic performance, principals must also focus on "meeting the unique developmental needs of young adolescents who are undergoing tremendous cognitive, emotional, physical, and social change" (Valentine et al., 2004, p.1). These factors make middle schools an important and interesting population for this study on school leadership.

For the quantitative portion of the study, the Powell School Leadership survey was administered to principals, mathematics resource teachers, and mathematics teachers. The instrument was designed to solicit judgments about school leadership behaviors. Of the 60 questions on the survey, 13 were questions for the school vision, mission and culture domain, 13 were questions for the mathematics curriculum and classroom instruction domain, 13 were questions for the family and community involvement domain, 9 were questions for collaboration and shared leadership, and 12 were questions for effective management.

For the qualitative design, focus group interviews were utilized. The research participants for the focus group included principals, mathematics resource teachers, and mathematics teachers, representing both groups of schools. The sessions were tape-recorded. An open-ended semi-structured moderator guide was used to facilitate

the discussion of the research questions. The researcher used Powell's conceptual framework as a lens for analysis. The data were transcribed. The transcripts were shared with the study participants to check for accuracy and verification. The reporting of the focus group material did not identify names of persons or individual schools.

### Definitions of Terms

The following terms are defined to provide the reader with a common language regarding the research study.

Adequate Yearly Progress - A provision of the *No Child Left Behind* Act that categorizes the annual academic performance in mathematics and reading that each school must reach. According to the law, all students must be proficient by the 2013-2014 school year.

Leadership Practices - The characteristics of a principal that contribute to school success.

Leadership Style - The manner and approach of providing direction, implementing projects, and motivating people.

Mathematics Resource Teacher - A state-certified teacher in mathematics who supervises the mathematics department, serves as a curriculum liaison to the principal, and who conducts teacher observations.

Mathematics Teacher - The individual who plans learning experiences for students and prepares instructional plans and materials to meet the needs of all students in the mathematics class.

Meet Standards - Middle schools that make adequate yearly progress for two consecutive years in mathematics.

Middle School - Schools with configuration of grades six through eight that are separated administratively from elementary and high schools.

No Child Left Behind Act of 2001 (NCLB) - The legislation that reauthorized the Elementary and Secondary Education Act (ESEA) also known as Public Law 107-87 (U.S. Department of Education, 2001b). NCLB focuses on (1) testing and achievement of all students, (2) adequate yearly progress, and (3) highly qualified teachers.

Powell Model - This model has identified effective school leadership behaviors and labeled them in domains. The five domains include: (1) vision, mission, and culture; (2) curriculum and classroom instruction; (3) collaboration and shared leadership; (4) family and community involvement; and (5) effective management. These domains influence principals' behaviors and practices.

Principal - The chief executive officer of a school site who manages the instructional program.

#### Limitations of the Study

1. The findings of this study are limited to the county in a mid-Atlantic state where the study took place.
2. The findings of the study are limited to conditions in the middle schools where the study was conducted.
3. The findings of the study are limited to the principals, mathematics resource teachers and mathematics teachers who participated in the study.
4. The findings of the study are limited to populations based on the single criterion of identifying schools that made or did not make state standards in mathematics.
5. The findings of the study are limited by the socioeconomic levels of the different middle schools in this study. The percentage of students receiving free and

reduced-price meals was obtained through the collection of demographic background data on each middle school.

6. The findings of the study are limited since this study only looked at leadership from a single criterion: adequate yearly progress determination.

7. The findings of the study are limited since the researcher did not perform a bias check analysis for non-survey respondents.

#### Delimitations of the Study

1. The study is bound only to those leadership practices detailed in the conceptual framework. Therefore, this study offers only one perspective on principal leadership.

2. The study concentrated only on the leadership practices of middle school principals in a mid-Atlantic county. This study did not focus on elementary schools, high schools, or non-public schools.

3. It should be noted that the researcher is a middle school principal in the mid-Atlantic county where this study was conducted. Therefore, there may be a concern for the potential of researcher bias. To limit such bias, the researcher used multiple methods of collecting data and did not lead the focus groups.

#### Organization of Study

This dissertation was organized in five chapters. The first chapter presents an introduction to the study, its significance, and the statement of the problem. The definitions of important terms, and research methods with limitations and delimitations, are also included in this chapter. The second chapter is devoted to a discussion of the major themes associated with the literature relevant to this study. The third chapter explains the methodology used in this study. The fourth chapter presents

the results of the data analysis. The fifth chapter includes the conclusions and recommendations for further study.

## CHAPTER II

### REVIEW OF THE LITERATURE

The purpose of this study was to investigate the extent to which leadership practices of principals in middle schools identified as at risk of not meeting state standards in mathematics differ from those in schools identified as meeting state standards in mathematics. The conceptual framework of this study was built on the perspective that the behaviors and practices of a principal influence the learning community of a school. In this framework the vision of the principal is the key element that serves as the overarching domain and is supportive of the five other domains, which are: (1) vision, mission, and culture; (2) mathematics curriculum and classroom instruction; (3) collaboration and shared leadership; (4) family and community involvement; and (5) effective management (Felder, 2006). This mixed method study will seek to understand the leadership behaviors of principals regarding mathematics and school leadership practices.

This review of research was designed to highlight the literature related to the importance of the principal, the evolving role of the principal, and middle school mathematics. The leadership of the school principal is addressed within each of these sections. The final section discusses the relationship of the literature to the present study.

#### The Importance of the Principal

Principals are captivated by the notion of leadership. Peter Northouse (2004), in his book, *Leadership Theory and Practice*, reminds us that leadership is a complex process with multiple dimensions and theories. He states "leadership is a process whereby an individual influences a group so as to achieve a common goal" (p.2).

School systems often seek individuals with special leadership ability to lead their schools as principals.

The school principalship is one of the most demanding jobs in American education (Levine, 2006). As the person in charge of the daily operation of a particular school, the principal is vested with enormous responsibility for the education of students, the supervision of personnel, and the adherence to numerous laws and policies. Keller (1998), in his article, *Principal Matters*, identified eight characteristics that were important in providing sound leadership. He states a good principal:

1. recognizes teaching and learning as the main business of a school;
2. communicates the school's mission clearly and consistently to staff members, parents, and students;
3. fosters standards for teaching and learning that are high and attainable;
4. provides clear goals and monitors the progress of students toward meeting them;
5. spends time in the classrooms and listening to teachers;
6. promotes an atmosphere of trust and sharing;
7. builds a good staff and makes professional development a top concern;  
and
8. does not tolerate bad teachers.

Strong leadership can provide the necessary leverage to successfully meet major challenges facing schools today. Sweeny (1992) contended, "Effective schools have effective leaders." Schools cannot exist without exceptional leaders. Bjork and Ginberg (1995) further asserted that excellent schools simply cannot exist without exceptional leaders. According to former Education Secretary Riley,

The Principalship is a position that is critical to educational change and development. A good principal can provide a climate that can foster

excellence in teaching and learning, while an ineffective one can quickly thwart the progress of the most dedicated reformers.

(Educational Testing Service, 2002, p.13)

Research also shows that schools which have raised student achievement in spite of students' socioeconomic backgrounds almost invariably do so with the guidance of an effective leader (Keedy, 2004). Moreover, it is documented in the research that a principal's behavior and practices impact student achievement.

### School Leadership Standards

Principals have been given a set of standards outlining effective school leadership practices. These standards, adopted in 1996 by the Interstate School Leaders Licensure Consortium, include the following seven "Standards for School Leaders:"

1. Standards should reflect the centrality of student learning.
2. Standards should acknowledge the changing role of the school leaders.
3. Standards should recognize the collaborative nature of school leadership.
4. Standards should be high, upgrading the quality of the profession.
5. Standards should be performance-based systems of assessment and evaluation for school leaders.
6. Standards should be integrated and coherent.
7. Standards should be predicated on the concepts of access, opportunity, and empowerment for all members of the school community.

These standards were adopted by 42 states and are used by educational organizations, including the National Council for the Accreditation of Teacher Education (NCATE), which used them to develop their own set of standards.

According to Van Meter and McMinn (2001), the standards have been used to "prepare school leaders, to access existing school leaders and to guide school leaders' professional development" (p.5).

### Leadership Development

Having a set of standards for practice does not automatically lead to effective leaders. Corporate America has focused on effective leadership development and practices for decades. In their research on some of the best-run companies in the United States, Peters and Waterman (1982) found that almost every excellent company was associated with a strong leader.

Because of the significance of the principal, researchers have documented the importance of principal preparation and professional development programs in fostering effective principals (Lashway, 1999; Leithwood, Seashore, Anderson & Wahlstrom, 2004). School districts have designed leadership programs that focus on the evolving role of the principal and ways to build capacity for professional development, preparation, and training. A number of these programs are described here.

Based on corporate management concepts, the New York City Public Schools includes the *Leadership Academy* which is a rigorous, fifteen-month training program designed to teach effective leadership skills to aspiring principals (New York City Department of Education, 2004). The program started in 2003. Candidates must complete several phases throughout the course of their training including a theory-based summer session, a residency period spent working with a mentor principal within a school, and a final preparatory summer before taking over one of New York City's 1200 public schools (New York Times, December 21, 2005).

The New York program uses a three-tier process. Phase one of the Leadership Academy's Aspiring Principals Program incorporates dynamic, problem-based learning scenarios to place the future school leaders in the types of situations they will experience as principals. Aspiring principals develop the knowledge, skills, and dispositions necessary to confront pressing challenges and leadership for instructional effectiveness. In phase two, aspiring principals enter a residency program where they are paired with another program participant and work with a mentor principal for the duration of the academic year. Phase three of the program supports aspiring principals as they transition to leadership roles within specific schools. The program incorporates analyses of student and teacher performance data, preparation for "Firsts" (such as the first staff meeting, first parent association meeting, first school leadership team meeting), professional development planning, and preparation of a personal development plan for the first year as a principal.

In the state where the proposed study was conducted, the State Department of Education created the Division for Leadership Development. The mission of the Division is to build the instructional leadership capacity of present and potential school leaders in the content and skills needed to increase student achievement (Instructional Leadership Framework, 2002). In 2004, the *Instructional Leadership Framework* described expected outcomes related to principals' instructional leadership. The framework is based on the *Task Force Report on the Principalship* adopted by the State Board of Education in 2000. The task force was created in response to statewide concerns regarding the lack of candidates for the school principalship and the need to redefine the role of the principal. The purpose of the Instructional Leadership Framework was to:

- drive the instructional leadership curriculum for the Division of Leadership Development;

- guide instructional leadership professional development for veteran, new, and potential school leaders;
- serve as a catalyst for the alignment of professional development for those who supervise and evaluate principals;
- provide a self-assessment/reflective practice tool for principals and potential school leaders; and
- promote dialogue in districts around matters of instructional leadership.

In the school district in which this study was conducted, a *Leadership Development Program* (LDP) was organized in 1995. The program is designed to assist participants in developing the knowledge, skills, strategies, attitudes and aspirations to become effective school-based leaders and to improve student learning.

As school leaders face increasingly high demands to reach higher standards and raise student achievement, the LDP "aspires to develop the strong leadership that is needed to meet these challenges" (County board of education, p.1). This program includes a greater focus on academic standards and outcomes, increased interest in more collaborative leadership, more demands for community involvement, new instructional strategies, data-driven decision-making, and technology.

The LDP content is based on both the Standards for School Leaders, developed by the Interstate School Leaders Licensure Consortium (ISLLC), and the local school district standards. The LDP provides thoughtfully planned and integrated training and support to new administrators beginning with their first year as a student support specialist (secondary), and continuing with a two-year assistant principal component (County board of education, 2006). LDP participants attend monthly leadership seminars that focus on student achievement, job-embedded professional development, reflective practices, and problem solving.

In summary, the two statewide programs, the Leadership Academy and the Instructional Leadership Framework, along with the district-level program, Leadership Development Program, are representative of the emphasis placed on developing effective leadership in aspiring and acting principals.

#### Middle School Principal

The literature related to the middle school principalship documents the need to focus specific attention on strategies to lead schools in the 21<sup>st</sup> century. In 1982, the National Middle School Association (NMSA) published *This We Believe*, which defined the characteristics of developmentally responsive middle schools (Valentine, Clark, Hackmann, & Petzko, 2004). *The NMSA publication* identified the following characteristics of effective middle-level schools:

- educators' knowledge about and commitment to young adolescents,
- a balanced curriculum based on the needs of young adolescents,
- a range of organizational arrangements,
- varied instructional strategies,
- a full exploratory program,
- comprehensive advising and counseling,
- continuous process for students,
- evaluation procedures compatible with the nature of young adolescents,
- cooperative planning, and
- a positive school climate.

These ten characteristics of effective middle schools illustrate the need for principals to understand the developmental and educational needs of young adolescents in order to exert effective leadership in the middle school setting.

Valentine et al. (2004) conducted a national study of leadership in middle level schools. They reviewed over 270 middle school programs and school practices. The authors identified six highly successful middle schools and the personal leadership qualities of each school's principal. They found the principals: provided vision, modeled behavior, fostered commitment, provided individualized support, and engaged communities effectively. These qualities contributed to the success of the middle school principals.

In 2005, the National Association of Secondary School Principals (NASSP), which was established in 1916 as a support of middle school and high school principals, published a comprehensive report on middle schools entitled *Breaking Ranks in the Middle: Strategies for Leading Middle School Reform*. The report was designed:

....to provide middle level principals with a field guide to school improvement...with the bulk of the responsibility for testing under NCLB resting at the middle grades we have chosen to focus this guide on recommendations and strategies that principals have some degree of control over in reforming their schools...our hope is that aligned practices will result in student success. (NASSP, p.1)

This report was an effort to communicate strategies for principals to support middle level reform initiatives. The centerpieces of the report focus on collaborative leadership, personalization, and academic rigor.

Beginning several decades ago, comprehensive reviews have been conducted of the literature on school administrators. Bridges (1982) reviewed 322 research reports on school administrators published between 1967 and 1980. Bridges organized his research on school administrators using the three components of Halpin's (1966) paradigm on administrator behavior on school administrators. Bridges (1982)

observed, when assessing the impact the of school administrators, that researchers are far more likely to focus on "organizational maintenance" than "organization achievement" (p.21). In the 1970s and 1980s, the leadership literature focused on effective leaders and leadership abilities. The theme that emerged from the research is that principals should be good managers and leaders. Duttweiler and Hord (1987) stated:

The research shows in addition to being accomplished administrators who develop and implement sound policies, procedures, and practices, effective administrators are also leaders who shape the school's culture by creating and articulating a vision, winning support for it and inspiring others to attain it. (p.65)

In his study on middle school principals, Bennis (1990) indicated that all leaders have the capability to create a vision, transform stakeholders, and the ability to translate that vision into a school-wide mission to impact student achievement. The research focusing on middle school principals has, through the decades, highlighted the association of strong leadership qualities among principals and high functioning schools.

### School Leadership and Student Achievement

Decades of research indicate that school principals can affect student achievement. The research has revealed links between what principals do and how students perform (Waters, Marzano, & McNulty, 2003.) Cotton (2003) reports that principals who know about teaching and learning are the principals who are actively engaged in improving instruction at their schools. These same principals have higher-achieving students than principals who manage only the non-instructional aspects of

their schools. Earlier, Cotton (1996) pointed to a direct link between classroom observation feedback given to teachers and students' academic performance.

According to Farkas, Johnson, Duffett, Foleno, and Foley (2001), school district superintendents believe that a good principal is at the heart of success of a school's accomplishments. In their research, they concluded that 62% of the superintendents will move a principal with a proven talent to a low-performing school as an excellent way to turn that school around. Elmore (2000) concurred, noting that effective school leaders build capacity within the organization through professional development, high expectations, and collective accountability for results.

### The Evolving Role of the Principal

#### *Historical Forces Within The Principalship*

Through the decades of the twentieth century, significant forces in history changed the role of the principal. Beginning with the Civil Rights Movement, there was debate about the equalization of the public school system. At the heart of this controversy were the desegregation challenges for educators which initiated the National Association for the Advancement of Colored People (NAACP). When the National Commission on Excellence released *A Nation at Risk* (1983), it was a call to action requiring states to study the link between the role of the principal as instructional leader and efforts to improve student achievement. The result was an acceleration of the emphasis of the principal's emerging new role.

In the 1970s, researchers were identifying schools where children performed successfully and examining the leadership in those schools. According to DuFour and Eaker (1998), the principal of the 1970s and 1980s was a manager, "a strong, forceful, assertive individual who was quick to take the initiative...aggressive, professionally

alert, dynamic, determined to create the schools they deemed necessary, no matter what!" (p.183).

During the 1990s, with the standards movement, principals found themselves at the center of an accountability movement. In fact, when the standards and accountability movement commenced, the principal became an integral player in implementing accountability mandates. During this time, the principal's role shifted dramatically to a leader who was willing to work collaboratively with teachers to examine practices in order to improve student achievement. Beck and Murphy (1993) observe that school leadership changed frequently.

Through the enactment of the *No Child Left Behind Act* and other state accountability measures, local school systems have become concerned about making improvements in achievement for all student subpopulations (NASSP, 2005).

Daeschner, Munoz, and Barnes (2004) wrote:

There is a high degree of interest in determining what factors influence schools' ability to close the achievement gaps. From the school effectiveness research perspective, educational research and policy is about collecting evidence on what makes a good school and how to make schools good. (p.5)

The impact of No Child Left Behind has expanded the role of the principal. As stated in *K-12 Principals Guide To No Child Left Behind* (2003),

NCLB adds substantially to the principal's responsibilities and accountability for student achievement, staff quality, the quality and legitimacy of the schools' curriculum and instruction....moreover, the positive and negative consequences of this new accountability and these new responsibilities are most dramatically felt in a school being reconstituted—essentially re-staffed. No Child Left Behind is now

asking the principal to weave together the needs of the demands of all stakeholders. These needs and demands create an environment where principals are accountable to these stakeholders in ways they may never have been before. (pp. 2-3)

These federal and local mandates have increased the importance of the principalship, especially in middle schools where all grades have annual high stakes testing.

### *Shifting Roles*

In addition to the increasing importance of the principal, the role of the principal has shifted from manager to leader. The demands on educational leaders have shifted due to the efforts needed to meet new national, state, and local educational standards (Levine, 2006). The School Leadership for the 21<sup>st</sup> Century Initiative of the Institute for Educational Leadership created a task force to examine the role of the principal. The findings, entitled *Leadership for Student Learning: Reinventing the Principalship* (2000) states that schools of the 21<sup>st</sup> century will require a new type of principal, one whose role will be defined in terms of the following:

1. Instructional leadership that focuses on strengthening teaching and learning, professional development, data-driven decision making and accountability;
2. Community leadership manifested in a big-picture awareness of the school's role in society, shared leadership among educators, community partners and residents, close relationships with parents and other community members, and advocacy for school capacity building and resources; and
3. Visionary leadership that demonstrates energy, commitment, entrepreneurial spirit, values, and the conviction that all children will

learn at high levels, as well as inspiring others with this vision both inside and outside the building. (p.4)

The task force suggested the current role of the principal, indicating:

School leaders today must serve as leaders for student learning. They must know academic content and pedagogical techniques. They must work with teachers to strengthen skills. They must collect, analyze and use data in ways that fuel excellence. They must rally students, teachers, parents, local health and family service agencies, youth development groups, local businesses and other community residents around the common goal of raising student performance. And they must have the leadership skills and knowledge to exercise the autonomy and authority to pursue these strategies. (p.2)

The National Association of Elementary School Principals (2001) further defined the evolving role of the principalship in terms of standards all principals should know and be able to do. The standards include: (1) learner-centered leadership; (2) high expectations and standards for both academic and social development; (3) student achievement; (4) culture of continuous learning for adults that is tied to school goals; (5) using multiple data sources for instructional improvement; and (6) community involvement that shares the responsibility for school success. These descriptions are the most detailed regarding the new role of the principal. The focus of the standards is that student learning must be at the center of what schools are all about and should drive all the decisions schools make (NAESP, 2001)

In 2005, NASSP convened a task force on the principal's changing role. Commenting on the forthcoming report, *Changing Role of the Middle School Level and High School Leader: Learning for the Past – Preparing for the Future*, NASSP Executive Director, Gerald Tirozzi, stated:

This publication brings into clear focus how the secondary school principal's role has dramatically changed over the years. The authors provide insightful observations and concise strategies as to how school leaders can succeed in a period of change and greater accountability. The report will focus on how school leaders work, present trends that will affect leadership, and the emerging leadership models to deal with the increasing demands of the Principalship. (NewsLeader, February, 2007, p.1)

Bencivenga and Elias (2003) stated that "principals must take the lead in defining, articulating, and implementing a vision of a school community and academic excellence" (p. 64). Successful implementation of accountability policies has shifted the role of the principal in school systems. In the book, *A New Agenda for Research in Educational Leadership*, Firestone and Riehl (2005) shared the results of the task force on research co-sponsored by the American Educational Research Association. The guiding questions included: How can educational leaders increase student learning; and how can they foster equity in educational outcomes. The book was in response to the "shift in educational policy from expecting educational leaders to be effective fiscal, organizational, and political managers to making them accountable for student, staff and school performance" (p.39). Their research was built on the following assumptions:

1. School leadership improves student learning;
2. School leadership is exercised by principals;
3. A core set of leadership characteristics extends to all contexts; and
4. Successful leaders in schools with diverse populations focus on establishing special conditions that support student achievement, equity, and justice.

Mazzeo (2003) reported that strong school leaders, through a clear focus on teaching and learning, have a direct impact on teacher practices. He described the critical responsibility of the principal to assign and evaluate teachers. He stated, "when classroom instruction is weak in underperforming schools, or when large numbers of teachers are teaching out-of-field in these schools, significant responsibility rests with the principal" (p.2).

The research offers some important insights about the evolving role of the principal. Hanny (1987) states that

effective principals are expected to be effective instructional leaders. . . the principal must be knowledgeable about curriculum development, teacher and instructional effectiveness, clinical supervision, staff development, and teacher evaluation. (p.209)

Bryce (1983) and Fullan (2001) agreed with this view of the principal's role. However, Fullan expanded the leadership role to be more active and collaborative. He indicated that the principal now works "with teachers to shape the school as a workplace in relation to shared goals, teacher collaboration, teacher learning opportunities, teacher commitment, and student learning" (p.161). In another research article, Fullan (2001) contended that truly successful school leaders must become multidimensional and conceptual thinkers to transform a school culture.

Another study, the School Leadership Challenge, conducted by the Panasonic Foundation (2001) in conjunction with the American Association of School Administrators, reported that school systems are trying to understand the challenges facing today's principals. The authors concluded that the role of the principal has become more complex. Hallinger (1992) further states that it is the principal's responsibility to create a strong school culture and to support teachers in redesigning the instructional program so all students can learn.

### *School Leadership Practices*

During the last 40 years, there has been a dramatic shift in the role and responsibilities of principals. While much literature exists on school leadership and leadership practices, there are few empirical studies on understanding the role of the principal and the significance of principal leadership behaviors (Potter, 2002). A number of studies and reviews (Levine, 2006; Scheerens & Bosker, 1997; Seashore-Louis, Marks, & Kruse, 1996; Teddlie & Stringfield, 1993) characterized principal leadership and attributes in schools where student achievement was high as (a) sharing leadership with teachers, (b) utilizing academic support staff, (c) buffering the core technology, (d) orienting towards "maverick" leadership, (e) acquiring needed resources (f) monitoring school activities, (g) maintaining a school vision and high expectations concerning teaching and learning, (h) focusing on student learning and teacher development, (i) recruiting quality teachers, and (j) creating a learning organization built on trust and respect.

In distinguishing between leadership and management, Fenton (1990) suggested that leadership is the ability to visualize, articulate, and create structures for supporting the vision while management is closely associated with rules, regulations, and roles classifying expected behaviors associated with a specific change effort.

By concentrating on teaching, instructional leaders of the past emphasized the inputs of the learning process. By concentrating on learning, today's school leaders shift both their own focus and that of the school community from inputs to outcomes and from intention to results. Schools need principal leadership as much as ever. But only those who understand that the essence of their job is promoting student and teacher learning will be able to provide that leadership.

Today, the role of principal includes a much deeper involvement in teaching and learning. More attention is now focused on learning and some researchers now use

the term "learning leaders" to mean instructional leaders (DuFour, 2002). As DuFour focuses on the shift in the role, he states "given the dynamic complexity of the new role, the leadership practices of principals are essential for this new type of leader." In a recent article about the kind of leadership that is needed for school reform, Protheroe (2005) asserted, "principals are at the center....their leadership is the successfully navigating change" (p.54). Moreover, as principals focus on teaching and learning, it is important the students have access to a rigorous and focused curriculum.

### Middle School Mathematics

Principals can play a key role as leaders to promote high-quality mathematics instruction (Nelson, 1999). Research shows that their understanding of mathematics instruction, and their ideas about how they can support it, is significantly influenced by their own ideas about teaching, learning, and the nature of mathematics (Reys, Chavez, & Reys, 2003; Scott, 2003). It is important to understand how principals connect new ideas about mathematics, learning, and teaching with the decisions and actions that constitute administrative practices. In a study by Stein and D'Amico (2002), the authors investigated the content knowledge (that is, the ideas about mathematics, learning, and teaching) that elementary principals use in the administrative practice of classroom observation and teacher supervision. Their study addresses the following questions:

- What ideas about mathematics, children's learning, and elementary mathematics instruction inform what principals attend to when observing elementary mathematics classrooms?
- How do these ideas inform their judgments about the quality of the instruction they observe and what they decide to talk with teachers about in post-observation conferences?

- How does this content knowledge shape their leadership concerns in the actual practice of classroom observation and teacher supervision?

As the research suggests, in order to support leadership practices in mathematics, the principal is pivotal. Barth (2002) contends that the support of the principal is important to the successful implementation of the curriculum.

### *Middle School Algebra*

The study of algebra in middle school is associated with rigorous instruction. In fact, "algebra for everyone" is a reform embraced by the College Board and the National Council of Teachers of Mathematics (Gamoran & Hannigan, 2000; Steen, 2007). Algebra has been recognized as a branch of mathematics used to solve problems and real-world situations (Reys, Chavez, & Reys, 2003). Researchers also cite studies that demonstrate the benefits of early algebra study. For example, data from the National Educational Longitudinal Study (NELS:88) revealed that 83% of students who took algebra I and geometry enrolled in college within two years of their scheduled high school graduation (Riley, 1998) and that rigorous math courses result in higher math achievement. Of students in the same study who did not take algebra I and geometry, only 36% enrolled in higher education within two years of completing high school. These studies that have encouraged schools to offer algebra and geometry to more students at earlier grades are correlational.

In their study, Gamoran and Hannigan (2000) confirmed the benefits of taking algebra during grades 8 through 10. In that study, which focused on achievement as well as socio-economic status and ethnicity, the researchers found that taking algebra benefits all students, with low achievers benefiting along with high achievers.

The benefits of algebra are so substantial that former U.S. Education Secretary Riley first encouraged the study of algebra in the eighth grade for greater numbers of

students. He also associated algebra with the study of rigorous math in high school. Since algebra and geometry are considered to be college preparatory courses, algebra in the eighth grade is considered the "gatekeeper" course to high school calculus (Oakes et al., 1990). In a later study, Atanda (1999) found that 37% of the NELS participants who studied algebra in the eighth grade in 1988 completed an advanced level math course, while only 29% of the students who did not take algebra in the eighth grade went on to complete one of the identified higher level math courses (trigonometry, statistics, analytical geometry, introduction of analysis and calculus) prior to graduation. The importance of algebra as a gatekeeper for entry into higher mathematics is not a new idea. It has been known for a long time but has recently received a great deal more attention from educators who realized that early enrollment in algebra at the middle school level will better prepare students for success in high school.

### *Current State of Middle School Mathematics*

There is growing debate about the current state of K-12 mathematics (Friedman, 2005; Haycock, 2007; National Academics, 2005). Over the past twenty years, there has been a significant increase in the number of students taking advanced mathematics. In 1990, 29% of high school graduates took four years of mathematics, ending with trigonometry, but by 2004 that figure increased to 72%. In 2004, 29% of the 13-year-olds reported taking an algebra course, an increase of 16% from 1986 (Perie & Moran, 2005).

Compared to other nations, the overall level of middle school mathematics achievement has not increased. Results from the *Trends in International Mathematics and Science Study* (TIMSS) focused on the nation's teaching and learning of mathematics. TIMSS was most recently administered in 41 countries in 2003 (NCES,

2003). In the United States, this test was sampled on 9,829 fourth and 8,912 eighth graders in 2003. In 2003, eighth-graders in Chinese Taipei, Hong Kong, Japan, Korea, and Singapore outperformed U.S. eighth-graders in mathematics. Fourth and eighth graders in the United States fared better than the international average in mathematics on the TIMSS in 2003, though there was not a significant change in the U.S. student scores from 1995 to 1999 (NCES, 2003). But eighth-graders in U.S. public schools with the highest poverty levels (75% or more of students eligible for free or reduced-price lunch) had lower average mathematics and science scores than the international average.

The international stature of students in the United States has decreased in mathematics. The mathematics proficiency measured for the United States student samples between 1995 and 2003 indicated that fourth graders' scores did not change and that eighth graders' scores increased significantly during those years (NCES, 2003). Within these comparisons, the United States mathematics curriculum contrasts negatively with the curriculum of countries that have performed well on recent international comparisons. Similar results are demonstrated through the *Program for International Student Assessment* (PISA), which is the international assessment for secondary students that is given every three years (NCES, 2004). In the 2003 results, the United States ranks in the bottom third of the 39 participant countries for mathematics literacy.

Within the field of mathematics, there are concerns about curricula, instructional practices and levels of student achievement (Snead, 1998). The 1989 National Research Council study entitled *Everybody Counts* concluded that because of the lack of mathematical literacy and the failure of a rich, high-quality math curriculum, many secondary students are not prepared for tomorrow's jobs. According to Foegen and Deno (2001),

efforts to revise mathematics instruction have been accompanied by a push toward authentic assessment strategies involving open-ended tasks, checklists, interviews, extended investigations, and portfolios. Spurred in part by dissatisfaction with multiple-choice standardized tests that assess computation and isolated skills, proponents of reform advocate procedures that are based on student performance, more closely tied to the curriculum, representative of realistic mathematical tasks, and more useful to teachers for improving instruction. (p.5)

### *Middle School Standards*

Middle school mathematics standards for students are defined by individual states and local boards of education, although most have adopted some forms of *The Standards* published by the National Council of Teachers of Mathematics (NCTM) (1989, 1991, 1995, 2000). This association was the first organization to develop comprehensive standards for a subject area. Published as the Curriculum and Evaluation Standards for School Mathematics in 1989, the standards "redefined the study of math so that concepts and topics would be introduced at an earlier age, and students view math as a relevant problem-solving discipline rather than as a set of obscure formulas to be memorized" (Diegmueller, 1995, p.5).

In the state in which this study was conducted, the middle school state standards in mathematics include: number relationships and computation/arithmetic; algebra, patterns, and functions; geometry; measurement; probability; statistics; and problem reasoning, communications, and connections. Also, the state has established an "essential mathematics content" that should be taught in every classroom (State Department of Education, 2004). This curriculum, named the "voluntary state curriculum" (VSC), was developed to support the alignment of curriculum,

instruction, and assessment throughout the state. Table 2 shows the alignment of the NCTMS standards to the state in which this study was conducted.

Table 2

*NCTM Standards for Mathematics*

NCTM	Mid-Atlantic State
Operation	Number Relationships & Computation/Arithmetic
Algebra	Algebra, Patterns & Functions
Geometry	Geometry
Measurement	Measurement
Data Analysis & Probability	Probability Statistics
Problem Solving	Problem Solving
Reasoning	Reasoning
Communications	Communications
Connections	Connections

*Access to Rigorous Pathways*

Researchers have identified a variety of factors that contribute to the decision to accelerate students in mathematics. The criteria regarding placement in more accelerated and rigorous pathways are determined at the district or school level. Across schools and school districts, however, there are vast differences in the placement criteria. Useem (1992) identified previous mathematics performance as a common factor in the acceleration of students in algebra. Other factors used to sort middle school students into differentiated math curricula include: achievement results, recommendations, math grades.

Nearly a decade ago, Useem's (1992) study of Boston schools concluded that while some districts had an elaborate set of criteria based on high cut-off scores for entrance into accelerated classes, others had far less restrictive test scores criteria, and still others relied almost exclusively on teacher recommendations (p.9-10).

VanderVeen, Manaster, and Speer (2006) revealed that in the United States, there were considerable differences in middle school math placement practices regarding which students to accelerate.

While there may be variances in the placement of students, some researchers have related the reasons to culture and organization practices of middle schools (Hallinan, 2004; Wentzel, 1997). Hallinan concluded that middle school placement in math is often influenced by factors such as school resources, class size policy, teacher working conditions. But Useem (1992) concluded that acceleration is the reflection of the philosophy of school leaders. Principals who believe in promoting rigor have developed plans and opportunities for student success. Therefore, the belief of the school leader influences acceleration decisions.

#### *No Child Left Behind Act and Middle School Mathematics*

For middle schools, the *No Child Left Behind Act* of 2001 (NCLB) has increased accountability and changed the educational landscape at both the state and local levels for several reasons (K-12 Principals' Guide, 2003). First, the law mandates that every student in a school that receives federal funding must be tested in mathematics at least one time in each year in middle school. This item replaces a similar requirement in the Clinton Administration's *Improving America's Schools Act* (IASA) of 1994 (Goertz & Duffy, 2001). Beginning in the 2005-2006 school year, the act mandates that the grades 3 through 8 annual mathematics assessments measure the achievement of students against state academic achievement standards (p. 1450). The

law requires that assessments must take place on an annual basis in each grade and that the format of the assessments is to be determined by state education officials.

In addition, the law charges each state to establish academic standards in mathematics for students at all grade levels and that the assessments shall be derived from the standards. The standards must specify what mathematical knowledge and capabilities every child is expected to know and be able to do (p. 1445) and the benchmarks for qualifying students as proficient or advanced in mathematics for each grade. Prior to NCLB, states were required to define proficiency levels for students of schools receiving Title I funds—advanced proficiency, proficiency, and basic proficiency. By the 2000-2001 school year, nearly all of the states had these levels in place (Goertz & Duffy, 2001). In the year prior to NCLB, most states had accountability systems for schools or districts. But unlike the mandates called for in NCLB, many of these states had reward systems for exceptional schools as well as sanctions for underperforming schools (Goertz & Duffy, 2001). Establishing proficiency levels for schools enabled the use of retention, awarding of diplomas, and student tracking. Furthermore, the results were required to be reported in the form of school or district report cards (Goertz & Duffy, 2001). NCLB takes this system and places into it a requirement that all schools display gains in proficiency, not only those legislated by Title I. Benchmarks in assessments for proficiency levels, required by NCLB, must be measurable objectives that correspond to the standards. Those schools not displaying adequate gains in proficiency are labeled "in need of improvement" and then must produce a school improvement plan that may include restaffing, curricular change, or restructuring. This aspect of the law has been the most controversial practice surrounding NCLB and schools nationwide have already begun the process of removing the "in need of improvement" label.

NCLB requires principals to develop a comprehensive plan to ensure that every student reaches proficiency in mathematics. Principals must focus their attention on implementing instructional practices to enhance teaching and learning. Therefore, they must provide teachers with support, guidance and mentoring. The role of the principal is important and incorporating successful leadership practices that focus on mathematics will support student achievement in mathematics.

### The Relationship of the Literature Review to This Study

The literature review presented here includes many citations that allude to the significance of the principalship. Further, the literature suggests how the role of the principal evolved as a result of historical forces. This study is prompted by the need for understanding the new role of the principals. This need is especially pertinent given the rapidly changing influence of social institutions, changing diverse demographics, and accountability efforts at the federal and state level. The middle school principal of the 21<sup>st</sup> century has been characterized as a change agent, a transformational leader, and someone that can engage in collaborative leadership and decision making (Valentine, Clark, Hackmann, & Petzo (2002).

Now, middle school principals have responsibility for leading instruction in a wide variety of specific subjects (Cole, 1999; Kilpatrick et al., 2001). Among those subjects, mathematics is a particularly important venue to study because of our nation's poor results in state accountability measures. The research from middle school mathematics provides the essential foundation for success in rigorous high school curricula and post-secondary experiences. Understanding leadership practices of the principals and their effect on middle school mathematics will create research that will enhance our understanding of this relationship and provide the potential to increase student achievement, thus furthering state accountability efforts. Given this context,

the following research questions guided this study of the relationship between leadership practices and middle school mathematics:

*Research Question 1*

From the perspective of middle school principals, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 2*

From the perspective of middle school mathematics resource teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 3*

From the perspective of middle school mathematics teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk

of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 4*

What are the curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who are concerned with providing leadership to students in mathematics? Are there differences in these curricular and instructional issues between middle schools meeting state standards and those not meeting state standards?

## CHAPTER III

### RESEARCH DESIGN AND METHODOLOGY

Middle school principals must now be actively involved in improving a school's instructional program. Instructional change requires school leadership. Now middle school principals have responsibility for leading instruction in a wide variety of specific subjects. Principals can play a key role as leaders to promote high-quality mathematics instruction (Nelson, 1999). Research shows that their understanding of mathematics instruction, and their ideas about how they can support it, is significantly influenced by their own ideas about teaching, learning, and the nature of mathematics (Reys, Chavez, & Reys, 2003). However, a better understanding of school leadership practices in middle schools is needed in order to support principals with their efforts to improve student mathematics achievement.

The purpose of this chapter was to outline the procedures of inquiry used to investigate the extent to which leadership practices differ in middle schools identified as at risk for not meeting state standards in mathematics and in schools identified as meeting state standards in mathematics. In this chapter, the methodology of the study is presented. It includes the research questions and overview of the research design, a description of the study population, a discussion of the instrumentation, and the methods and procedures used for collecting and analyzing the data.

#### Overview of Research Methods

For this research study, the data were collected using a mixed-method approach that included both quantitative and qualitative methods. The data were gathered through the use of a survey and focus groups to answer the research questions.

The first phase of this research focused on quantitative methods. According to Palmquist (2003), "surveys can be useful when a researcher wants to collect data on phenomena that cannot be directly observed" (p.4). For this study, a survey was used to measure school leadership practices and behaviors from the viewpoints of middle school principals, mathematics resource teachers and mathematics teachers.

The second phase of this research focused on qualitative methods. In order to describe persons' stories, behavior, organizational functioning, or interactional relationships, the use of qualitative analysis is warranted (Creswell, 2003; LeCompte & Pressle, 1993; Merriam, 1998; Strauss & Corbin, 1994). Specifically, the source for data collection was focus group interviews of principals, mathematics resource teachers, and mathematics teachers. Focus groups were used to obtain participants' perceptions of middle school mathematics and school leadership. According to Merriam (1998), focus groups allow for the opportunity to collect data about a lived experience and the ability to explore topics and generate hypotheses from the participants' perspective as compared to other forms of qualitative research (Morgan, 1988).

### Research Design

This mixed-method study was designed to investigate the extent to which leadership practices and behaviors differ in middle schools identified as at risk of not meeting state standards in mathematics and in schools identified as meeting state standards in mathematics. This study sought to understand the school leadership behaviors of middle school principals.

The theoretical framework of Powell (2004) guided this research project. Powell (2004) identified five domains of effective principal leadership behaviors and practices. According to Powell, these domains, based on her research, contribute to

effective school leadership. The domains include: (1) vision, mission, and culture; (2) curriculum and classroom instruction; (3) collaboration and shared leadership; (4) family and community involvement, and (5) effective management. Powell (2004) designed a survey and interview questions based on the five domains. The survey information and interview protocols for this study were modified from Powell's work to fit the needs of this study. They are discussed in detail in the instrumentation section of this chapter.

### Study Setting

Harris County\* has a population of 942,000 and a landmass of 497 square miles. It is a diverse, but affluent, mid-Atlantic county. The minority and immigrant population grew from 19% of the total population in 1990 to over 40% in 2001. The black or African American community represents the largest minority population in Harris County, comprising 15% of the county's population. Between 1990 and 2000, the African American population grew by 43%.

In Harris County, the Hispanic or Latino population is the fastest growing racial/ethnic group. According to the U.S. census, the population grew by 80% between 1990 and 2000. This county is the home of the largest Latino community in the region with Salvadorans comprising the largest group in the county. Almost half of the Hispanics residing in the state reside in this county.

A nine-member Board of Education is the county's educational policymaking body. The Harris County residents elect seven county residents for a four-year term and secondary school students elect a student member. The Board of Education directs the operation of the school system and oversees local education expenditures from county, state and federal sources. It also monitors the implementation of the school system's strategic plan, reviews the work of the superintendent of schools, and grants

applications, purchases, land acquisitions, and school construction repairs and alterations.

The Harris County school district serves a diverse student body. Over 23% of the students receive free and reduced-price meals (FARMS) with 12,000 students in English speakers of other languages (ESOL) programs. Eighty percent of high school seniors take the SAT and the average score is 1102. The average score of African-Americans is 917; the average score of Hispanic students is 944; and the average score of whites is 1163.

The 199 public schools of Harris County include 127 elementary schools, 38 middle schools, 25 high schools, 7 special education centers, and 1 career technology center. The kindergarten to twelfth grade student enrollment is more than 139,000. During the 2005-2006 school year, the total minority student population was 57.7%. It included 22.9% African-American, 14.7% Asian American, 20.1% Hispanic and .3% American Indian. As Harris County looks to the future, the projected enrollment in 2008 will be 145,622 students. Organizationally, the school district is divided into six regions—two rural, three suburban and one urban. Each region is comprised of a cluster of high schools with feeder middle and elementary schools.

### Research Questions and Statistical Hypotheses

Prior to beginning the research, a number of research questions were developed to provide the structure for data collection and analysis:

#### *Research Question 1*

From the perspective of middle school principals, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective

management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Statistical Hypothesis 1*

From the perspective of middle school principals, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 2*

From the perspective of middle school mathematics resource teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Statistical Hypothesis 2*

From the perspective of middle school mathematics resource teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared

leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 3*

From the perspective of middle school mathematics teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Statistical Hypothesis 3*

From the perspective of middle school mathematics teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

*Research Question 4*

What are the curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who are concerned with providing leadership to students in mathematics? Are there differences

in these curricular and instructional issues between middle schools meeting state standards and those not meeting state standards?

### Procedures

Following the approval of the dissertation proposal by the research committee and the University's Human Subjects Review Board, the researcher requested permission from the school system's research division to conduct the study. This research endeavor was conducted in a school system within a mid-Atlantic state. Thirty-three middle schools were selected from the Harris County\* School System—15 schools that met state standards for mathematics and 18 schools that were at risk for not meeting state standards for mathematics.

Schools were selected to participate in this study based on their state annual assessments in mathematics. The selected schools were in two categories: (a) those that achieved Annual Yearly Progress (AYP) in mathematics for two consecutive years (the 2004-2005 school year and 2005-2006 school year) and (b) those that did not achieve Annual Yearly Progress (AYP) in mathematics for the same two consecutive years (the 2004-2005 school year and 2005-2006 school year).

The research topic was chosen for two reasons. First, there is very little research on school leadership at the middle school level. Second, there is even less research on leadership in teaching mathematics at the middle school level, although success in mathematics is considered a marker for success in high school or for graduation.

The selection of 33 of the 38 middle schools occurred after consultation with the school system's Division of Research and Evaluation. Five schools were eliminated because of the special nature of their student body. Thirty-three principals, 33 mathematics resource teachers, and 190 mathematics teachers provided an adequate

sample size for the quantitative survey search portion of this study. The large number of teachers was included to ensure a better representation of the perceptions of teachers within the school sample.

Six principals, six mathematics resource teachers, and six mathematics teachers from each of the two schools groups (those that met state standards in mathematics and those that are at risk for not meeting state standards in mathematics) were purposely chosen for the focus group interviews. Three focus groups were formed—one for principals, one for mathematics resource teachers, and one for mathematics teachers. Each group drew from middle schools identified as meeting state standards in mathematics and middle schools identified as at risk of not meeting state standards in mathematics. Table 3 displays the sample invited to participate in the study.

Table 3

*Study Sample*

	15 Schools Meet Standards	18 Schools Do Not Meet Standards	Total
Surveys			
Principals	15	18	33
Resource teachers	15	18	33
Teachers	82	108	190
Focus Groups			
Principals	3	3	6
Resource teachers	3	3	6
Teachers	3	3	6

## Instrumentation

Powell (2004) developed a conceptual framework regarding effective principal practices and leadership behaviors based on the review of literature and her case study findings. Powell's survey instrument was designed to measure the extent to which principals exhibit behaviors in the following five domains: vision, mission, and culture; curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management.

In developing the survey, Powell (2004) began with 110 questions which were examined and assessed by 13 doctoral students at Virginia Polytechnic Institute and State University to establish validity. The validation process resulted in the elimination of questions based on "appropriate domain, importance, and understandability." Powell's final instrument contained 76 questions.

For this study, the validity of the instrument was reviewed by middle school principals, assistant principals, and mathematics coordinators working in a public school district in schools other than where the study was conducted. These reviewers suggested a number of changes, which were incorporated into the survey used for this study. The total number of questions was reduced from 110 to 60 based on the recommendations of the reviewers. The researcher also modified some of the questions in the section on curriculum and instruction so that they were more concerned with middle school mathematics. The survey used a four-point Likert scale in which the perceptions of principals, mathematics resource teachers, and mathematics teachers are measured on a continuum from highly unfavorable (i.e., 1=strongly disagree) to highly favorable (i.e., 4=strongly agree). According to the survey information sheet, respondents were asked to indicate their perspective about leadership behaviors and practices of themselves (for the principals) or their principal

(for the mathematics resource teachers and math teachers). The survey also included items requesting demographic information from the participants.

Of the 60 questions on the survey, 13 were questions addressing the school vision, mission and culture domain, 13 were questions regarding the curriculum and classroom instruction domain, 13 were questions for the family and community involvement domain, 9 were questions focused upon collaboration and shared leadership, and 12 were questions related to effective management.

The reliability of Powell's original instrument was verified by two researchers, Powell (2004) and Felder (2006). Both computed Cronbach alphas for each of the five domains. For domain 1, Powell's alpha score was .88 and Felder's was .92. For domain 2, the scores were .79 and .77, respectively. For domain 3, they were .95 and .87. For domain 4, they were .86 and .79, and for domain 5, they were .95 and .95. The Cronbach alphas on the five domains of the survey used in this study were calculated after the survey was administered and were based on the data gathered. The Cronbach alphas for the questions in each domain were .89 for vision, mission and culture; .87 for curriculum and classroom instruction; .83 for collaboration and shared leadership; .80 for family and community relations; and .83 for effective management.

### Data Collection

Following the approval of the dissertation proposal by the research committee and the University's Human Subjects Review Board, the researcher requested permission from the school system's research division to conduct the study. After written consent to conduct the study was obtained from the school system, an initial request for participation (Appendix A) was mailed to all identified subjects. This information, which included an invitation to respond to the survey, was sent to 33 principals, 33 mathematics resource teachers, and 190 mathematics teachers. Subjects

were asked to sign the informed consent form (Appendix B) prior to responding to the survey (Appendix C).

The sample of middle school principals, mathematics resource teachers, and mathematics teachers representing both groups of schools was asked to participate in a focus group discussion. An initial request for participation (Appendix D) was mailed to all identified subjects. This information was sent to six principals, six mathematics resource teachers, and six mathematics teachers and invited them to participate in focus groups. Subjects were asked to sign the informed consent form (Appendix E) to agree to respond to the focus group questions (Appendix F).

The discussions were taped and transcribed. Focus group interviews were arranged at a time and location convenient to participants and were conducted by an educational consultant. Each focus group lasted for one hour. The responses were coded, based upon the questions they addressed and the variables of the individual respondents in the groups. Focus group data were analyzed by the researcher and sorted by topics, clusters, and patterns.

### Data Analysis

This study used quantitative and qualitative research methods. As Chappelle (2001) shared, "in social and behavioral research how to combine qualitative and quantitative thinking is a way that helps provide relevant insights and solve social problems" (p.23). Quantitative methods were used by the researcher to answer research questions 1, 2, and 3. The survey data were analyzed by computing Cronbach alphas to establish inter-item reliability. Correlations were computed for responses of principals, mathematics resource teachers, and mathematics teachers and were analyzed to the five domains of the survey. Independent t-tests of principals, mathematics resource teachers, and mathematics teachers were also computed

between the two groups (schools making adequate progress and schools that were at risk of not making adequate progress). Analysis of variance was computed within the two group of schools, looking for differences between the principals, the mathematics resource teachers, and the mathematics teachers.

Qualitative methods were used to answer research question 4. A focus group interview is defined as a "carefully planned discussion designed to obtain perceptions on a defined area of interest" (Krueger, 1988, p. 18). Another definition of this qualitative research method is a "technique used to obtain data about feelings and opinions of small groups of participants about a given problem, experience, service or other phenomenon" (Basch, 1987, p.414).

The primary source for qualitative data collection was through focus group interviews because this method allows for (a) the opportunity to collect data through group interaction, (b) the ability to explore topics and generate hypotheses, (c) the ease of data collection, and (d) the researcher's moderate control of the focus groups as compared to other forms of qualitative research (Livesey, 2002; Morgan, 1988). Krueger (1988) states two other advantages—high face validity and speedy results. The primary limitations of focus group interviews are that data are sometimes difficult to analyze (Krueger, 1988) and that conclusions are not applicable to the population (Basch, 1987).

Historically, focus group interviews developed out of a need felt by social scientists in the late 1930s. They began examining the value of non-directive individual interviewing as an improved source of information. Traditional methods of gathering information relied heavily upon a process that gave excessive influence to the interviewer and limited the respondent through predetermined, closed-ended questions. During the 1940s the military used focus group strategies to improve morale. In the 1950s, Merton, Fisk and Kendall formalized the procedures used in

focus group interviews in their work entitled *The Focused Interview* (in Krueger, 1988).

The most frequent use of focus group interviews for the last 30 years has been in the area of marketing research (Hartman, 2004). This has been due, in large part, to the belief that focus group interviews explain, at a reasonable cost to the interviewer, how people regard an experience, idea, or event. Recently, the procedure has gained renewed popularity among social scientists, evaluators, planners, and educators. This study uses focus group interviews because it best suits the purpose of the study regarding middle school principal leadership practices, in general, and middle school mathematics, in particular.

The research design that was used for this study included principals, mathematics resource teachers, and mathematics teachers. The size of the focus group was determined by two considerations, according to Merton, Fiske, and Kendal (1990):

It should not be so large as to be unwieldy or to preclude adequate participation by most members nor should it be so small that it fails to provide substantially greater coverage than that of an interview with one individual. (p. 137)

Keeping the two considerations in mind, the size of a focus group will range from a minimum of not less than two members to the maximum of twelve as recommended above (Basch, 1987; Krueger, 1988; Morgan, 1988).

The focus group included principals, mathematics resource teachers, and mathematics teachers. "Mixing participants from different groups naturally leads to a comparison of the discussion than separate groups" (Morgan, 1988, p.4). Prior to beginning the focus group, a number of questions were developed to provide the structure for focus group discussion. The guidelines recommended by Krueger (1988)

for question formation were followed in the creation of a matrix of probes. Basch's (1987) recommendation that the general research questions should lead the way for designing specific question paths was followed.

For purposes of this study, several measures were taken to ensure the validity of the focus group procedures. While validity can be assessed several ways, this researcher chose face validity which is described by Krueger (1988):

Typically, focus groups have high face validity, which is due in part to the believability of comments from participants. People open up in focus groups and share insights that may not be available from individual interviews, questionnaires, or other data sources. (p.42)

Face validity will have been achieved in this study if the research questions have been answered by the data obtained through the chosen procedures. The context of this study lends itself to one of the research designs for focus group interviews suggested by Krueger (1988). He states:

Focus groups can be used alone, independent of other procedures. They are helpful when insights, perceptions, and explanations are more important than actual numbers. (p.40)

To insure that the question paths developed by this researcher had face validity, the questions were reviewed by an educational consultant. The review of the questions generated suggestions for change and resulted in approval of the final draft. The researcher then pilot tested the questions through a series of focus group interviews on a sample group of participants. Merriam (1998) recommended that "pilot testing is crucial for trying out questions" thus allowing for refinement. The results were compared for accuracy in obtaining desired information and for consistency of responses.

A moderator guide (Appendix H) provided to the educational consultant the basic structure for the focus group, while still allowing focus group members to pursue their own discussion. The moderator guide was designed to give participants an opportunity to discuss the leadership practices of middle school principals and to discuss curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who provide instructional leadership to students in mathematics.

The moderator's guide was developed using the domains of Powell's framework to elicit detailed descriptions regarding principal leadership behaviors. The guide also employed the use of probes to encourage clarification regarding curricular issues faced by middle school principals, mathematics resource teachers, and mathematics teachers. The focus group moderator's guide with interview questions was field tested with principals, mathematics resource teachers, and mathematics teachers prior to the formal interview phase of the data collection process. An educational consultant analyzed the results of the field test and made recommendations to the researcher. As a result, two questions were revised. Based on the field testing, the researcher established a set of interview questions (Appendix F).

### Summary

In summary, this chapter has outlined the procedures of inquiry used to investigate the extent to which differences in leadership practices and behaviors exist in middle schools identified as at risk for not meeting state standards in mathematics and in schools identified as meeting state standards in mathematics. This chapter described the research design, and the methods and procedures to be used for

collecting and analyzing the data. The results of the data were used to confirm or refute the study's hypotheses and to draw conclusions about the behaviors and practices of middle school principals in schools identified as at risk for not meeting state standards in mathematics and in schools identified as meeting state standards in mathematics.

## CHAPTER IV

### FINDINGS

#### Introduction

Just as societal and school demographics have changed in recent decades, so has the type of leadership needed to successfully lead the rapidly changing middle schools of this century. Now, middle school principals have responsibility for leading instruction in a wide variety of specific subjects (Cole, 1999; Kilpatrick et al, 2001). Among those subjects, mathematics is a particularly important venue to study because of the persistent poor results in student accountability measures. In the state where this study was conducted, all middle schools must meet "adequate yearly progress" (AYP) in mathematics by the 2013-2014 academic year. Students must be tested in mathematical proficiency at least once each year in grades 6 through 8. Because of the important role of mathematics in preparing students for successful performance in high school, research on middle school mathematics provides important data for building a foundation for success in rigorous high school curricula and post-secondary experiences.

School leaders must effectively employ their knowledge, skills, theories, and values in an effort to improve student learning and meet state standards in mathematics. The leadership of the principal plays an integral part in student achievement. Understanding leadership practices of principals and their effect on student performance in middle school mathematics will enhance our understanding of this relationship and the potential to increase student achievement.

Chapter IV presents the results of the data analysis. This mixed-method study was designed to investigate the extent to which leadership practices and behaviors differ in middle schools identified as at risk of not meeting state standards in

mathematics and in middle schools identified as meeting state standards in mathematics. The conceptual framework of this study is built on the assumption that the practices of a principal have a significant influence on the learning community of a school.

The first phase of this research focused on quantitative methods. Thirty-three middle schools were selected to participate in this study. Eighteen schools were identified as meeting state standards in mathematics and fifteen schools were identified as at risk of not meeting state standards in mathematics. During the spring of 2007, principals, mathematics department chairpersons, and mathematics teachers at the 33 middle schools completed the Leadership Behaviors and Practices Survey developed by Powell (2004). Dr. Powell constructed the survey based on the results of her findings from a case study as well as a comprehensive review of the literature in leadership.

The second phase of this research emphasized a qualitative methodology. Data collection included focus group interviews of principals, mathematics resource teachers, and mathematics teachers. Three separate focus groups were used to obtain participants' perceptions of middle school mathematics and school leadership.

### Procedures

The Institutional Review Board of the mid-Atlantic state university approved the study's protocols in accordance with the *Federal Policy for the Protection of Human Subjects (OHRP)*. The office of the deputy superintendent of the selected school district in a mid-Atlantic state approved the researcher's request to conduct research. Data collection activities included the administration of a survey and three focus group discussions. The approved sample from the school district included one principal and one mathematics resource teacher from each of the 33 middle schools,

and 190 middle school mathematics teachers from schools that met standards and schools at risk for not meeting state standards in mathematics.

A cover letter, a consent form, and a copy of the Leadership Behaviors and Practices Survey, as well as a self-addressed, stamped envelope, were mailed to all participants on May 13, 2007 with an invitation to complete the survey and mail it back to the researcher. The cover letter contained the purpose of the study and background information regarding the survey instrument (Appendix A). The researcher maintained a log of the individuals who were surveyed. At the mid-point, the response rate reached 51% and the decision was made to send a follow-up request to everyone who was sent the original request to participate in the study. The researcher also sent e-mails to all the principals and mathematics resource teachers, asking them to encourage the teachers to respond to the survey, if they had not already done so. It should be noted that the survey was sent out early in May, which is the month designated for state testing (high school assessments). This meant that some of those invited to participate in the study were at the same time working hard to prepare students for the state testing program. After another reminder was sent to participants, the response rate rose to about 74%, which is judged to be an adequate response rate (Fink, 1995). A copy of the second request letter is included in Appendix B. The final number of responses is displayed in Table 4. The total principal response rate was 84.8%; for mathematics resource teachers, it was 66.6%; and for mathematics teachers, 55.7%. The lower return rates for resource teachers and math teachers were probably due to the demands of the state testing program and preparation for final exams in mathematics (algebra, honor geometry) in early June.

Table 4

*Response Rates of Principals, Mathematics Resource Teachers, and Mathematics**Teachers*

Principals	Number of Surveys Sent	Number of Surveys Received	Response Rate (%)
Schools Meeting Math Standards	15	13	86.6
Schools Not Meeting Math Standards	18	15	88.2
Total	33	28	84.8
Resource Teachers	Number of Surveys Sent	Number of Surveys Received	Response Rate (%)
Schools Meeting Math Standards	15	10	66.6
Schools Not Meeting Math Standards	18	12	66.6
Total	33	22	66.6
Teachers	Number of Surveys Sent	Number of Surveys Received	Response Rate (%)
Schools Meeting Math Standards	82	58	70.7
Schools Not Meeting Math Standards	108	48	44.4
Total	190	106	55.7

## Reliability

Cronbach alphas were used to compute reliability of the Leadership Behaviors and Practices Survey. Cronbach alphas measure inter-item reliability and consistency of the survey instrument. They are used when no pretest-posttest reliability measures are available. Cronbach alphas were computed on all five domains and were checked for internal consistency. The results were compared to the results of Powell (2004) and Felder (2006) and are presented in Table 5. The Cronbach alphas for Powell and Felder as well as for the present study (McLeod) are all very similar. According to Gall, Gall and Borg (1999).

If a scale has a high alpha coefficient [typically, .60 or higher, with the highest possible coefficient being 1.00], it means that individuals who respond in a certain way to one item on the scale are likely to respond in the same way to the other items on that scale. (p. 196)

The data show that the survey has a total reliability score of .95 (McLeod = .93) indicating strong inter-item reliability. The Cronbach alphas shown in Table 5 for Powell and Felder are consistently higher than those of McLeod. The reason may be that the number of statements used by McLeod was fewer than those on the Powell and Felder surveys. It also may be the result of a more diverse group of educators that were asked to respond to the survey. Felder only surveyed elementary school principals and teachers, while McLeod surveyed middle school principals, mathematics resource teachers and mathematics teachers. The differences between elementary and middle school personnel may also have had an effect on the reliability scores for McLeod.

Table 5

*Cronbach Alphas for Powell Study, Felder Study, and McLeod Study*

Domain	No. of Items	Alpha Score – Powell (2004)	Alpha Score – Felder (2006)	No. of Items	Alpha Score – McLeod (2006)
Domain 1: Vision, Mission, & Culture	16	.88	.92	13	.89
Domain 2: Mathematics Curriculum & Classroom Instruction	22	.79	.77	13	.87
Domain 3: Collaboration & Shared Leadership	9	.85	.87	9	.83
Domain 4: Family & Community Involvement	16	.86	.79	13	.80
Domain 5: Effective Management	13	.80	.76	12	.83
Total Instrument	76	.95	.95	60	.93

#### Correlation Coefficients

The researcher next computed Pearson Product Moment correlation coefficients to describe the magnitude of the relationship between the five different domains for both schools that met and those that did not meet state standards. A correlation coefficient can range from -1.00 to +1.00. The results are displayed in Tables 6 and 7. In interpreting these data, the researcher used an established set of criteria to make judgments about the significance of the correlations (Gliner & Morgan, 2000). If a correlation was between 0.0 and .30, it was considered to be weak; if it were between .31 and .70 it was considered modest; and if it were .71 or

above, it was considered to be strong (Gliner & Morgan, 2000). The .05 level was used to identify those correlations that were statistically significant.

The data presented in Table 6 are for middle schools that met state standards; they show that most of the correlations were in the modest to strong range, .60 to .80, and all were different from 0 with statistical significance at the 0 .001 level. The highest correlation in Table 6 is between vision, mission, and culture and effective management. All of the correlations between Domain 1 and the other domains are above .81, except for domain 4, where the correlation is .62. The correlations for Domain 4 are the lowest in the table. Domain 2, mathematics curriculum and classroom instruction, has strong correlations with Domains 1 and 5, but much lower ones with Domains 3 and 4. It should be remembered that the higher the correlation, the stronger the relationship among the variables.

Table 6

*Correlation Coefficients for Domains 1 – 5 for Schools Meeting State Standards*

	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5
DOMAIN 1	1.00 (82)	.83 (80) P=.001***	.81 (82) P=.001***	.62 (80) P=.001***	.91 (78) P=.001***
DOMAIN 2		1.00 (82)	.61 (82) P=.001***	.54 (80) P=.001***	.80 (79) P=.001***
DOMAIN 3			1.00 (84)	.59 (81) P=.001***	.75 (79) P=.001***
DOMAIN 4				1.00 (81)	.58 (79) P=.001***
DOMAIN 5					1.00 (79)

P = < .05\*; <.01\*\*; <.001\*\*\*

Domain 1 – Vision, Mission and Culture; Domain 2 – Mathematics Curriculum and Classroom Instruction; Domain 3 – Collaboration and Shared Leadership; Domain 4 – Family and Community Involvement; Domain 5 – Effective Management

Table 7 presents the correlations for middle schools at risk of not meeting state standards. In general, the correlations for the at-risk group of schools are much lower than for the schools meeting state standards. All but one correlation are in the modest range, .30 to .70. The one exception is domains 1 and 5, which have a correlation of .80. Domain 4 has the lowest correlations in the table, ranging from .44 to .52. Domain 4 concerns family and community involvement. The correlations presented in Table 7 show much less agreement about the domains and their relationships to each other than do those presented in Table 6.

Table 7

Correlation Coefficients for Domains 1 – 5 for Schools At Risk Of Not Meeting State Standards

	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5
DOMAIN 1	1.00 (71)	.63 (67) P=.001***	.67 (69) P=.001***	.45 (67) P=.001***	.80 (66) P=.001***
DOMAIN 2		1.00 (67)	.49 (67) P=.001***	.44 (65) P=.001***	.64 (64) P=.001***
DOMAIN 3			1.00 (69)	.52 (67) P=.001***	.71 (66) P=.001***
DOMAIN 4				1.00 (67)	.42 (65) P=.001***
DOMAIN 5					1.00 (66)

P = < .05\*; <.01\*\*; <.001\*\*\*

Domain 1 – Vision, Mission and Culture; Domain 2 – Mathematics Curriculum and Classroom Instruction; Domain 3 – Collaboration and Shared Leadership; Domain 4 – Family and Community Relations; Domain 5 – Effective Management

## Research Questions and Statistical Hypotheses

The research questions and statistical hypotheses are presented here with discussion of the findings for each question.

### *Research Question 1*

From the perspective of middle school principals, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Statistical Hypothesis 1*

From the perspective of middle school principals, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

The data presented in Table 8 for the principals' perceptions indicate that the statistical hypothesis was accepted. There were no statistically significant differences in the means in any of the five domains comparing middle schools that met standards with those middle schools that did not. It is important to note that the standard deviations for domains 1 and 2 were much larger for the schools not meeting state

Table 8

*Independent t-Test of Principals' Differences in Perceptions of Five Leadership Domains Between Schools Meeting State Standards and Schools At Risk Of Not Meeting State Standards*

Vision, Mission, and Culture – Domain 1

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	14	44.00	3.21	.59	18	.57
At Risk	13	42.92	5.85			

Mathematics Curriculum and Classroom Instruction – Domain 2

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	14	43.71	3.58	.41	21	.69
At Risk	13	43.00	5.28			

Collaboration and Shared Leadership- Domain 3

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	14	30.36	3.15	1.00	25	.33
At Risk	13	29.08	3.52			

Family and Community Relations – Domain 4

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	14	38.93	5.73	.69	25	.50
At Risk	13	37.54	4.68			

Effective Management – Domain 5

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	14	39.00	3.90	.50	24	.62
At Risk	13	38.25	3.72			

P = < .05\*; <.01\*\*; <.001\*\*\* Met = Schools Meeting Standards; At Risk = Not Meeting Standards

standards than for the schools meeting state standards. In examining the data, it is important to note that having a high score indicates a more positive perception of success.

### *Research Question 2*

From the perspective of middle school mathematics resource teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Statistical Hypothesis 2*

From the perspective of middle school mathematics resource teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, and culture; curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

The data presented in Table 9 for mathematics resource teachers' perceptions of the principal indicate that the statistical hypothesis was accepted. There were no statistically significant differences in means across the five domains. The standard deviations for the schools meeting state standards were almost 50% larger in domains 1, 2, 3, and 5 than in schools not meeting state standards.

Table 9

*Independent t-Test of Mathematics Resource Teachers' Differences in Perceptions of Five Leadership Domains Between Schools Meeting State Standards and Schools At Risk Of Not Meeting State Standards*

Vision, Mission, and Culture – Domain 1

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	12	38.17	7.78	.01	20	.99
At Risk	10	38.20	6.46			

Mathematics Curriculum and Classroom Instruction – Domain 2

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	12	37.92	9.04	1.01	20	.33
At Risk	10	41.30	6.08			

Collaboration and Shared Leadership- Domain 3

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	12	24.92	4.81	.93	20	.37
At Risk	10	26.70	4.06			

Family and Community Relations – Domain 4

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	12	34.50	6.80	.02	19	.98
At Risk	9	34.44	2.74			

Effective Management – Domain 5

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	11	35.91	7.64	.33	18	.74
At Risk	9	36.89	4.96			

P = < .05\*; <.01\*\*; <.001\*\*\* Met = Schools Meeting Standards; At Risk = Not Meeting Standards

### *Research Question 3*

From the perspective of middle school mathematics teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Statistical Hypothesis 3*

From the perspective of middle school mathematics teachers, there are no statistically significant mean differences in the perceptions of principals in the five leadership domains identified by Powell (vision, mission, culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

The data presented in Table 10 for mathematics teachers' perceptions of the principal indicate that in four of the five domains, the statistical hypothesis was accepted. There were no statistically significant differences across those four domains. For Domain 4, family and community relations, there was a statistically significant difference at the .03 level, indicating that the perception of the teachers in the "met" schools was statistically higher. Therefore, the statistical hypothesis for Domain 4 was rejected. In all cases, the standard deviations were larger in the schools meeting state standards than in the schools not meeting state standards.

Table 10

*Independent t-Test of Mathematics Teachers' Differences in Perceptions of Five Leadership Domains Between Schools Meeting State Standards and Schools At Risk Of Not Meeting State Standards*

Vision, Mission, and Culture – Domain 1

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	56	38.55	8.01	1.21	102	.23
At Risk	48	36.83	6.12			

Mathematics Curriculum and Classroom Instruction – Domain 2

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	56	42.00	7.23	1.56	98	.12
At Risk	44	40.05	4.56			

Collaboration and Shared Leadership- Domain 3

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	56	23.16	5.28	.79	97	.43
At Risk	46	24.83	3.30			

Family and Community Relations – Domain 4

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	55	36.13	6.21	2.21	95	.03*
At Risk	45	33.80	4.28			

Effective Management – Domain 5

	No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
Met	54	34.63	6.67	1.37	97	.17
At Risk	45	33.67	4.13			

P = < .05\*; <.01\*\*; <.001\*\*\* Met = Schools Meeting Standards; At Risk = Not Meeting Standards

### *Additional Analyses*

When the researcher finished the analyses on Research Questions 1 through 3, he observed that in all cases the principals of both groups of middle schools had higher mean scores (although not statistically significantly different) than did the mathematics resource teachers and the mathematics teachers. Therefore, the researcher wanted to determine whether there were statistically significant differences among the three groups of educators—principals, mathematics resource teachers, and mathematics teachers—in each group of schools.

The results of that analysis of variance for schools that met the state standards are presented in Table 11. Because the researcher wanted to be conservative, in all cases he used Scheffé's multiple range test and set the level of significance at .05.

The data displayed in Table 11 indicate that for Domain 1, there was a statistically significant difference. However, when the researcher used Scheffé's test, it showed that the first domain was not statistically significant. The data for Domain 2 show that there were no statistically significant differences among the three groups.

Table 11

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools That Met the State Standards*

#### Vision, Mission, and Culture – Domain 1

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	354.56	177.28	3.23	.04*
Within Groups	79	4,331.51	54.83		

Table 11 (continued)

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools That Met the State Standards*

Mathematics Curriculum and Classroom Instruction – Domain 2

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	233.60	116.80	2.34	.10
Within Groups	79	3,943.77	49.92		

Collaboration and Shared Leadership – Domain 3

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	435.83	217.91	8.93	.001***
Within Groups	81	1,975.73	24.39		

Mean	Type	G r p	G r p	G r p	Group 1 – Math Resource Group 2 – Principals Group 3 – Math Teachers
24.16	Teachers	3	1	2	
24.92	Resource Teachers				
30.36	Principals	*	*		

Family and Community Relations – Domain 4

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	136.85	68.43	1.77	.18
Within Groups	78	3,016.04	38.67		

Table 11 (continued)

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools That Met the State Standards*

Effective Management – Domain 5

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	213.71	106.86	2.59	.08
Within Groups	76	3,131.50	41.20		

P = < .05\*; <.01\*\*; <.001\*\*\*

For Domain 3, the principals had statistically significantly higher means than did the mathematics resource teachers and the mathematics teachers. The principals' mean was 30.36, while the resource teachers' and teachers' means were 24.16 and 24.92, respectively. This is an important finding since collaboration and shared leadership are key components of effective schools. For Domains 4 and 5, there were no statistically significant differences between principals, mathematics resource teachers, and mathematics teachers in schools that met the state standards.

Table 12 presents the results of the analysis of variance for the three groups of educators in schools that were at risk of not meeting state standards. For Domain 1, there was a statistically significant difference at the .0001 level among the three groups. The principals' mean was 42.92, while the resource teachers' was 38.20, and the teachers' mean was 36.83. For Domain 2, there were no statistically significant differences among the three groups.

In Domain 3, there was a statistically significant difference, at the .001 level, among the three groups. The principals' mean was 29.08, the resource teachers' mean was 26.70, and the teachers' mean was 24.83. For Domain 4, there was a statistically

significant difference among the three groups, but it was somewhat smaller. The principals again had the highest mean, 37.54; the resource teachers' mean was 34.44; the teachers' mean was 33.80. For Domain 5, there was a very statistically significant difference among the three groups. The principals' mean was 38.25, the resource teachers' mean was 36.89, and the teachers' mean was 33.07. In these domains (3, 4, 5), the principals consistently scored higher. This finding is important because it suggests that in 4 of the 5 domains, the mathematics teachers in middle schools not meeting state standards had statistically significantly lower mean scores on their perceptions of the principals' leadership than did the principals.

Table 12

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools At Risk of Not Meeting the State Standards*

Vision, Mission, and Culture – Domain 1

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	379.40	189.70	5.07	.001***
Within Groups	68	2,545.19	37.43		

Mean	Type	G r p	G r p	G r p	Group 1 – Math Resource Group 2 – Principals Group 3 – Math Teachers
36.83	Teachers	3	1	2	
38.20	Resource Teachers				
42.92	Principals	*			

Table 12 (continued)

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools At Risk of Not Meeting the State Standards*

Mathematics Curriculum and Classroom Instruction – Domain 2

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	90.47	45.23	1.86	.16
Within Groups	64	1,560.01	24.38		

Collaboration and Shared Leadership – Domain 3

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	190.66	95.33	8.01	.001***
Within Groups	66	785.63	11.90		

			G	G	G	Group 1 – Math Resource
			r	r	r	Group 2 – Principals
			p	p	p	Group 3 – Math Teachers
Mean	Type		3	1	2	
24.83	Teachers					
26.70	Resource Teachers					
29.08	Principals	*				

Table 12 (continued)

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools At Risk of Not Meeting the State Standards*

Family and Community Relations – Domain 4

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	141.26	70.23	4.00	.02*
Within Groups	64	1,130.65	17.67		

			G	G	G	Group 1 – Math Resource
			r	r	r	Group 2 – Principals
			p	p	p	Group 3 – Math Teachers
Mean	Type		3	1	2	
33.80	Teachers					
34.44	Resource Teachers					
37.54	Principals	*				

Table 12 (continued)

*One-Way Analysis of Variance of Differences Among Principals', Mathematics Resource Teachers', and Mathematics Teachers' Judgments of Principals' Perceptions of Five Leadership Domains in Schools At Risk of Not Meeting the State Standards*

Effective Management – Domain 5

	df	Sum of Squares	Mean Square	F	Sig.
Between Groups	2	312.50	156.25	8.95	.001***
Within Groups	63	1,099.94	17.46		

			G	G	G	Group 1 – Math Resource
			r	r	r	Group 2 – Principals
			p	p	p	Group 3 – Math Teachers
Mean	Type		3	1	2	
33.07	Teachers					
36.89	Resource Teachers					
38.25	Principals	*				

P = < .05\*; <.01\*\*; <.001\*\*\*

Sample Demographics

Tables 13, 14, and 15 present the demographics for three sets of respondents. The response totals on demographic items indicate that not all those asked to participate responded to the survey; of those who did respond, not all responded to all items. Therefore, the numbers are lower than the total invited to participate.

For the schools that met the standards, 15 of 17 principals responded. Only one set of responses had no usable data. Thirteen of 15 principals from at-risk schools responded. Again, one set of responses was not usable.

For the schools meeting standards, 12 of 18 resource teachers responded and all of the data were usable. For the at-risk schools, 10 resource teachers responded and all of the data were usable.

For mathematics teachers in schools meeting state standards, 58 responded and 54 sets were usable. For the teachers in the at-risk schools, 48 responded and 46 provided usable data.

Table 13

*Demographics of Principals in Two School Types (Those That Met Standards and Those At Risk of Not Meeting Standards)*

Group		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
<b>Gender</b>						
Male	Met	10 (.71)				
	At Risk	6 (.50)				
Female	Met	4 (.29)				
	At Risk	6 (.50)				
<b>Years in Education</b>						
		1-5	6-10	11-15	16-20	21+
	Met	0	2 (.18)	3 (.27)	4 (.37)	2 (.18)
	At Risk	0	2 (.17)	3 (.25)	4 (.33)	3 (.25)
<b>Years at This School</b>						
		1-5	6-10	11-15	16-20	21+
	Met	8 (.73)	1 (.09)	0	2 (.18)	0
	At Risk	9 (.75)	3 (.25)	0	0	0
<b>Educational Level</b>						
		BA/BS	MA	MA+30	Ph.D/ Ed.D	
	Met	0	2 (.18)	5 (.46)	4 (.36)	
	At Risk	0	4 (.33)	6 (.50)	2 (.17)	
<b>Age</b>						
		21-30	31-40	41-50	51+	
	Met	0	4 (.44)	2 (.22)	3 (.34)	
	At Risk	0	5 (.42)	5 (.42)	2 (.16)	

A slightly greater proportion of male principals responded in both met and at-risk schools. The number of years in education and the number of years at the present school were similar for both groups of principals for years 1 through 5. For years 6 through 10, the proportion of principals for at-risk schools was more than 3 times greater than at the met schools. At years 16 through 20, the met schools had twice as many principals responding as the at-risk schools. A greater proportion of principals at the at-risk schools were at the MA and MA+30 levels. At the Ph.D. or Ed.D. level, twice as many principals in the schools meeting standards had the degree. In terms of age, the data is similar for both groups for ages 31-40. The at-risk schools had more than twice as many principals in the 41-50 age group. At the 51+ group, just the opposite was true.

Data on the mathematics resource teachers at both groups of schools (Table 14) indicate that there were more than four times the number of females as males. There were no resource teachers employed in education in the 0 to 5 group. It is not surprising that everyone in this group had five or more years of experience, given that resource teachers are usually promoted from the ranks of experienced teachers. In years 6 through 10, the proportions favor at-risk schools, while just the opposite is true for the 11-15 group. In the 21+ group, the at-risk schools have twice as many mathematics resource teachers as do the met schools.

In the section on years at the present school, the "met" schools had 27% more resource teachers in the 1-5 year group as did the at-risk schools. In the 6-10 year group, the at-risk schools proportion of resource teachers was three times greater than at the met schools. In the 11-15 year group, the "met" schools had many more resource teachers than did the at-risk schools. The opposite was true in the 21+ group.

The data on educational level favor the at-risk schools in all areas but the MA+30, where the teachers in the met schools had four times as many MA+30

degrees. In terms of age, the met schools have many more resource teachers in the 31-40 year age group than do the at-risk schools. In the 41-50 and the 51+ age groups, the at-risk schools have many more resource teachers than the met schools.

Table 14

*Demographics of Mathematics Resource Teachers in Two School Types (Those That Met Standards and Those At Risk of Not Meeting Standards)*

Group		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
<b>Gender</b>						
Male	Met	4 (.33)				
	At Risk	0				
Female	Met	8 (.67)				
	At Risk	10 (1.00)				
<b>Years in Education</b>		1-5	6-10	11-15	16-20	21+
	Met	0	3 (.25)	6 (.50)	1 (.08)	2 (.17)
	At Risk	0	4 (.40)	0	2 (.20)	4 (.40)
<b>Years at This School</b>		1-5	6-10	11-15	16-20	21+
	Met	8 (.67)	1 (.08)	3 (.25)	0	0
	At Risk	4 (.40)	4 (.40)	0	0	2 (.20)
<b>Educational Level</b>		BA/BS	MA	MA+30	Ph.D/ Ed.D	
	Met	0	4 (.33)	8 (.67)	0	
	At Risk	0	6 (.60)	2 (.20)	2 (.20)	
<b>Age</b>		21-30	31-40	41-50	51+	
	Met	1 (.08)	6 (.50)	1 (.08)	4 (.34)	
	At Risk	2 (.20)	0	4 (.40)	4 (.40)	

The data on mathematics teachers and gender presented in Table 15 show that there were similar proportions of males and females in the two groups of schools. The data on years in education are similar for three groups; for the 1-5 and 6-10 years of

experience groups, there are differences. The 1-5 year group of at-risk schools have about 50% more mathematics teachers than do the met schools. In the 6-10 year group, just the opposite is true. There are no important differences between the two groups in years at the present school except for the 21+ group, where the met schools have many more veteran teachers than do the at-risk schools.

Table 15

*Demographics of Mathematics Teachers in Two School Types (Those That Met Standards and Those At Risk of Not Meeting Standards)*

Group		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
<b>Gender</b>						
Male	Met	15 (.28)				
	At Risk	10 (.22)				
Female	Met	39 (.72)				
	At Risk	36 (.78)				
<b>Years in Education</b>						
		1-5	6-10	11-15	16-20	21+
	Met	9 (.17)	24 (.44)	7 (.13)	6 (.11)	8 (.15)
	At Risk	13 (.29)	14 (.31)	8 (.17)	3 (.06)	8 (.17)
<b>Years at This School</b>						
		1-5	6-10	11-15	16-20	21+
	Met	36 (.67)	10 (.19)	2 (.03)	1 (.02)	5 (.09)
	At Risk	36 (.78)	10 (.22)	0	0	0
<b>Educational Level</b>						
		BA/BS	MA	MA+30	Ph.D/ Ed.D	
	Met	11 (.21)	29 (.55)	13 (.24)	0	
	At Risk	8 (.17)	18 (.39)	20 (.44)	0	
<b>Age</b>						
		21-30	31-40	41-50	51+	
	Met	15 (.29)	17 (.34)	14 (.27)	5 (.10)	
	At Risk	12 (.27)	15 (.35)	8 (.18)	9 (.20)	

The educational level of mathematics teachers with a BA/BS degree was quite similar for both groups of schools. In the schools meeting standards, there were 16% more MA degrees than for the teachers at the at-risk schools. However, the at-risk teachers had more MA+30 certification than those teachers at the met schools.

The data on age show little difference between teachers in the met and at-risk schools for age groups 21-30 and 31-40. In the 41-50 group, the met schools had more veteran mathematics teachers than did the at-risk schools. In the 51+ age group, the at-risk teachers had more mathematics teachers than did the met schools.

### Overview of Qualitative Design

For the qualitative portion of this study, three separate focus group interviews were conducted in July 2007 to primarily address Research Question 4. As well, the focus groups were designed to provide some additional information regarding Research Questions 1-3.

#### *Research Question 4*

What are the curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who are concerned with providing leadership to students in mathematics? Are there differences in these curricular and instructional issues between middle schools meeting state standards and those not meeting state standards?

A purposeful sampling of principals, mathematics resource teachers, and mathematics teachers representing both groups of schools was selected to identify participants for the focus group discussions. An initial request for participation (Appendix D) was mailed to six principals, six mathematics resource teachers, and six mathematics teachers (Appendix E). Four principals, two mathematics resource teachers, and four mathematics teachers responded and participated in the interviews.

Table 16 delineates the response rate by type of school and professional role. It should be noted that the initial request for participation was mailed after the school year, which may account for the low response rate for mathematics resource teachers.

Table 16

*Focus Group Participation Rates*

	No. of Schools Represented	No. Participating	Response Rate (%)
Principals—Schools Meeting Standards	3	2	66.2
Principals—Schools Not Meeting Standards	3	2	66.6
Total Principals	6	4	66.4
Resource Teachers—Schools Meeting Standards	3	1	33.3
Research Teachers Schools Not Meeting Standards	3	1	33.3
Total Resource Teachers	6	2	33.3
Teachers—Schools Meeting Standards	3	2	66.6
Schools Not Meeting Standards	3	2	66.6
Total Teachers	6	4	66.6

A focus group Moderator's Guide was developed using Powell's domains as a framework to elicit detailed descriptions regarding principal leadership behaviors. The guide encouraged the use of probes to increase clarification regarding curricular issues faced by middle school principals, mathematics resource teachers, and mathematics teachers. The Moderator's Guide was field tested with subjects from schools in another county in preparation for the interview phase. An educational consultant reviewed the field test data and made recommendations to the researcher. As a result, two questions were revised. The revised Moderator's Guide is found in Appendix H. It incorporates

the recommendations of Yin (1984) and Merriam (1988) by including open-ended questions, use of probes, etc. Table 17 includes the questions used in the focus groups.

Table 17

*Focus Group Questions*

Group	Focus Area	Question
All Groups	Vision	What is your vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Collaboration and Shared Leadership	In what ways do you create family and community involvement?
Principals	Family and Community Involvement	In what ways do you create family and community involvement?
	Family and Community Involvement	What do you do to ensure teachers are teaching the mathematics curriculum and students are learning?
	Instructional Monitoring	What do you do to ensure teachers are teaching the mathematics curriculum and students are learning?  What are the curriculum and instructional issues faced daily by you?
Mathematics Resource Teachers	Vision	What is the vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Family and Community Involvement	In what ways do you support family and community involvement?
	Instructional Monitoring	In what ways do you collaborate with school leadership to identify, define and evaluate mathematics instructional goals to ensure consistency with county mathematics program?  What are the curriculum and instructional issues faced daily by you?

Table 17 (continued)

*Focus Group Questions*

Mathematics Teachers	Vision	What is the vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Family and Community Involvement	In what ways do you support family and community involvement?
	Instructional Monitoring	How do you know you are teaching the mathematics curriculum and your students are learning?  What are the curriculum and instructional issues faced daily by you?

All focus group discussions were audio taped and transcribed. These data were categorized using the conceptual framework outlined in chapter one in order to group the interview data into the domains associated with the school leadership practices. Codes were developed to capture the data. The transcripts were reviewed using a data analysis template, and were color coded for descriptors. The descriptors were then categorized into themes (Table 18).

Table 18

*Focus Group Themes*

Focus Group Areas	Themes
Vision	1. Influence  2. Building Relationships
Instructional Monitoring	1. Looks-Fors/Walkthroughs
Collaboration and Shared Leadership	1. Transparency
Family and Community Involvement	1. Affirmation of the Community  2. Personal Freedom

The results of the analysis of focus group data are described for each focus group area. Abridged forms of the interview questions serve as subheadings.

### *Vision*

The first interview question focused on vision: What is the vision for the school and how does it influence your school culture? Two themes evolved among the three groups interviewed. First, the responses indicated that vision *influenced* the cultural norms within the school environment. Second, the responses centered on the importance of *relationships in applying* vision, mission, and goals.

#### *Theme #1: Influence (Schools That Met Mathematics Standards)*

In the theme, influence, principals from schools that met standards viewed the vision of the school as a product of the principal. One principal shared,

I know that I influence the school vision and school culture by celebrating our achievements, ensuring that there is a highly qualified teacher in every classroom and providing the necessary resources that are needed to improve instruction.

Another principal reported,

my vision for my school [is] to be successful according to the county targets. We have been given middle school targets that respond to state assessments and algebra completion by eighth grade completion.

A mathematics resource teacher indicated that the principal inspires the vision in her building. She acknowledged,

At \_\_\_\_\_ middle school, our principal sets the vision for our school. The vision is very clear and is written in the staff handbook, student handbook etc., . . . and it is posted throughout the school. Our principal wants staff and students to be engaged and learning. Our

vision focuses on students being ready for rigorous and challenging course work.

The mathematics teachers also stated that the principal provided the vision and added that stakeholders were supportive. A teacher from a school that met standards shared,

The principal sets the vision in my school. . . .I know this is similar with other middle schools. For my principal, it is about the school climate.....students being safe, learning, involved after-school clubs and activities.

While the principal is seen as influencing the vision, teachers also indicated that the vision influenced the norms in the school.

*Theme #1: Influence (Schools At Risk for Not Meeting Mathematics Standards)*

Principals from schools at risk for not meeting standards in mathematics echoed that the principal influenced the vision and learning with the school environment. One principal from a school at risk of not meeting state standards summarized the notion of influence by saying, "my goal is to establish a vision that is not written in a plan, but it is reflective of my influence within the school environment. The culture of my school is established by the school leadership."

Another principal from schools at risk for not meeting standards in mathematics describing her vision shared;

It is not what the parents believe, it's how the children feel in the classroom. My job is to find teachers that are supportive of the school vision. Like when I interview staff, I need to "feel" that the candidate would support and be aligned with our goals. If not, we move to the next candidate.

A principal also stated the school culture is a collaborative experience with stakeholders. He stated, "my goal is get input from stakeholders in ways to move the vision into the school house....I want my school to known as a place where students, parents, teachers etc work together to achieve success."

Another principal remarked, "my vision for \_\_\_\_\_[school] is to win the MSDE Blue Ribbon School of Excellence Award and improve student achievement in all subgroups, so that when looking at school data, the subgroups will be unpredictable."

A mathematics resource teacher indicated that the vision was influenced by the principal. She remarked, "our vision is mandated by \_\_\_\_\_, our principal. I have seen him provide leadership to lead county, state, and national mandates."

Most of the mathematics teachers echoed similar beliefs about how a school vision is influenced by the principal, but three mathematics teachers from a school that was at risk for not meeting state standards indicated that their vision was influenced by the state assessments. A teacher reported,

our vision is now aligned with making adequate yearly progress and meeting the annual measurable objective in mathematics for next year; we are in school improvement one. Now, we have an academic steering committee (ASC) that provides support for our school.

Another teacher from a school at risk for not meeting state standards in mathematics commented, "We are now focused on the voluntary school curriculum. That is our vision in our math department. Our ASC meetings have focused our school vision and narrowed down our school priorities to making AYP."

Lastly, a teacher shared, "since we did not meet standards, the school vision as well as staff morale is at a crossroad. I have been teaching for over twenty years and we have lost our power and control in relation to the vision."

*Theme #2: Building Relationships (Schools That Met Mathematics Standards)*

Principals described school environments that focus on building relationships within the school culture. A principal reflected,

I build relationships with staff, students, and parents which ensures support and trust for my vision. I am a cheerleader for the school and I promote our successes. I want the school to be known for outstanding academic and student programs that are first in the county, state and the nation.

Teachers (mathematics and resource) vaguely mentioned relationships within the class or school environment. Comments included "our culture is focused on curriculum standards and alignment." For example, a mathematics resource teacher explained, "our school culture in mathematics is all about the county criteria, final exams results, and targets." Lastly, a teacher shared, "we are all about teaching the curriculum."

*Theme #2: Building Relationships (Schools At Risk for Not Meeting Mathematical Standards)*

A principal from an at-risk school revealed the importance of relationships between the teacher and students. One indicated: "In order to have good scores, you must have caring teachers that support your vision for remediation, enrichment, and acceleration in math." Teachers shared, "I need to be a part of the process to invest in the process with students." "In order to work on the mission and goals, we must teach, reach, and search for the best in students." Another principal remarked, "My focus on student achievement and learning requires our staff to be less self-centered and more teacher-centered. This means we must have a culture of change – a place where we adapt and build relationships." These responses indicate a shared view among participants of the importance of relationships in defining a vision.

A mathematics resource teacher also emphasized the importance of relationships:

At my school we work hard to make connections, . . . yes, connections with our staff, faculty, and students. We are professional learning community that seeks to increase achievement instruction for all students by striving for a positive, safe and supportive learning environment.

Also, mathematics teachers from this same category shared the importance of building relationships to support the school culture.

Our school culture is about everyone working together in a united manner. Our principal always talks about being student focused than teaching math. I get tired of hearing it, but she is correct. With a relationship is developed, students will do anything for you,

Another teacher supports this rationale by stating, "I invest time in students at the beginning of the year so I can teach later."

These statements suggest the importance of building relationships to achieve the vision of the school.

### *Instructional Monitoring*

The second set of interview questions focused on instructional monitoring and curricular issues. The questions include:

- What do you do to ensure teachers are teaching the mathematics curriculum and students are learning?
- In what ways do you model instructional strategies to support the implementation of the curriculum in mathematics classes?
- What are the curricular challenges faced by your daily.

The major descriptors under the theme of instructional monitoring were *curricular look-fors/walkthroughs* and *curriculum acceleration* to support instruction.

*Theme #3: Look-fors and Walkthroughs (Schools That Met Mathematics Standards)*

In this category of schools, principals described instructional accountability as instructional walkthroughs to support the fidelity of the curriculum. They often equated the walkthroughs as instructional monitoring in mathematics. A principal that met standards in mathematics shared,

First, I hire a highly qualified math teacher in every classroom and require curriculum training and development. I meet with the Math Resource Teacher often. We have a standing meeting once a month, but she visits my office daily. I have articulated the school and system targets. I review formative and summative assessment data and require re-teaching and reassessment opportunity for all students. Visit and observe classroom regularly and plan math programs that will improve student achievement.

Another principal from the same category remarked,

The mathematics instruction is based upon Max Thompson's theory of instruction and Rick Dufour's corollary questions, What do we want students to know and be able to do? How will we know what they have learned? and What will they do when they do not learn? Within my school, there is fidelity of MCPS mathematics curriculum and all students follow the prescribed mathematics sequence.

Next, another principal remarked,

In all our math team meetings, we consistently keep student performance data at the forefront of what we are thinking and doing

with regards to instruction. We ensure that time is built into the schedule to allow teachers/teams to meet weekly to conduct data chats and curriculum updates/reviews. We also have time available after school to support continued data analysis. We use Performance Matters as well as formative and summative assessments to gauge whether students are learning. In addition to having content area administrators attend Math data chats, notes and actions items from these meeting are shared with me on a regular basis by the Math Content Specialists.

A resource teacher that met state standards shared,

There is an eighty-five minute block of mathematics daily for all students at my school. The other content areas met every other day. We, the mathematics department, realized that some students were not prepared for middle school instruction with gaps in student learning and/or students returned in August lacking retention of previously taught curriculum. The MCPS curriculum is taught aligned to the Voluntary State Curriculum and the Maryland School Assessment (MSA) to support state assessments. I designed formative assessments to inform instruction and, if students need more time to learn a specific concept, skill, then the necessary instruction could be provided. These formative assessments drive the instruction.

She also stated that her instructional program was inspired by Ron Brandt's materials and courses, including

Our instructional program was inspired by the following books, workshops, article, and courses: "Powerful Learning" by Ron Brandt, which focuses on the ten characteristics of schools that are learning organizations; "Results" by Mike Schmoker, which focuses on school

conditions that could be developed to favor results; "Real Questions, Real Answers - Focusing Teacher Leadership on School Improvement" by John H. Clark, which focuses on the steps to build a problem-based school; "Developing Professional Learning Communities" by Rick DuFour, which focuses on school district reform "Learning-Focused Schools" workshop where Max Thompson presented the components of keeping a school focused on student learning and how to identify essential curriculum; "Baldrige Process" workshop, which focused on how to use data to help inform instructional decisions to improve school performance; "90/90/90 Schools – A Case Study" article, which focuses on best practices of schools that had 90% minority, 90% poverty, and 90% achievement rate; "Skillful Teacher" course, which focused on best practices in teaching; "Research for Better Teaching – Observing and Analyzing Teaching I" which focused on how to (1) observe and analyze teacher decision making and its impact on student learning, (2) collect data about teaching to provide feedback and coaching that stimulates teacher thinking and reflection, and (3) experiment with strategies for building professional learning communities characterized by shared objectives, shared accountability, collegiality and collaboration.

Examples of responses of mathematics teacher from schools meeting standards, "I use curriculum guides and units calendars to monitor my instruction." and "The curriculum look-fors assist me with my instructional planning." and "I receive feedback from my resource teacher regarding the instructional calendar." and "My school has departmental walkthroughs for curricular issues." Regarding curriculum issues, mathematics teachers commented, " for our accelerated students,

we push them so hard and fast "and "the curriculum is so vast and we cannot provide the necessary attention for our at-risk students."

*Theme #4: - Look-fors and Walkthroughs (Schools At Risk For Not Meeting Mathematical Standards)*

A principal for a school not meeting standards shared, "We monitor using departmental walkthroughs to give teachers feedback for instructional monitoring." Another principal in the same category revealed, "I work with my math resource teacher to ensure the curriculum is being implemented. We meet monthly to discuss instructional monitoring." Other principals also suggested that these instructional walkthroughs were not limited to teachers. They included other administrators and staff members. But principals in schools meeting standards spoke of walkthroughs to support the notion of students' mastery of curricular objectives.

In contrast, a mathematics resources teacher and mathematics felt that principals were not demonstrating instructional accountability within the context of the regular classroom. They shared, "My principal does not know the curriculum; he focuses on the classroom observation process." And "My principal does not use the instructional monitoring tool in mathematics; he is more of a manager." A teacher shared that "the principals do not have professional development to ensure that curricular needs are being met. Our curriculum is vast and hard for me." Another resource teacher acknowledged that collaboration "was challenging" with the principal since "the county has instructed resource teachers to supervise and observe the entire math department."

*Theme #5: Curriculum Acceleration*

Respondents from schools that were at risk for meeting state standards described curricular issues that were faced by administrators, teachers, and students. Overall, schools that met standards did not mention curricular challenges. But schools

that were at risk for meeting state standards in mathematics focused on acceleration challenges, course alignment with state standards, and curriculum implementation. A principal from the at-risk schools stated,

The system's rigor for all philosophy when students are not cognitively ready at age 11 or 12 for accelerated courses. We know the research for language acquisition attainment with LEP students but we still assess and compare them to their American peers.

Another remarked,

...having middle school students take high school courses for credit, but not having the same benefits as a high school student. The exam schedule is an example of the inequities of rigors in middle school. High school students take two exams each day and go home at noon to study for the next day's exams. Middle school students take exams for credits but are required to stay in school all day and complete course work. Seeing straight A students earn a "D" in an accelerated course and blaming the teachers for not connecting to the student. In addition, persuading parents of the necessity to take Algebra I by grade 8. If the child is not successful, persuading the family to forego extracurricular activities, county sports team, specialized choirs, etc. in order to be tutored in math to meet the standards because moving down is not an option. Telling families that a two-week vacation to Israel, El Salvador, or China would impact the student's performance when we know that the vacation is an once-in-a-lifetime opportunity for many families. I am amazed at how much school performance dictates the families' decision for vacation, residence, community activities, etc.

One mathematics resource teacher from a school at risk for not meeting standards commented on the following issues with the school system math curriculum:

1. Mile wide, inch deep – there is toooooo much content that they are trying to cover so students do not get in depth with any one concept
2. Does not match all level of students across the county
3. Does not follow a specific textbook
4. Formative and summative assessment questions are extremely authentic which makes it hard to prepare students for the tests since there is nothing like them in the texts. It almost forces us to teach to the test.
5. Test questions are very tricky, too many details to think about – a question that tests a specific indicator may use other indicators in it prior to testing the one that is being tested
6. Is not currently aligned to state testing

A mathematics teacher observed,

Curriculum issues abound regarding students being able to successfully complete and pass the Algebra in and by 8th grade. It is an especially challenging if students have been accelerated past Algebra Prep/Math 8 into Algebra since the MSA is still aligned with the Algebra Prep/Math

Another remarked, "Algebra is not aligned with the MSA, hence teachers are both teaching Algebra and the MSA indicators which is quite a challenge due to the constraints of the curriculum."

### *Significance of Shared Leadership and Collaboration*

The third interview question addressed collaboration and shared leadership. In most situations, the thematic response of *transparency* was very dominant. The guiding question was, Describe collaboration and shared leadership in your school.

*Theme #6: Transparency (Schools That Met Standards in Mathematics)*

Principals identified themselves as being open and fair to the input of stakeholders. A principal revealed,

Our leadership meets for one hour each week. Our schedule is 1st meeting - management items (calendar, schedules, security, special events, etc.); 2nd meeting – data; 3rd meeting curriculum updates/review of student work; 4th meeting – diversity. (We are reading the *Courageous Conversations* book together with facilitation support from Donna Graves' team.

One principal shared, "I believe in shared leadership with my staff and community." Another principal offered, "We meet only once a month. During that time we focus on -school climate, management, and instructional issues."

According to a mathematics resource teacher, it was very evident how leadership structures are organized into a school.

*Instructional Council:* Administrative team, Resource Teachers, Team Leaders, and Resource Specialists. We meet weekly to review school and student data and artifacts, implement system and school initiatives, receive curriculum updates, school management and calendar events.

*Team Meetings:* Meet two or three times a week to review student data, share concerns, meet with parents, with certain meetings devoted to staff development. *Department Meetings:* Meets monthly to implement and review curriculum and instructional strategies to improve student achievement. *School Improvement Team:* IC members, parents, and students. We meet once a month to review the school improvement plan, team, and department action plans. *Committee Meetings:* Meets monthly to plan school events, implement programs, recognize staff

and students. *PTA Meetings*: Monthly, PTA Presidents plan meetings with the principal to meet the needs of the parent community.

*Theme #7: Transparency (Schools At Risk For Not Meeting Standards In Mathematics)*

All principals in this category agreed that they fostered an environment that promoted shared leadership. A principal from a school at risk from not meeting standards shared,

Collaboration at its best is when teachers/staff members work together and in support of each other in order to increase student achievement and learning. Shared leadership is the belief, actions and behaviors that demonstrate staff's responsibility and accountability for leading our school towards the fulfillment of our school improvement goals.

A principal from a school at risk for not meeting standards remarked, "The middle school initiative has split the IRT/Team Leader position. As a result, I meet with my department chairs (content specialist) every Tuesday. We only discuss curricular/instructional issues like walkthrough data, observations, literacy plans, etc . . . I meet with team leaders once a month for a management meeting. Assistant principals meet with their grade level team leaders on a bi-weekly meeting. Once a month, the entire group meets for a school improvement meeting to discuss progress on SIP goals. Our staff development teacher works with the instructional council to set the agenda for Tuesday meetings and monthly management meetings. The grade level administrators work with team leaders to set the bi-weekly meeting agenda.

For example, a mathematics resource teacher outlined,

There are tiers of shared leadership and all agenda and meeting notes are sent to the principal for review: Administrative Team: Principal, Assistant Principal, Magnet Coordinator, Resource Counselor, and

Administrative Secretary. We meet weekly and supervise the total school program: Instructional, Management, and Community.

On the other hand, the mathematics teachers had difficulty identifying the shared leadership of the principal. Teachers from this category especially focused on the "top down approach" from the school administration. A teacher commented "At my level, I wish we had shared leadership. I was hired to teach algebra and I do that. I do not see collaboration from the principal." These distinctions based upon collaboration appeared exclusively in the responses of the mathematic teachers.

#### *Family and Community Involvement*

The fourth interview question was: How do you create family and community involvement? The dominant themes that emerged from the data suggest that respondents perceive notions of involvement center around issues of the community.

#### *Theme #8: Affirmation of the Community (Schools Meeting Standards In Mathematics)*

In analyzing the responses of principals, the majority of the responses were clustered in the theme of *affirmation of the community* because they contained descriptors that indicated listening and being attentive to parents, PTA, and PTA executive board. Typical of the descriptions offered by the principal is the following,

At my school, we work to develop a strong partnership with the PTA. I meet with the executive board monthly, attend monthly PTA meetings, and we co-sponsor activities that will support community involvement. We co-sponsor the back-to-school night picnic, international night, staff appreciation week, promotion reception, volunteer program, etc.

Another principal responded,

As the principal of the school, I believe that I am the host of the house. I welcome all visitors, as if they were guests in my home. My first encounter with community members, staff, and students is genuine and they feel validated and valued in my presence. Everyone likes to feel important in the presence of a leader, and having the leader say your name or recognize a family crisis is essential. I have met with civic leaders, police, mayor, newspaper staff, participated in the community parades and festivals. I have attended community forums that benefit my students and school.

Another popular descriptor within the theme of affirmation of the community was student recognition. A great number of teacher responses focused on student recognition programs (honor roll, student of the month, etc.) to support community involvement. A mathematics teacher responded, "Our middle school believes in student involvement. We have student ambassadors and student helpers. We also recognize students for achievement, effort and citizenship. We invite parents to these award recognitions and we seek volunteers to assist our school."

*Theme #9: Affirmation of the Community (Schools At Risk for Not Meeting Mathematical Standards)*

A principal from a school that did not make standards shared, "we create family and community involvement by recognizing student achievement via constant communication and gatherings with various stakeholder groups around student performance." Another principal from a school at risk for making standards outlined, "I believe that it's important to ask about families, celebrations, and personal challenges and remember names." A mathematics resource teacher commented, "We have Family Fun Nights with hands-on activities to support current instructional units. We provide babysitting and dinner."

A common theme identified by mathematics teachers that were at risk for meeting state standards was *personal freedom*. Quite a few teachers' responses focused on the notion that it is the responsibility of the school to foster community partnership, not the individual teacher. One teacher summed it up fittingly when she stated, "Teachers support community involvement, we do not create it!!" Another mathematics teacher expressed, "I support community involvement, but I need time to do the county requirements in math. We have formative and summative assessments and I need to focus on those areas of the curriculum." Another similar comment was: "We have a challenging student body and it is my responsibility to be the instructor, not create family involvement for the entire school."

#### Summary

This chapter presented the findings associated with the study. Quantitative and qualitative methods were used to address the four research questions. A number of recommendations for practice and for further research were drawn from these findings and are presented in Chapter 5, as are conclusions reached as a result of this study.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter consists of four sections: research summary, findings of the study, conclusions, and recommendations. The research summary frames the major issues that led to this research endeavor. It includes the purpose of the study, problem statement, research questions, and methodology. An analysis of the data is found in the findings section. Based on the findings, the researcher included recommendations for further practice for principals and for extended research.

#### Purpose of the Study

The purpose of this study was to use quantitative methodology to identify, compare and contrast the leadership practices of principals in two types of middle schools: those identified as meeting state standards in mathematics and those identified as at risk of not meeting state standards. The behaviors and practices were studied from the perspective of principals, mathematics resource teachers, and mathematics teachers. The researcher uses Powell's (2004) five domains of effective principal leadership behaviors and practices (e.g., vision, mission, and culture; curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) as lenses through which to view the principals' leadership.

The study also used qualitative methodology (focus group interviews) as a non-directive method to obtain information about principals' leadership behavior and practices that may not be available through general quantitative research methods. Using a moderator's guide, the researcher prepared a series of questions to guide the focus group discussions.

## Statement of the Problem

Just as societal and school demographics have changed in recent decades, so has the type of leadership needed to successfully lead the rapidly changing middle schools of this century. Now, middle school principals have responsibility for providing instructional leadership in a wide variety of specific subjects (Cole, 1999; Kilpatrick et al., 2001). Among those subjects, mathematics is a particularly important venue to study because of our nation's poor results in state accountability measures. In the proposed state of this study, all middle schools must meet "Adequate Yearly Progress "(AYP) by the 2013-2014 academic year in mathematics. Students must be tested at least once in mathematical proficiency in grades 6-8. To that end, the research from middle school mathematics provides important direction for increasing success in rigorous high school curricula and post-secondary experiences.

The practices of the principal play an integral part in student achievement. Understanding leadership practices employed by principals and the effect of these practices on achievement of middle school students will create a knowledge base that will enhance our understanding of this relationship and provide the potential to increase student achievement, thus furthering state accountability efforts.

In this era of *No Child Left Behind*, middle school principals must now be actively involved in improving a school's instructional program. Instructional change requires principal leadership. Principals can play a key role as leaders to promote high-quality mathematics instruction (Nelson, 1999). Research shows that their understanding of mathematics instruction, and their ideas about how they can support it, are significantly influenced by their own ideas about teaching, learning, and the nature of mathematics (Reys, Chavez, & Reys, 2003). However, a better understanding of school leadership practices in middle schools is needed in order to support principals with their efforts to improve student mathematics achievement.

## Research Questions

Prior to beginning the research, the following research questions were developed to provide the structure for data collection and analysis.

### *Research Question 1*

From the perspective of middle school principals, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Research Question 2*

From the perspective of middle school mathematics resource teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

### *Research Question 3*

From the perspective of middle school mathematics teachers, are there differences in the perceptions of principals regarding the five leadership domains identified by Powell (vision, mission, and culture; mathematics curriculum and classroom instruction; collaboration and shared leadership; family and community involvement; and effective management) between middle schools identified as at risk

of not meeting state standards in mathematics and schools identified as meeting state standards in mathematics?

#### *Research Question 4*

What are the curriculum and instructional issues faced daily by middle school principals, mathematics resource teachers, or mathematics teachers, who are concerned with providing leadership to students in mathematics? Are there differences in these curricular and instructional issues between middle schools meeting state standards and those not meeting state standards?

#### Methodology

This study used both quantitative and qualitative research methods as a means to provide relevant insights and potential solutions to the research questions. Thirty-three middle schools were selected from a county in a mid-Atlantic state. The researcher used 15 middle schools making Adequate Yearly Progress (AYP) in mathematics and 18 middle schools at risk of not making AYP to conduct the study. A total of 33 principals, 33 mathematics resource teachers and 190 teachers were invited to participate in this study.

Middle schools were selected for this study for a variety of reasons. The primary reason for choosing middle schools is because the accountability of No Child Left Behind has the greatest impact on middle school leaders. The cornerstone of the testing of all students in grades 3-8 impacts all middle school grades. Also, as middle school students focus on academic performance, principals must also focus on "meeting the unique developmental needs of young adolescents who are undergoing tremendous, cognitive, emotional physical, and social change" (Valentine et al., 2004, p.1). These factors make middle schools an important and interesting population for this study on school leadership.

For the quantitative portion of the study, the Powell School Leadership survey was administered to principals, mathematics resource teachers, and mathematics teachers. The instrument was designed to solicit judgments about school leadership behaviors. Of the 60 questions on the survey, 13 were questions for the school vision, mission and culture domain, 13 were questions for the curriculum and classroom instruction domain, 13 were questions for the family and community involvement domain, 9 were questions for collaboration and shared leadership, and 12 were questions for effective management.

For the qualitative design, focus group interviews were utilized. The research participants for the focus group included principals, mathematics resource teachers, and mathematics teachers, representing both groups of schools. The sessions were tape-recorded. An open-ended moderator guide was used to facilitate the discussion of the research questions. The researcher used Powell's conceptual framework as a lens for analysis. The data were transcribed. The transcripts were shared with the study participants to check for accuracy and verification. The reporting of the focus group material did not identify names of persons or individual schools.

### Summary of Quantitative Survey Findings

Overall, the survey findings indicated that the Powell Leadership instrument had a strong degree of inter-item reliability, based on the computation of Cronbach alphas on the five domains.

Finding #1: The instrument had a high degree of reliability across the five domains tested.

Finding #2: The correlation coefficients for schools identified as meeting state standards were in the modest to strong range (.50 to .80). All correlations were

statistically significantly different from 0.0 at the .001 level. Correlations provide information on the strength of the relationship among the five domains in the survey.

Finding #3: The correlation coefficients for schools identified as at risk for meeting state standards were lower than the schools meeting state standards. All but one correlation were in the modest range, .40 to .70. All correlations were statistically significantly different from 0.0 at the .001 level.

Finding #4: An independent t-test of principals' differences in perceptions of five leadership domains between schools meeting state standards and schools at risk of not meeting state standards confirmed no statistically significant difference across the five domains.

Finding #5: An independent t-test of mathematics resource teachers' differences in perceptions of five leadership domains between schools meeting state standards and schools at risk of not meeting state standards confirmed no statistically significant difference across the five domains.

Finding #6: An independent t-test of mathematics teachers' differences in perceptions of five leadership domains between schools meeting state standards and schools at risk of not meeting state standards confirmed no statistically significant difference was found across four domains. For domain 4, family and community relations, there was a statistically significant difference at the .03 level. Since the researcher did 15 independent t-tests, it is possible that this finding happened by chance.

#### Additional Analyses

Based on findings 4, 5, and 6, the researcher believed that the Powell instrument was not as sensitive as he hoped it would be in isolating differences between the two types of schools and the five domains. As mentioned in Chapter 4,

the researcher observed that in all cases both groups of principals had higher mean scores (although not statistically significantly different) than did the mathematics resource teachers and the mathematics teachers. Therefore, the researcher sought to determine, with additional analysis, whether there were statistically significant differences among the three groups of educators—principals, mathematics resource teachers, and mathematics teachers—in each group of schools.

Finding #7: A one-way analysis of variance compared principals', mathematics resources teachers', and mathematics teachers' judgments of principals' perceptions of five leadership domains in schools meeting state standards. The results indicated that there were no statistically significant differences in domains 1, 2, 4, and 5 between the three groups of educators, but there was a statistically significant difference at the .001 level in Domain 3, collaboration and shared leadership, between the principals and the other two groups.

Finding #8: A one-way analysis of variance compared principals', mathematics resources teachers', and mathematics teachers' judgments of principals' perceptions of five leadership domains for schools at risk for not meeting state standards. The results indicted that there were statistically significant differences at the .001 level in domains 1, 3, 4, and 5 between the principals and the mathematics teachers, but there was no statistically significant difference in domain 2, mathematics curriculum and classroom instruction.

### Conclusions Based on Quantitative Results

The researcher identified 33 middle schools to study, 15 of which met state standards and 18 that did not meet state standards. The response rate for principals was 84.8%; for mathematics resource teachers, it was 66.6%; and for mathematics teachers, it was 55.7%. The researcher concluded that this was an acceptable rate,

given the fact that the study was conducted in May while the middle schools were taking the state-mandated tests and were nearing the closing of schools for the summer.

The content validity of the instrument was documented by Powell and re-documented by this researcher as the result of reviews by principals and mathematics staff in counties other than the county where the study was done. The researcher computed Cronbach alphas to establish the inter-item reliability of the survey. The researcher concluded that the survey had high inter-item reliability of .93 across the five domains. The lowest, .80, was for family and community involvement. The highest, .89, was for vision, mission, and culture.

The researcher computed correlation coefficients for both types of schools. The correlations were all statistically significant at the .001 level. The correlations were modest, .54, to strong, .91, for the schools meeting state standards and somewhat weaker, .42 to .80, for the schools not meeting state standards. For domain 2, mathematics curriculum and classroom instruction, the relationships were strongest for domain 1, .83, and domain 5, .80, and weakest for domain 3, .61, and domain 4, .54. In all cases the correlations were even weaker for schools not meeting state standards. The researcher concluded that there was a modest to strong relationship between the five domains in the schools that met state standards and a much more modest relationship between the five domains for schools that did not meet state standards.

The researcher next used independent t-tests to look for statistical differences in research questions 1 through 3. The conclusion reached on research question 1, which compared differences between principals' judgments about principal leadership in middle schools that met state standards compared with schools that did not meet state standards, showed there were no statistically significant differences on any of the five domains between the two school groups.

For research question 2, which compared differences between mathematics resource teachers' judgments about principal leadership in middle schools that met state standards compared with schools that did not meet state standards, the researcher concluded there were no statistically significant differences on any of the five domains between the two school groups.

For research question 3, mathematics teachers' judgments of principal leadership, there were no statistically significant differences for domains 1, 2, 3, and 5 between the two groups of schools. For domain 4, family and community relations, there was a statistically significant difference. The means of the teachers in the met schools were statistically significantly higher than in the not-met schools. The researcher concluded that this is an important finding since parental and community involvement in schools has been shown to be an important factor in school success.

Based on these findings, the researcher concluded that the Powell instrument was unable to detect indications that the principals' behavior in met schools was perceived differently than in the at-risk schools, with one exception. In the at-risk schools, the mean for family and community relations was statistically significantly lower than the mean for the met schools. It is important to note that the standard deviations for both met and unmet schools were in some cases quite large. This suggests that there were lower levels of agreement between educators in the schools than was indicated by the means. The researcher concluded that some additional analysis was warranted on the basis of the finding that principals in met and at-risk schools all had higher mean scores (although not statistically significant) than did the mathematics teachers. Therefore, he did some additional analysis using analysis of variance to look for differences within school groups between principals, mathematics resource teachers, and resource teachers,

From the data analysis for schools that met standards, the researcher found that for domains 1, 2, 4, and 5, there were no statistically significant differences between the three professional groups in perceptions of the principal's leadership. For domain 3, collaboration and shared leadership, there was a statistically significant difference between the principals, the mathematics resource teachers, and the mathematics teachers. The principals had a more positive view of their leadership abilities than did the mathematics resource teachers or the mathematics teachers. The researcher concluded that the principals have a higher opinion of their ability to collaborate and share leadership than do the mathematics resource teachers and the mathematics teachers. For a principal to collaborate and share leadership responsibilities with others can be a difficult task.

The same analysis was done on the middle schools that did not meet state standards. The results of the analysis of variance show that for domains 1, 3, 4, and 5, there were statistically significant differences between the principals and the mathematics teachers, but not between the principals and the mathematics resource teachers. The researcher concluded that the principals and mathematics resource teachers have a more positive view of the principal's leadership than do the mathematics teachers. These important differences suggest that this lack of agreement on the leadership may be one of the major reasons why these schools are at risk of meeting state standards.

This conclusion may offer some insight into why the successful schools are successful. There seems to be a great deal more agreement about the principal's leadership among the three professional groups in the schools meeting state standards (with one exception) than in the schools not meeting standards. This difference is particularly important in light of the fact that it is the mathematics teachers in the

poorer performing schools that have significantly lower opinions of the principal's leadership in four of the five domains.

In all of the data analysis, it is interesting to note that there were no statistically significant differences in domain 2, mathematics curriculum and classroom instruction. All principals, mathematics resource teachers, and mathematics teachers gave the principal high marks, between 3.25 and 3.50 on a 4.00 scale in that domain. The researcher concluded that the vision of the school, whether meeting standards or not, was supported by the principal, mathematics resource teachers, and mathematics teachers. The researcher feels that the Powell (McLeod) survey instrument was quite sensitive to differences among professional educators about leadership behavior, particularly in schools not meeting state standards. It was not as sensitive in schools meeting the standards.

#### Summary of Focus Group Findings

Based on the focus group discussions, the following are the findings:

Finding #1: Both categories of schools had created a school vision. From the comments made in the focus group meetings, it appeared that the vision of the school was more the product of the principals' thoughts than of the whole school.

Finding #2: In schools that met state standards in mathematics, the mathematics resource teachers and the mathematics teachers seemed more likely to embrace the school vision than in the not-met schools.

Finding #3: All principals tried to promote collaboration and shared leadership, indicated by the opinions expressed in the focus groups. But this effort was more successful in the met schools than in the non-met schools.

Finding # 4: Principals in the not-met schools were not as knowledgeable about the mathematics curriculum as the mathematics teachers felt they should be.

Finding #5: In the area of shared leadership and collaboration, both groups of principals identified themselves as being open and fair to input from mathematics resource teachers and mathematics teachers.

Finding #6: Schools in the not-met category identified significant curricular issues (acceleration, curricular monitoring and implementation).

### Conclusions Based on Qualitative Results

Based on the focus group interviews, the researcher arrived at the following conclusions. All of the schools had created a school vision. From the comments made in the focus group meetings, it appeared that the vision of the school was more the product of the principals' thoughts than of the whole school. In the met schools, the mathematics resource teachers and the mathematics teachers seemed more likely to embrace the school vision than in the not-met schools. These two groups ensured that the instruction was research-based and implemented in the schools. All principals tried to promote collaboration and shared leadership, indicated by the opinions expressed in the focus groups. Again, this was more true in the met schools than in the non-met schools. From comments made in the focus groups, the researcher concluded that mathematics resource teachers from the schools not meeting state standards were more influenced by the state assessments than by the school's vision.

From the focus groups' discussion of instructional monitoring in mathematics, it is clear that all of the schools tended to rely heavily on curriculum guides and unit calendars to monitor instruction. The curriculum look-fors assisted the principals in noting different features of the instructional program that supported the curriculum guides, but were used more often by the met schools principals. The researcher concluded that the principals in the not-met schools were not as knowledgeable about

the mathematics curriculum as the mathematics teachers felt they should be. One direct quote was, "My principal does not know the curriculum."

In the area of shared leadership and collaboration, both groups of principals identified themselves as being open and fair to input from mathematics resource teachers and mathematics teachers. The researcher concluded from the mathematics teachers' comments that they had difficulty identifying any shared leadership with the principal. One teacher commented, "At my level, I wish we had shared leadership!"

Most of the comments in the focus groups about family and community involvement acknowledged its importance. Everyone tried to affirm the importance of the community and indicated that they listened attentively to parents and the PTA. One of the most common ways of affirming the community was by active recognition of the students' performance in many areas. The researcher concluded that the educational professionals are trying hard to win community support, but it cannot be a one-sided effort. By that they meant that members of the community must also show initiatives to become involved with the schools.

### Recommendations For Practice

As school districts throughout the country focus on meeting state standards, principals must rely on skills and theories to improve student learning (Northouse, 2004; Powell, 2004). Understanding leadership practices will enhance our understanding of this relationship. The results of this study could be beneficial to school districts, principals, teachers, and schools of education in their efforts to improvement student achievement and further state accountability efforts. Specifically, the implications for practice for this study include:

*Recommendation #1*

Middle school principals from at-risk schools working to meet state standards in mathematics must involve families and community members in programs and initiatives that support parent engagement. The culture of the school must be as supportive to them as it is to the students and staff. These constituents must be partners with the school, working for the success of the students. It is recommended that at risk schools have a parent and community parent liaison to support greater engagement because a good principal can provide a climate that can foster excellence in teaching and learning (Riley, 2002).

*Recommendation #2*

Because the landscape of middle school education is rapidly changing due to NCLB, policy and trends in the profession, it is recommended that existing middle school principals of at-risk schools receive on-going instructionally and leadership support through a tailored and individualized mentoring program where practices relevant to mathematic achievement are modeled and promoted.

*Recommendation # 3*

Based on focus group data, it is important that middle school principals from both categories of schools use the practice of shared leadership to get input from stakeholders and build capacity in order to support school achievement goals. A process of creating a shared vision and mission will allow staff to participate, contribute, and be committed to the instructional goals of the school. As cited in the literature, it is essential that the principal create a nurturing environment in which all stakeholders participate in shaping the vision of the school (Dufour, 2002). The notion of professional learning communities is predicated upon leadership being “a process whereby an individual influences a group so as to achieve a common goal”

(Northouse, 2004). Creating a shared vision and mission is the first step in this process.

*Recommendation #4*

Based on focus group data, a recommendation to school systems is that middle school principals from the at-risk group of schools may need ongoing professional development in the mathematics curriculum. This may be delivered in mixed team sessions consisting of middle school principals along with their mathematics resource teachers and mathematics teachers. This delivery of training will allow middle school principals the opportunity to cultivate effective instructional techniques in order to convey these expectations and to communicate their knowledge to mathematics teachers and other staff within the discipline. Middle school principals must demonstrate their understanding of curriculum, assessment, and instruction and clearly convey this knowledge to mathematics teachers. After all, principals who know about teaching and learning are the principals who are actively engaged in improving instruction at their schools (Cotton, 2003).

*Recommendation #5*

Based on focus group data, middle school principals may need to create a collaborative environment with staff and provide opportunities for shared leadership to support the shared common vision of the school. Mathematics teachers who feel they work in partnership with the principal and are valued as instructional classroom mathematics leaders experience greater degrees of ownership in what happens at school and therefore increase the probability of success regarding state standards in mathematics (Nelson, 1999). As a consequence, middle school principals must seek and reflect upon feedback from stakeholders in a collaborative manner.

## Recommendations for Further Studies

This study provided rich, detailed description of practices of middle school principals. Though the data provided some details and answers regarding practices of the principal, it raised other questions for further research. Questions for further study are recommended as follows:

1. It is recommended that this study be replicated with other persons who work closely with the principals (assistant principals, instructional leadership council members, PTA executive board members). They should be surveyed to ascertain principals' leadership practices.
2. It is recommended that a case study be conducted with a middle school that has met standards in mathematics for over three years. This qualitative research endeavor would provide a rich and detailed understanding of the leadership practices within a successful school environment.
3. It is recommended that student perceptions of instructional leadership be ascertained to see what impact (direct or implied) the instructional leadership has in stimulating student attitudes and behaviors toward learning mathematics.

Appendix A  
Request for Participation in Study

## **Recruitment Letter For Principals (Survey)**

May 1, 2007

Dear Colleague:

I am writing to invite you to participate in a study of Leadership Practices of Middle School principals. The study, which is being conducted as part of my doctoral program, will examine the relationship between school leadership practices and middle school mathematics achievement.

You will be asked to respond to the Powell Leadership Survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. This survey also asks about your background and experience. Participation in the survey should take approximately twenty minutes. Data collection for the study will include a survey of all participants.

Your responses are confidential. All identifying information will be removed and survey data will be maintained in secure files and will be accessible only to me. Reports and other communications related to the study will not identify respondents by name, nor will it identify any schools. Study results will be available in a summary report, which will be given to Montgomery County Public Schools.

If you are willing to complete the survey, please complete the survey consent form and the survey instrument. Please mail the survey and survey form in the self-addressed stamped envelope.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244 or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3590.

Thank you for your participation.

Nelson McLeod

**Recruitment Letter – Mathematics Teacher (survey)**

May 1, 2007

Dear Mathematics Teacher:

I am writing to invite you to participate in a study of Leadership Practices of Middle School principals. The study, which is being conducted as part of my doctoral program at the University of Maryland College Park, will examine the relationship between school leadership practices and middle school mathematics achievement.

You are asked to respond to the Powell Leadership Survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. The survey also asks about your background and experience. Participation in the survey should take approximately twenty minutes.

Your responses are confidential. All identifying information will be removed and survey data will be maintained in secure files and will be accessible only to me. Reports and other communications related to the study will not identify respondents by name, nor will they identify any schools. Study results will be available in a summary report, which will be given to Montgomery County Public Schools.

Please read the survey consent form. Then, you will response to the survey instrument using the enclosed scantron sheet with a number #2 pencil. Please mail the survey only (it can be folded) in the self-addressed stamped envelope by Friday, June 1, 2007.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244 (work) or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3580.

Thank you for your participation.

Nelson McLeod

## **Recruitment Letter For Mathematics Resource Teacher (Survey)**

May 1, 2007

Dear Colleague:

I am writing to invite you to participate in a study of Leadership Practices of Middle School principals. The study, which is being conducted as part of my doctoral program, will examine the relationship between school leadership practices and middle school mathematics achievement.

You will be asked to respond to the Powell Leadership Survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. This survey also asks about your background and experience. Participation in the survey should take approximately twenty minutes. Data collection for the study will include a survey of all participants.

Your responses are confidential. All identifying information will be removed and survey data will be maintained in secure files and will be accessible only to me. Reports and other communications related to the study will not identify respondents by name, nor will it identify any schools. Study results will be available in a summary report, which will be given to Montgomery County Public Schools.

If you are willing to complete the survey, please complete the survey consent form and the survey instrument. Please mail the survey and survey form in the self-addressed stamped envelope.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244 or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3590.

Thank you for your participation.

Nelson McLeod

Appendix B  
Informed Consent Form

**CONSENT FORM - PRINCIPALS**

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As a principal, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to complete the Powell Leadership survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. The survey contains sixty (60) items, uses a four point Likert scale, and will take approximately twenty minutes to complete. This survey also includes a section with demographic questions. You will mail the survey and survey forms in a self-addressed envelope.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. Your name will not be included on the surveys and other collected data. A code will be placed on the survey through the use of an identification key. The researcher will be able to link your survey to your identity and only the researcher will have access to the identification key. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals	
<b>Do I have to be in this research? May I stop participating at any time?</b>	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
<b>What if I have questions?</b>	This research is being conducted by Nelson McLeod, Department of Educational Leadership and Policy at the University of Maryland, College Park. If you have any questions about the research study itself, please contact at: Nelson McLeod, 11311 Newport Mill Road, Kensington, Maryland, 20904, (301) 929-2244 or by (e-mail) <a href="mailto:nelson_mcleod@mcpsmd.org">nelson_mcleod@mcpsmd.org</a> . If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) <a href="mailto:irb@deans.umd.edu">irb@deans.umd.edu</a> ; (telephone) 301-405-0678. This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

**CONSENT FORM – MATHEMATICS RESOURCE TEACHER**

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As mathematics resource teacher, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to complete the Powell Leadership survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. The survey contains sixty (60) items, uses a four point Likert scale, and will take approximately twenty minutes to complete. This survey also includes a section with demographic questions. You will mail the survey and survey forms in a self-addressed envelope.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. Your name will not be included on the surveys and other collected data. A code will be placed on the survey through the use of an identification key. The researcher will be able to link your survey to your identity and only the researcher will have access to the identification key. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals	
<b>Do I have to be in this research? May I stop participating at any time?</b>	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
<b>What if I have questions?</b>	This research is being conducted by Nelson McLeod, Department of Educational Leadership and Policy at the University of Maryland, College Park. If you have any questions about the research study itself, please contact at: Nelson McLeod, 11311 Newport Mill Road, Kensington, Maryland, 20904, (301) 929-2244 or by (e-mail) <a href="mailto:nelson_mcleod@mcpsmd.org">nelson_mcleod@mcpsmd.org</a> . If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) <a href="mailto:irb@deans.umd.edu">irb@deans.umd.edu</a> ; (telephone) 301-405-0678. This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

**CONSENT FORM – MATHEMATICS TEACHER**

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As a mathematics teacher, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to complete the Powell Leadership survey. The survey asks you to give your perception about school leadership practices and middle school mathematics achievement. The survey contains sixty (60) items, uses a four point Likert scale, and will take approximately twenty minutes to complete. This survey also includes a section with demographic questions. You will mail the survey and survey forms in a self-addressed envelope.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. Your name will not be included on the surveys and other collected data. A code will be placed on the survey through the use of an identification key. The researcher will be able to link your survey to your identity and only the researcher will have access to the identification key. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals	
<b>Do I have to be in this research? May I stop participating at any time?</b>	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
<b>What if I have questions?</b>	This research is being conducted by Nelson McLeod, Department of Educational Leadership and Policy at the University of Maryland, College Park. If you have any questions about the research study itself, please contact at: Nelson McLeod, 11311 Newport Mill Road, Kensington, Maryland, 20904, (301) 929-2244 or by (e-mail) <a href="mailto:nelson_mcleod@mcpsmd.org">nelson_mcleod@mcpsmd.org</a> . If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) <a href="mailto:irb@deans.umd.edu">irb@deans.umd.edu</a> ; (telephone) 301-405-0678. This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

## Appendix C

### Surveys

# Middle School Leadership Survey

## Principals

Using this 60-item survey instrument, you are asked to indicate your perspective about your leadership behaviors and practices. Please use the following scale in answering these items.

12
3
4
Strongly Agree  
 Strongly Disagree      Disagree      Agree

Please be discriminating! The results will be more helpful if you think about each item as it pertains to your leadership behaviors and practices only. Please answer all questions and complete the five background questions as well. Thank you for your time and input. Please use the attached Scantron sheet to record your answers.

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
1. Curriculum needs determine the type and frequency of mathematics staff development	1	2	3	4
2. The principal and staff together develop the school plan.	1	2	3	4
3. Teachers provide mathematics instruction using the mathematics instructional model (warm-up, guided practice, independent practice, and closure)	1	2	3	4
4. The school staff embraces the vision of the principal for school success.	1	2	3	4
5. Teachers facilitate interactive student discussions about mathematical concepts and process.	1	2	3	4
6. Teachers use mathematics assessment data to plan instruction.	1	2	3	4
7. The principal, not the district, makes hiring decisions.	1	2	3	4
8. The principal supports the discipline plan.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
9. Teachers address the individual mathematics needs of students.	1	2	3	4
10. Outside organizations support the school monetarily.	1	2	3	4
11. Teachers know what resources to use for students' social and educational needs.	1	2	3	4
12. Family members feel comfortable in the school.	1	2	3	4
13. The principal provides teachers with enough supplies, books, and materials to deliver instruction.	1	2	3	4
14. There is a feeling of respect among and between staff members and students.	1	2	3	4
15. Teachers focus on the state mathematics standards when teaching the curriculum.	1	2	3	4
16. The teachers are encouraged to give the principal input on the purchase of resources.	1	2	3	4
17. Most parents attend conferences concerning student progress.	1	2	3	4
18. Parents are seen frequently in the school.	1	2	3	4
19. Family members are encouraged to come to school.	1	2	3	4
20. Mathematics teachers in this school believe all children can learn.	1	2	3	4
21. Successes are celebrated frequently by the principal and teachers.	1	2	3	4
22. Leadership in the school is shared between the principal and teachers.	1	2	3	4
23. The internet is used for communication between school and home.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
24. Students in this school understand and follow the discipline plan for behavior.	1	2	3	4
25. The school vision sets the stage for how the staff proceeds with instruction.	1	2	3	4
26. After-school programs are well attended by parents.	1	2	3	4
27. The principal is seen frequently throughout the building.	1	2	3	4
28. Teachers are encouraged to participate in decision-making.	1	2	3	4
29. Community members volunteer at the school.	1	2	3	4
30. The principal understands good mathematics instruction.	1	2	3	4
31. Teachers frequently assess students on state mathematics standards.	1	2	3	4
32. The staff makes decisions with the principal concerning teaching and learning.	1	2	3	4
33. The principal manages funds to ensure the school has the best resources to teach the students.	1	2	3	4
34. There are uninterrupted blocks of time for mathematics instruction.	1	2	3	4
35. The teachers plan the mathematics program in collaboration with the principal.	1	2	3	4
36. The culture of the school is conducive to learning.	1	2	3	4
37. The school develops a plan to ensure all students are successful.	1	2	3	4
38. Teachers maintain a high level of student engagement in mathematics.	1	2	3	4
39. The principal visits classrooms frequently.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
40. Teachers in the school work for the success of all students.	1	2	3	4
41. The principal keeps the teacher-student ratio low.	1	2	3	4
42. The principal makes some academic decisions without the input of teachers.	1	2	3	4
43. Members of civic or social organizations volunteer in the school.	1	2	3	4
44. Teachers are leaders in the school.	1	2	3	4
45. The school forms partnerships with businesses.	1	2	3	4
46. The principal uses a variety of funding sources to sustain mathematics programs at the school.	1	2	3	4
47. The principal knows the names of the students.	1	2	3	4
48. The school is the center of the community.	1	2	3	4
49. Teachers help students make connections to prior knowledge in mathematics.	1	2	3	4
50. Most people in our school believe the principal is an ethical leader.	1	2	3	4
51. Teachers differentiate instruction to meet students' needs in mathematics.	1	2	3	4
52. There is a parent liaison to assist parents.	1	2	3	4
53. Most mathematics teachers participate in staff development.	1	2	3	4
54. The discipline plan for student behavior is effective.	1	2	3	4
55. A nurse on staff addresses the medical needs of students.	1	2	3	4
56. Teachers in our school are free to be risk-takers.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
57. The staff participates in the hiring process.	1	2	3	4
58. The mathematics curriculum is the focus of classroom instruction.	1	2	3	4
59. Teachers are honest with parents concerning student progress.	1	2	3	4
60. Mathematics instructional time is protected from interruptions.	1	2	3	4

Please provide the following background information:

61. Are you: A) Male\_\_\_\_ B) Female\_\_\_\_\_

62. How many years have you been in education, including the years at your current school?

1	2	3	4	5
0-5	6-10	11-15	16-20	21+

63. How many years have you been principal at this school?

1	2	3	4	5
0-5	6-10	11-15	16-20	21+

64. Indicate your educational level

1	2	3	4
BA/BS	MA	MA+30	Doctorate

65. To what age group do you belong?

1	2	3	4
22-30	31-40	41-50	51+

# Middle School Leadership Survey

Middle School Mathematics Department Chairpersons

Using this 60-item survey instrument, you are asked to indicate your perspective about your principal's leadership behaviors and practices. Please use the following scale in answering these items.

12
3
4
Strongly Agree  
 Strongly Disagree      Disagree      Agree

Please be discriminating! The results will be more helpful if you think about each item as it pertains to your principal's leadership behaviors and practices only. Please answer all questions and complete the five background questions as well. Thank you for your time and input. Please use the attached Scantron sheet to record your answers.

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
1. Curriculum needs determine the type and frequency of mathematics staff development	1	2	3	4
2. The principal and staff together develop the school plan.	1	2	3	4
3. Teachers provide mathematics instruction using the mathematics instructional model (warm-up, guided practice, independent practice, and closure)	1	2	3	4
4. The school staff embraces the vision of the principal for school success.	1	2	3	4
5. Teachers facilitate interactive student discussions about mathematical concepts and process.	1	2	3	4
6. Teachers use mathematics assessment data to plan instruction.	1	2	3	4
7. The principal, not the district, makes hiring decisions.	1	2	3	4
8. The principal supports the discipline plan.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
9. Teachers address the individual mathematics needs of students.	1	2	3	4
10. Outside organizations support the school monetarily.	1	2	3	4
11. Teachers know what resources to use for students' social and educational needs.	1	2	3	4
12. Family members feel comfortable in the school.	1	2	3	4
13. The principal provides teachers with enough supplies, books, and materials to deliver instruction.	1	2	3	4
14. There is a feeling of respect among and between staff members and students.	1	2	3	4
15. Teachers focus on the state mathematics standards when teaching the curriculum.	1	2	3	4
16. The teachers are encouraged to give the principal input on the purchase of resources.	1	2	3	4
17. Most parents attend conferences concerning student progress.	1	2	3	4
18. Parents are seen frequently in the school.	1	2	3	4
19. Family members are encouraged to come to school.	1	2	3	4
20. Mathematics teachers in this school believe all children can learn.	1	2	3	4
21. Successes are celebrated frequently by the principal and teachers.	1	2	3	4
22. Leadership in the school is shared between the principal and teachers.	1	2	3	4
23. The internet is used for communication between school and home.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
24. Students in this school understand and follow the discipline plan for behavior.	1	2	3	4
25. The school vision sets the stage for how the staff proceeds with instruction.	1	2	3	4
26. After-school programs are well attended by parents.	1	2	3	4
27. The principal is seen frequently throughout the building.	1	2	3	4
28. Teachers are encouraged to participate in decision-making.	1	2	3	4
29. Community members volunteer at the school.	1	2	3	4
30. The principal understands good mathematics instruction.	1	2	3	4
31. Teachers frequently assess students on state mathematics standards.	1	2	3	4
32. The staff makes decisions with the principal concerning teaching and learning.	1	2	3	4
33. The principal manages funds to ensure the school has the best resources to teach the students.	1	2	3	4
34. There are uninterrupted blocks of time for mathematics instruction.	1	2	3	4
35. The teachers plan the mathematics program in collaboration with the principal.	1	2	3	4
36. The culture of the school is conducive to learning.	1	2	3	4
37. The school develops a plan to ensure all students are successful.	1	2	3	4
38. Teachers maintain a high level of student engagement in mathematics.	1	2	3	4
39. The principal visits classrooms frequently.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
40. Teachers in the school work for the success of all students.	1	2	3	4
41. The principal keeps the teacher-student ratio low.	1	2	3	4
42. The principal makes some academic decisions without the input of teachers.	1	2	3	4
43. Members of civic or social organizations volunteer in the school.	1	2	3	4
44. Teachers are leaders in the school.	1	2	3	4
45. The school forms partnerships with businesses.	1	2	3	4
46. The principal uses a variety of funding sources to sustain mathematics programs at the school.	1	2	3	4
47. The principal knows the names of the students.	1	2	3	4
48. The school is the center of the community.	1	2	3	4
49. Teachers help students make connections to prior knowledge in mathematics.	1	2	3	4
50. Most people in our school believe the principal is an ethical leader.	1	2	3	4
51. Teachers differentiate instruction to meet students' needs in mathematics.	1	2	3	4
52. There is a parent liaison to assist parents.	1	2	3	4
53. Most mathematics teachers participate in staff development.	1	2	3	4
54. The discipline plan for student behavior is effective.	1	2	3	4
55. A nurse on staff addresses the medical needs of students.	1	2	3	4
56. Teachers in our school are free to be risk-takers.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
57. The staff participates in the hiring process.	1	2	3	4
58. The mathematics curriculum is the focus of classroom instruction.	1	2	3	4
59. Teachers are honest with parents concerning student progress.	1	2	3	4
60. Mathematics instructional time is protected from interruptions.	1	2	3	4

Please provide the following background information:

61. Are you: A) Male\_\_\_\_ B) Female\_\_\_\_\_

62. How many years have you been in education, including the years at your current school?

1                    2                    3                    4                    5  
0-5                6-10                11-15                16-20                21+

63. How many years have you been mathematics department chairperson at this school?

1                    2                    3                    4                    5  
0-5                6-10                11-15                16-20                21+

64. Indicate your educational level

1                    2                    3                    4  
BA/BS            MA                    MA+30                Doctorate

65. To what age group do you belong?

1                    2                    3                    4  
22-30            31-40                41-50                51+

# Middle School Leadership Survey

## Middle School Mathematics Teachers

Using this 60-item survey instrument, you are asked to indicate your perspective about your principal's leadership behaviors and practices. Please use the following scale in answering these items.

12
3
4
Strongly Agree  
 Strongly Disagree      Disagree      Agree

Please be discriminating! The results will be more helpful if you think about each item as it pertains to your principal's leadership behaviors and practices only. Please answer all questions and complete the five background questions as well. Thank you for your time and input. Please use the attached Scantron sheet to record your answers.

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
1. Curriculum needs determine the type and frequency of mathematics staff development	1	2	3	4
2. The principal and staff together develop the school plan.	1	2	3	4
3. Teachers provide mathematics instruction using the mathematics instructional model (warm-up, guided practice, independent practice, and closure)	1	2	3	4
4. The school staff embraces the vision of the principal for school success.	1	2	3	4
5. Teachers facilitate interactive student discussions about mathematical concepts and process.	1	2	3	4
6. Teachers use mathematics assessment data to plan instruction.	1	2	3	4
7. The principal, not the district, makes hiring decisions.	1	2	3	4
8. The principal supports the discipline plan.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
9. Teachers address the individual mathematics needs of students.	1	2	3	4
10. Outside organizations support the school monetarily.	1	2	3	4
11. Teachers know what resources to use for students' social and educational needs.	1	2	3	4
12. Family members feel comfortable in the school.	1	2	3	4
13. The principal provides teachers with enough supplies, books, and materials to deliver instruction.	1	2	3	4
14. There is a feeling of respect among and between staff members and students.	1	2	3	4
15. Teachers focus on the state mathematics standards when teaching the curriculum.	1	2	3	4
16. The teachers are encouraged to give the principal input on the purchase of resources.	1	2	3	4
17. Most parents attend conferences concerning student progress.	1	2	3	4
18. Parents are seen frequently in the school.	1	2	3	4
19. Family members are encouraged to come to school.	1	2	3	4
20. Mathematics teachers in this school believe all children can learn.	1	2	3	4
21. Successes are celebrated frequently by the principal and teachers.	1	2	3	4
22. Leadership in the school is shared between the principal and teachers.	1	2	3	4
23. The internet is used for communication between school and home.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
24. Students in this school understand and follow the discipline plan for behavior.	1	2	3	4
25. The school vision sets the stage for how the staff proceeds with instruction.	1	2	3	4
26. After-school programs are well attended by parents.	1	2	3	4
27. The principal is seen frequently throughout the building.	1	2	3	4
28. Teachers are encouraged to participate in decision-making.	1	2	3	4
29. Community members volunteer at the school.	1	2	3	4
30. The principal understands good mathematics instruction.	1	2	3	4
31. Teachers frequently assess students on state mathematics standards.	1	2	3	4
32. The staff makes decisions with the principal concerning teaching and learning.	1	2	3	4
33. The principal manages funds to ensure the school has the best resources to teach the students.	1	2	3	4
34. There are uninterrupted blocks of time for mathematics instruction.	1	2	3	4
35. The teachers plan the mathematics program in collaboration with the principal.	1	2	3	4
36. The culture of the school is conducive to learning.	1	2	3	4
37. The school develops a plan to ensure all students are successful.	1	2	3	4
38. Teachers maintain a high level of student engagement in mathematics.	1	2	3	4
39. The principal visits classrooms frequently.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
40. Teachers in the school work for the success of all students.	1	2	3	4
41. The principal keeps the teacher-student ratio low.	1	2	3	4
42. The principal makes some academic decisions without the input of teachers.	1	2	3	4
43. Members of civic or social organizations volunteer in the school.	1	2	3	4
44. Teachers are leaders in the school.	1	2	3	4
45. The school forms partnerships with businesses.	1	2	3	4
46. The principal uses a variety of funding sources to sustain mathematics programs at the school.	1	2	3	4
47. The principal knows the names of the students.	1	2	3	4
48. The school is the center of the community.	1	2	3	4
49. Teachers help students make connections to prior knowledge in mathematics.	1	2	3	4
50. Most people in our school believe the principal is an ethical leader.	1	2	3	4
51. Teachers differentiate instruction to meet students' needs in mathematics.	1	2	3	4
52. There is a parent liaison to assist parents.	1	2	3	4
53. Most mathematics teachers participate in staff development.	1	2	3	4
54. The discipline plan for student behavior is effective.	1	2	3	4
55. A nurse on staff addresses the medical needs of students.	1	2	3	4
56. Teachers in our school are free to be risk-takers.	1	2	3	4

Survey Questions	1 = Strongly Disagree	2 = Disagree	3 = Agree	4 = Strongly Agree
57. The staff participates in the hiring process.	1	2	3	4
58. The mathematics curriculum is the focus of classroom instruction.	1	2	3	4
59. Teachers are honest with parents concerning student progress.	1	2	3	4
60. Mathematics instructional time is protected from interruptions.	1	2	3	4

Please provide the following background information:

61. Are you: A) Male\_\_\_\_ B) Female\_\_\_\_\_

62. How many years have you been in education, including the years at your current school?

1	2	3	4	5
0-5	6-10	11-15	16-20	21+

63. How many years have you been teaching at this school?

1	2	3	4	5
0-5	6-10	11-15	16-20	21+

64. Indicate your educational level

1	2	3	4
BA/BS	MA	MA+30	Doctorate

65. To what age group do you belong?

1	2	3	4
22-30	31-40	41-50	51+

## Appendix D

### Request for Participation in Focus Groups

**RECRUITMENT LETTER FOR PRINCIPALS (FOCUS GROUPS)**

Dear Participant:

As a doctoral student at the University of Maryland, I am currently involved in the dissertation segment of my program. I have designed a quantitative and qualitative research study. The purpose of my study is to examine the relationship between school leadership practices and middle school mathematics achievement. The means of collecting data will be interviews that will be audio taped and a survey. As a middle school principal, you are being requested to participate in a focus group for the study.

The researcher will ask participants to participate in focus group interviews of approximately one (1) hour in length. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris will serve as my external consultant and will conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.

All responses will be kept confidential, and the participants will not be identified by name. Participants will be referenced according to their positions. Only the members of my dissertation committee and I will have access to the records of information obtained directly from the interview. The benefit of participating in this study will help in the development of research regarding leadership practices of highly successful middle schools.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244, or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3590.

The results of this study will be provided in the form of an executive summary and made available to the institution and the participants upon request.

Signing below signifies that you will allow this researcher to complete the study.

Thank you for your consideration in this matter.

Nelson McLeod

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Signature and Position at Institution Date

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Name and Address of Institution

**RECRUITMENT LETTER FOR MATHEMATICS TEACHERS (FOCUS GROUPS)**

Dear Participant:

As a doctoral student at the University of Maryland, I am currently involved in the dissertation segment of my program. I have designed a quantitative and qualitative research study. The purpose of my study is to examine the relationship between school leadership practices and middle school mathematics achievement. The means of collecting data will be interviews that will be audio taped. As a mathematics teacher, you are being requested to participate in a focus group for the study.

The researcher will ask participants to participate in focus group interviews of approximately one (1) hour in length. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris will serve as my external consultant and conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.

All responses will be kept confidential, and the participants will not be identified by name. Participants will be referenced according to their positions. Only the members of my dissertation committee and I will have access to the records of information obtained directly from the interviews and the survey. The benefit of participating in this study will help in the development of research regarding leadership practices of highly successful middle schools.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244, or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3590.

The results of this study will be provided in the form of an executive summary and made available to the institution and the participants upon request.

Signing below signifies that you will allow this researcher to complete the study at your institution.

Thank you for your consideration in this matter.

Nelson McLeod

---

Signature and Position at Institution

Date

---

Name and Address of Institution

**RECRUITMENT LETTER FOR MATHEMATICS RESOURCE TEACHERS  
(FOCUS GROUPS)**

Dear Participant:

As a doctoral student at the University of Maryland, I am currently involved in the dissertation segment of my program. I have designed a quantitative and qualitative research study. The purpose of my study is to examine the relationship between school leadership practices and middle school mathematics achievement. The means of collecting data will be interviews that will be audio taped. As a mathematics resource teacher, you are being requested to participate in a focus group for the study.

The researcher will ask participants to participate in focus group interviews of approximately one (1) hour in length. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris, will serve as my external consultant, and conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.

All responses will be kept confidential, and the participants will not be identified by name. Participants will be referenced according to their positions. Only the members of my dissertation committee and I will have access to the records of information obtained directly from the interviews and the survey. The benefit of participating in this study will help in the development of research regarding leadership practices of highly successful middle schools.

If you have any questions or concerns about this study, you may contact me by calling 301-929-2244, or you may send me an e-mail at [nelson\\_mcleod@mcpsmd.org](mailto:nelson_mcleod@mcpsmd.org). You may also contact Dr. Carol Parham, chairperson of my committee, by directly calling the university at 301-405-3590.

The results of this study will be provided in the form of an executive summary and made available to the institution and the participants upon request.

Signing below signifies that you will allow this researcher to complete the study at your institution.

Thank you for your consideration in this matter.

Nelson McLeod

---

Signature and Position at Institution

Date

---

Name and Address of Institution

Appendix E

Informed Consent Form – Focus Groups

**CONSENT FORM – PRINCIPALS (focus group)**

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As a principal, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be asked to participate in focus group interviews. The research will ask participants to participate in focus group interviews of approximately one (1) hour in length. You will be asked 12 questions. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris, will serve as the external consultant, will conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.
<b>What about confidentiality?</b>	<p>We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. All responses will be kept confidential, and the participants will not be identified by name. Participants will be referenced according to their positions. Subjects will be asked not to discuss the group members' responses outside of the focus group.</p> <p>Only the student researcher will have access to the records of information obtained directly from the interviews. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.</p>
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals	
<b>Do I have to be in this research? May I stop participating at any time?</b>	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

## CONSENT FORM

### *Mathematics Resource Teacher (focus group)*

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As a mathematics resource teacher, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to participate in focus group interviews. The research will ask participants to participate in focus group interviews of approximately one (1) hour in length. You will be asked 12 questions. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris, will serve as the external consultant, will conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. All responses will be kept confidential, and the participants will not be identified by name. Subjects will be asked not to discuss the group members' responses outside of the focus group. Participants will be referenced according to their positions. Only the student researcher will have access to the records of information obtained directly from the interviews. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals	
<b>Do I have to be in this research? May I stop participating at any time?</b>	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

## CONSENT FORM

### Mathematics Teachers (focus group)

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project. As a mathematics teacher, you are familiar with middle school mathematics instruction. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to participate in focus group interviews. The research will ask participants to participate in focus group interviews of approximately one (1) hour in length. You will be asked 12 questions. These interviews will be scheduled at a time and location convenient to the participants. Dr. Mark Harris, will serve as the external consultant, will conduct the focus groups. He has been informed about the confidentiality procedures and consent requirements for all subjects.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect your confidentiality, all data will be secured at the office of the student researcher and access will be restricted to the researcher. All data will be destroyed one year after the completion of this dissertation. All responses will be kept confidential, and the participants will not be identified by name. Subjects will be asked not to discuss the group members' responses outside of the focus group. Participants will be referenced according to their positions. Only the student researcher will have access to the records of information obtained directly from the interviews. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<p><b>Do I have to be in this research?          May I stop participating at any time?</b></p>	<p>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p>	
<p><b>Statement of Age of Subject and Consent</b></p>	<p>Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.</p>	
<p><b>Signature and Date</b></p>	<p><b>NAME OF SUBJECT</b></p>	
	<p><b>SIGNATURE OF SUBJECT</b></p>	
	<p><b>DATE</b></p>	

## CONSENT FORM

### External Consultant (focus group)

<b>Project Title</b>	Exploring The Relationship Between School Leadership and Middle School Mathematics Achievement: An Examination of Leadership Practices Of Principals
<b>Why is this research being done?</b>	This is a research project being conducted by Nelson McLeod, Department of Educational Leadership and Policy, at the University of Maryland, College Park. We are inviting you to participate in this research project as an external consultant. The purpose of this research project is to examine the relationship between school leadership practices and middle school mathematics. As middle schools focus on meeting state standards, research is needed to identify which leadership practices will support schools in meeting mathematics standards.
<b>What will I be asked to do?</b>	You will be requested to conduct three focus group interviews. The research will ask subjects to participate in focus group interviews of approximately one (1) hour in length. The subjects who will participate in focus group interviews will be principals (approximately five individuals), mathematics resource teachers (about five individuals) and mathematics teachers (five individuals). You will ask each subject group 12 predetermined questions from focus group interview guide. These interviews will be scheduled at a time and location convenient to you and the subjects. You will be informed about the confidentiality procedures and consent requirements for all subjects.
<b>What about confidentiality?</b>	We will do our best to keep your personal information confidential. To help protect confidentiality of all subjects, all data will be secured at the office of the student researcher and access will be restricted to the researcher. Subjects will be asked not to discuss the group members' responses outside of the focus group. All data will be destroyed one year after the completion of this dissertation. All responses will be kept confidential, and the participants will not be identified by name. All interviews will be recorded. Participants will be referenced according to their positions. Only the student researcher will have access to the records of information obtained directly from the interviews. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
<b>What are the risks of this research?</b>	There are no known risks associated with participation in this research project.
<b>What are the benefits of this research?</b>	This research is not designed to help you personally, but the results may help the investigator learn more about which leadership practices will support schools in meeting state mathematics standards.

<p><b>Do I have to be in this research?          May I stop participating at any time?</b></p>	<p>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p>	
<p><b>Statement of Age of Subject and Consent</b></p>	<p>Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.</p>	
<p><b>Signature and Date</b></p>	<p><b>NAME OF SUBJECT</b></p>	
	<p><b>SIGNATURE OF SUBJECT</b></p>	
	<p><b>DATE</b></p>	

Appendix F  
Focus Group Questions

## Focus Group Questions

Group	Focus Area	Question
Principals	Vision	What is your vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Family and Community Involvement	In what ways do you create family and community involvement?
	Instructional Monitoring	What do you do to ensure teachers are teaching the mathematics curriculum and students are learning?  What are the daily curriculum and instructional issues faced daily by you?
Mathematics Resource Teachers	Vision	What is the vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Family and Community Involvement	In what ways do you support family and community involvement?
	Instructional Monitoring	In what ways do you collaborate with school leadership to identify, define and evaluate mathematics instructional goals to ensure consistency with county mathematics program?  What are the daily curriculum and instructional issues?

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Mathematics Teachers	Vision	What is the vision for the school and how does it influence your school culture?
	Collaboration and Shared Leadership	Describe collaboration and shared leadership in your school.
	Family and Community Involvement	In what ways do you support family and community involvement?
	Instructional Monitoring	How do you know you are teaching the mathematics curriculum and your students are learning?

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Appendix G  
Data Analysis Template

Data Analysis Template

	Schools That Met Mathematical Standards	Schools At Risk for Not Meeting Mathematical Standards
Vision		
Instructional Monitoring		

<b>Collaboration and Shared Leadership</b>		
<b>Family and Community Involvement</b>		

Appendix H  
Focus Group Moderator Guide

## FOCUS GROUP MODERATOR GUIDE

### Structured Questions:

#### **For the principal only:**

1. How long have you been the principal of this school?
2. What are the demographics of your school?
  - a) free and reduced-price lunch students (FARMS)
  - b) race/ethnicity
  - c) ESOL students
  - d) special education
3. What are your areas of certification in this state?
4. Please name the three most important things you do to ensure your students have met the standards in mathematics.

#### **For teachers only:**

1. What mathematics courses do you teach?
2. How long have you been teaching at this school?
3. What are your areas of certification in this state?
4. Please name the three most important things that happen in this school to ensure students have met the state standards in mathematics.

### Semistructured Questions:

#### **For Principals only:**

1. What is your vision for the school and how does it influence your school culture?

Prompts to use if necessary:

What is the shared vision?

What is the mission?

Do you have a mission statement and where is it displayed?

Describe your school culture

2. What do you do to ensure teachers are teaching the mathematics curriculum and students are learning?

Prompts:

State Assessments  
Use of curriculum  
Staff development  
Walkthroughs

3. Describe collaboration and shared leadership in your school

Prompts:

Decision making processes  
Who makes the decisions?

4. In what ways do you create family and community involvement?

Prompts:

Parent nights  
Parent training  
Volunteers  
PTA  
Baldrige School Improvement Team  
Partners with community

5. In what ways do you see yourself as an effective manager?

Prompts:

Obtaining resources for teaching  
Protecting time for teaching  
Student behavior

**For mathematics resource teachers only:**

1. In what ways do you model instructional strategies to support the implementation of the curriculum in mathematics classes?
2. In what ways do you collaborate with school leadership to identify, define and evaluate mathematics instructional goals to ensure consistency with county mathematics program.

**For mathematics teachers only:**

1. Describe the vision of the school.

Prompts:

The mission  
Culture  
Sharing the vision

2. How do you know you are teaching the mathematics curriculum and your students are learning?

Prompts

State assessments  
Staff development  
Assessment

3. Describe the collaboration and shared leadership in your school.

Prompts:

How are decisions made?  
Who makes the decisions?

4. In what ways do you create family and community involvement?

Prompts:

Parent nights  
Parent workshops  
Volunteers  
PTA  
Instructional Council  
Partnerships with the community

5. How is the principal an effective manager?

Prompts:

Obtaining resources for teaching  
Behavior management

*Unstructured Questions:*

1. What else do you need for me to know about ways you make students meet state standards?
2. Is there anything else I need to know about your school with regard to mathematics instruction?

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