ABSTRACT

Title of Document: AN INVESTIGATION OF THE FACTORS
                            THAT INFLUENCE REFORM
                            IMPLEMENTATION PRACTICES OF
                            MIDDLE SCHOOL MATHEMATICS
                            TEACHERS

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For over fifty years, researchers, politicians, policymakers, and educators have struggled with the issue of education reform. While these efforts have made some mark on the field of education, few, if any, have succeeded in changing the teaching and learning that goes on in classrooms at the level we would like to see. By studying a case where reform efforts are high and a case where reform efforts are minimal, researchers can better understand some of the key factors in implementing a reform initiative.

The purpose of this study was to describe the conditions under which educational reform can be implemented and sustained, and the conditions under which educational reform can be hindered and restrained. Specifically, this study sought to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement a comprehensive school reform program, the Baldrige in Education reform. In addition, this study sought to determine the impact of this reform implementation on student achievement in mathematics over time. This study used a mixed methods approach in order to fully investigate three questions: What factors

contribute to the variability of teachers' reform practices?; What is the impact of the Baldrige in Education reform initiative on schools' student achievement?; and What are some of the key factors that reportedly influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative

The results from analyses using hierarchical linear modeling indicated that one significant factor that influences teachers' implementation practices is whether or not they believe their students learn more as a result of the reform. Findings from analyses using ANCOVA in order to determine the impact of the reform on student achievement at the school level indicated that there was no impact on students' mathematics achievement (as measured by state standardized test scores) that could be attributed to Baldrige alone. A case study analysis of two middle schools revealed seven influential factors on teachers' reform practices. They included: Leadership; Accountability; Knowledge; Coherence; Time; Core Beliefs; and Perceived Behavioral Control.

AN INVESTIGATION OF THE FACTORS THAT INFLUENCE
REFORM IMPLEMENTATION PRACTICES
OF MIDDLE SCHOOL MATHEMATICS TEACHERS

By

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Dissertation submitted to the Faculty of the Graduate School of the
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DEDICATION

This work is dedicated to my parents, Robert and Karen Karch, who have been my role models for hard work, persistence, and personal sacrifice; and have instilled in me the importance of education, the inspiration to set high goals, and the confidence to achieve those goals.

This work is also dedicated to my three sons, Bobby, Charlie, and Tommy, each of which accompanied me during a unique piece of this doctoral study journey. The pride I take in this work pales in comparison to the pride I take in being their mother. I can only hope to be the kind of role model for them as my parents have been, and continue to be, for me.

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I give tremendous thanks to my parents who have helped me become the woman I am today. They both sent a strong message to my sister, Krista, and me that we could be anything we wanted with the combined power of education, hard work, integrity, and perseverance. Thank you for watching my children even when it wasn't convenient for you so that I could write; for cooking dinner for my family so that I didn't need to take time away from this project; for showing interest in this research when I'm sure you were tired of hearing about it; and for expressing how proud you are of me throughout every step of this program.

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CHAPTER ONE: INTRODUCTION

For over fifty years, researchers, politicians, policymakers, and educators have struggled with the issue of education reform. The various constituencies have approached the issue of education reform from many perspectives, including changing the curriculum, writing standards, passing legislation, creating new schools, mandating assessments, incorporating business practices, and revising the image of professional development. While all of these efforts have made some mark on the field of education, few, if any, of these efforts has succeeded in changing the teaching and learning that goes on in classrooms at the level the nation would like to see (Hatch, 2002; Silver, 1998; Tyack, 1995).

By studying a case where reform efforts are high and a case where reform efforts are minimal, researchers can better understand some of the key factors in implementing a reform initiative. The purpose of this study was to describe the conditions under which a comprehensive school reform can be implemented and sustained, and the conditions under which such an educational reform is hindered and restrained. Specifically, this study sought to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative. In addition, this study sought to determine the impact of this reform implementation on student achievement over time.

One area of particular interest was the issue of *coherence* among reform initiatives, and the role that coherence, or lack of coherence, plays in implementing reform initiatives. *Instructional program coherence* is defined as a set of inter-related

programs that are guided by a common framework for curriculum, instruction, assessment, and learning climate, and are pursued over a period of time (Newmann, Smith, Allensworth, & Byrk, 2001). This contrasts with a school system that adopts a wide variety of programs that are uncoordinated or limited. Darling-Hammond (1990) states, "Policies don't land in a vacuum. They land on top of other policies" (p. 346). When these policies make their way to the school door, often they are presented as fragmented, disjointed, and unrelated to a more comprehensive approach to school improvement. Through a mixed methods approach, it was my hope to better understand how a school's general reform efforts align with and influence mathematics education within the school in order to promote a more comprehensive, systemic reform initiative at the school level. By examining the interplay of general reform and mathematics reform practices, I hoped to gain insight into the factors that help and hinder the full implementation of reform initiatives.

Introduction to the Problem

The world was changed on October 4, 1957, when an object the size of a basketball was successfully launched into space by the Soviet Union. The Russians' successful launching of Sputnik I, the world's first artificial satellite, and then Sputnik II one month later, not only signaled Russia's advancement in science and technology, but it also caused the United States to perceive itself as "scientifically, technologically, militarily, and economically weak" (Bybee, 1997, p. 1). This event, lasting just over an hour and a half, marked the start of America's on-going, increasingly intense concern with maintaining its top ranking status as the dominant world power in the international arena.

The intense debate about America's standing that followed the Sputnik launch opened the door to major educational reform. While there had been growing disenchantment with the mathematics curriculum in the United States at that time (Usiskin, 1999), Sputnik made clear to the American public that it was of national interest to improve education, specifically in mathematics and science. Although they had previously opposed federal aid to schools for fear that federal funding would lead to federal control, the public required a change in American education (Bybee, 1997). In response, congress passed the *National Defense Education Act* (NDEA, 1958) in 1958, which provided aid to education in the United States at all levels, public and private. While it provided funding for technology education, counseling, and media center development, NDEA's primary purpose was to stimulate the advancement of education in science, mathematics, and foreign language.

However, this piece of legislation was only the beginning of what would become increasingly larger investments in education by the federal government in an attempt to improve the quality of the education system and ensure our position in the growing global economy. Specifically, the *Elementary and Secondary Education Act* (ESEA, 1965), which was passed in 1965, provided substantial monetary funds for kindergarten through twelfth grade education. This piece of legislation, also known as Title I, allocated one billion dollars a year to schools with a high concentration of low-income children. This was the beginning of Head Start, Follow-Through, Bilingual Education, and a variety of guidance and counseling programs. As a result of this sweeping, comprehensive legislation, the flood gates opened with respect to the creation of additional legislation, programs, and reform initiatives in education.

To improve the quality of the United States' education system, politicians, scholars, and reformers continued to pass legislation, create and implement reform programs, and start new initiatives specifically targeted at mathematics and science. The educational reform movement that began in 1957 only intensified with each passing decade and thrives in our present culture. The *No Child Left Behind* (NCLB) legislation, which reauthorizes ESEA, targets over $11 billion in financial assistance to schools for educating low-income students. ESEA allocates almost another $10 billion for teacher recruitment and professional development, educational technology, after-school programs, and other purposes. Funding from the federal government as well as many other non-profit and private organizations is available for education reformers who want to create and implement new programs. As Stigler and Hiebert (1999) state in their book, *The Teaching Gap*, "We are witnessing a tidal wave of educational reform that seems to gain momentum with each passing year "(p. 1). With this tidal wave of reform initiatives, educators have seen various reforms come in and out of style. This swinging of the initiative pendulum, as it is sometimes called, has now become commonplace in America's schools.

The statistics on schools participating in some form of reform movement show that the instability in education reform has not served as a deterrent for engaging in reform initiatives. A survey of schools across the country indicated that up to 63% of all schools were engaged in three or more simultaneous improvement initiatives at the time of the study, and up to 27% of schools indicated they were involved in as many as six reform initiatives at one time (Hatch, 1998). According to Marshall (1996),

If 'school reform' is a bandwagon, then the parade is still in progress. In the worst case, the continuing accumulation of school reform efforts is understood as succeeding waves of perpetual hassle and silliness which disturb the basic soundness of business-as-usual. In the best case, such efforts become a representation of participants' commitment to the repetitive nature of the learning process: desiring to know and understand - acting upon these desires - making sense of and reflecting upon those actions - identifying new or different desires to know and understand. (p.1)

These various reform efforts have been initiated from different interest groups. One increasingly powerful influence on school reform is the business world. According to a report on partnership trends, Larson (2001) states, "At local, state, and national levels, the business community has been looking over education's shoulder in recent years and has become more of a presence in the meeting rooms of boards of education and in the classrooms of schools across the country" (p. 3). Clearly, reform efforts within schools are alive and abundant.

While there are many approaches to reform initiatives, each approach reflects one or more of three broad perspectives taken from the research literature on the change process (Chin & Benne, 1969). In 1981, these classic perspectives were modified by House (1981) to better fit the changes that occur in education systems. These three perspectives are: the rational-scientific perspective; the political or coercive perspective; and the normative, cultural perspective. Sashkin and Egermeier (1993) use House's three perspectives as a backdrop for their four strategies for change: Fix the Parts; Fix the

People; Fix the School; and Fix the System. The following paragraphs describe each of these change perspectives and strategies.

Rational-Scientific/Fix the Parts and Fix the People Perspective

From the Sputnik launches to the 1970s, the rational-scientific perspective dominated reform initiatives. The strategy of what Sashkin and Egermeier (1993) call *fixing the parts* and *fixing the people* involves improvement by adopting various innovations in curriculum and instruction. Curriculum reform and pedagogical reform are two major examples of the rational-scientific perspective. By focusing on training and development, the emphasis of the reform shifts to *fixing the people*. This perspective assumes that people accept and use information that has proven effective in improving education.

Political/Coercive/Fix the People Perspective

The political/coercive approach relies on influencing individuals and systems to change through legislation and external leverage where power of various types is the dominant factor. While serving as a major influence over each of the decades, the political perspective was especially influential during the 1980s. This time period is marked with numerous educational task forces whose purpose was to create public accounts of the state of the public schools in order to drive legislative mandates for education. This perspective aligns with Sashkin and Egermeier's strategy of *Fix the People*. The underlying premise was that it was possible to force educators through legislation to behave accordingly. This use of force was intended to help shape the decisions, values, and actions of the people in public education. The use of policy in order to drive reform became dominant during this time period.

Cultural /Normative /Fix the School Perspective

The cultural perspective focuses on meanings and values within the organization as it is undergoing change. It represents a bottom-up approach to reform, and can be described as the strategy Sashkin and Egermeier (1993) call *fixing the school*. Changes occur in organizations as a result of leaders transforming their buildings and the programs that exist there. This perspective became popular in the late 1980s and was carried into the 1990s. During this time, terms such as *facilitative leadership* and tr*ansformational leadership* became mainstream buzzwords within school systems across the country. The underlying premise behind this perspective is that individuals are not passive recipients to change. Instead, they must play an active role in the reform in order to advance performance.

Despite the reform efforts from each of the three perspectives, there has been little evidence to suggest that any of these reforms have made the impact for which reformers and the public had hoped. And, despite the demand for increased quality in education, sustainable reform has been difficult to achieve. Research suggests that even when reform efforts have been successful, they are seldom sustained, resulting in fragmentation of improvement that undermines the capacity for continual improvement (Hatch, 2002). In fact, evidence has shown that education reform initiatives have not demonstrated the systemic transformational change that is needed on a large scale to bring about improvement in student achievement. According to Hatch (1998):

> The reports have been written; the crises have been declared. In response,
> we have struggled to professionalize teaching, to restructure schools, and
> to promote change in every aspect of schooling. Numerous individuals and

organizations have attempted to develop new models for schooling, hundreds of committees have established new standards, and thousands of schools have developed shared decision making, new missions, and common visions. Despite the efforts of many dedicated individuals and groups, and despite occasional successes, the fact remains that reform efforts in education are often fragmentary and uncoordinated. (p. 518)

Jeremy Kilpatrick, in the National Research Council's report *Adding it Up* (2001) states, "One area in which the research evidence is consistent and compelling concerns weaknesses in the mathematical performance of U.S. students" (p. 4). He continues by saying, "Since the early 1970s, a series of national and international assessments have provided a reasonably consistent picture of U.S. students' achievement in mathematics. Student performance at each of the grade levels assessed is considerably below what mathematics teachers and the public would prefer" (p. 55). Not only is this because the public wants its children to perform well, but also because of the phenomenal resources that have been spent on increasing student achievement.

Since 1965, it is estimated that over $321 billion in federal money have been spent on efforts to improve public education, yet in 2005, the percentage of students performing at or above grade level in mathematics was 36 percent at grade four and 30 percent at grade eight (*The Nation's Report Card,* Mathematics 2005). Student achievement data such as this is no secret. According to Stigler and Hiebert (1999), "Bad news from international comparisons of student achievement is no longer seen as esoteric by the American public; these days it is on the front page and a linchpin of many politicians' stump speeches" (p. 1). Stigler and Hiebert continue:

Even though every state in the country is working to develop higher standards for what students should be learning…the quick fix solutions implemented so far haven't had a noticeable impact. The problem is that most efforts to improve education fail because they simply don't have any impact on the quality of teaching inside the classroom. Teachers are not incompetent. Instead, they are severely limited, and American teaching has no system in place for getting better. Teaching is a *system*. It is not a loose mixture of individual features thrown together by the teacher. It works more like a machine with the parts working together and reinforcing one another. (p. 75)

Other mathematics educators have also written about needing a total systemic initiative in order to improve the state of mathematics education and the educational system as a whole. Jeremy Kilpatrick (2001) acknowledges this when he says, "The U.S. system of school mathematics cannot be made to operate better by fixing one tiny piece at a time; it requires a thorough, methodical overhaul" (p. 58).

In their synthesis of the literature on educational reform, Sashkin and Egermeier (1993) propose an emerging fourth perspective on school reform that addresses the growing movement toward systemic reform. While they recognize that the first three perspectives have seen little success, they state that examining the limited success of those methods can contribute to the effectiveness of a fourth, and most recent approach, which they call *fix the system*.

Fix the System Perspective

The new shift of *fixing the system* involves restructuring the entire educational system, from the state department to the district to the school building. Often labeled as *comprehensive school reform*, or *whole school reform*, this idea of fixing the system evolved in the early 1990s and has since dominated the literature on new and promising reform strategies. Today, it has become a dominant perspective of major school reform and reflects current approaches in the business sector. As stated in a research brief published by the Center for Comprehensive School Reform and Improvement (2005),

> Instead of add-on programs, what are needed now are whole-school reforms that greatly build the instructional capacity of schools to educate all students to much higher levels, focusing primarily on teachers and their ability to deliver high-quality, effective instruction inside the classroom. We must begin to view improvement as a continuous institutional process rather than as a sporadic set of activities or isolated projects. (Jerald, p. 4)

One model of comprehensive school reform that many schools across the country are using to improve the quality of their educational program and increase student achievement is the Baldrige in Education Criteria.

The Baldrige in Education Criteria has its roots in the business sector and stems from Deming's total quality management philosophies that were popular after World War II. These total quality principles became popular in the 1980s under President Reagan and his Secretary of Commerce, Malcolm Baldrige. In 1987, Reagan signed the *Baldrige National Quality Improvement Act*, providing for recognition of quality improvements

among manufacturing, services, and small businesses. This legislation specifically addressed strategic planning for quality improvement programs in business and industry. It advocated a systems approach to a systems problem. Each year, businesses across the country complete the application process and compete to win the Malcolm Baldrige National Quality Award. Used by corporate giants such as Motorola, IBM, Xerox, Honeywell, and Baxter Corning the Baldrige Criteria for Excellence has been called "one of the best kept secrets of the corporate world" (Hutton, 2000). It serves as "the defining framework for quality" and includes everything "necessary and sufficient for effective organizational practice" (Hooper, 2004, p. 24). The Baldrige program has been heralded by governments, major corporations, and business media as "the most effective and elegant way out of economic crisis and into the global market" (Giroux & Landry, 1998, p.183).

In 1999, President Clinton expanded the Baldrige program to include health care and education. The Baldrige in Education Initiative, which included six states, began implementing the Baldrige Criteria in school systems and universities across the country. Their stated aim was to transform K-16 education into a high performing system. Today, all but two states in the country have adopted a customized version of the Baldrige Criteria and Total Quality Award for Education. School districts across the country have adopted this comprehensive reform initiative taken from the business sector and have applied it to quality school improvement efforts (NIST, 2005).

While there are numerous anecdotal accounts of Baldrige in Education's success and failure, and several case studies conducted on changes in leadership due to Baldrige in Education, there have been no studies focusing on the factors that influence the

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implementation of Baldrige in Education, and few studies conducted on teachers' level of implementation, teachers' concerns, and the impact of Baldrige on student achievement as measured by state assessments over time. Key weaknesses in the studies that do exist include "failure to provide any evidence of process change, positive trend data, or any school comparisons. With faculty and staff training a key element in Baldrige, little evidence of improved staff development is reported with sufficient detail" (Noeth & Walpole, p. 74).

With so many education systems participating in such a wide reaching reform initiative, it is of fundamental importance to study not only the factors that influence the implementation of Baldrige in Education, but also the impact of this reform on student achievement. What factors help or hinder an education reform, and more specifically mathematics education reform, in taking hold? What is the impact of this reform on student achievement? These are the overarching questions this study sought to answer.

Statement of the Problem

School districts across the country have readily embraced the Baldrige in Education Quality Reform Initiative. However, while there are many anecdotal reports on the professed improvements in schools and school districts that have implemented the Baldrige in Education reform initiative, there is an absence of data on the conditions under which successful implementation of this reform initiative can occur, and an absence of data as it relates to the factors that influence teachers' implementation of this reform.

Purpose of the Study

The purpose of this study was to describe the conditions under which educational reform can be implemented and sustained, and the conditions under which educational reform can be hindered and restrained. Specifically, this study sought to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative. In addition, this study sought to determine the impact of this reform implementation on student mathematics achievement over time.

Research Questions

The following research questions were the focus of this study:

1. What factors contribute to the variability of teachers' reform practices?

   a. What factors contribute significantly to the variability of teacher implementation levels of the Baldrige in Education reform initiative?

   b. What factors contribute significantly to the variability of teacher concerns about the Baldrige in Education reform initiative?

   c. What factors contribute significantly to the variability of teachers' beliefs that they are better teachers because of the Baldrige in Education reform initiative?

   d. What factors contribute significantly to the variability of teachers' beliefs that students learn more as a result of the Baldrige in Education reform initiative?

2. What is the impact of the Baldrige in Education reform initiative on schools' student achievement in mathematics?

   a. Does mathematics achievement differ over years of implementation of the Baldrige in Education reform initiative?

   b. Does mathematics achievement differ by cohort?

   c. Does the effect of years of implementation of the Baldrige in Education reform initiative on schools' students' mathematics achievement depend on which cohort a school is assigned?

3. What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative?

Definition of Terms and Limitations

The following definition of terms and limitations are included to clarify understanding with respect to this study.

Definition of Terms

Baldrige Education Criteria for Performance Excellence: A set of criteria designed by the Baldrige National Quality Program to assist organizations in developing an integrated approach to organizational performance management. The United States Department of Commerce oversees the Baldrige Quality Program and the Award.

Instructional Program Coherence: a set of inter-related programs that are guided by a common framework for curriculum, instruction, assessment, and learning climate, and are pursued over a period of time (Newmann, Smith, Allensworth, & Byrk, 2001).

<u>Educational Load</u>: A school's poverty rate as determined by the percent of students currently or ever in the past receiving free or reduced meal services.

<u>Cohort</u>: The number assigned to each group of schools which determines when a school began the reform initiative and thus the length of the school's involvement in Baldrige.

Limitations

The following have been identified as limitations to this study:

1. The scope of this study was limited to middle schools within one school district that have implemented the Baldrige reform initiative for a minimum of two years.

2. This study on level of participation was limited to the perceptions of the administration, staff development teacher, and the mathematics teachers in these schools.

3. The standardized test data used in this study was limited to the percent of students meeting standard in mathematics for each school.

4. Data was gathered post-implementation. Therefore no pre-test data on teacher beliefs was available.

Significance

This study hoped to expand upon the body of research of school reform by shedding light on the conditions under which implementation of a reform initiative, specifically Baldrige in Education, can be fostered or hindered. By learning more about the factors that contribute to education reform taking hold and the influence general reform can have on mathematics teaching and learning, researchers and mathematics

educators are better able to implement future reform initiatives in productive and

meaningful ways.

By studying the impact of this reform on teachers and on student achievement,

this research project contributes to the growing literature about the Baldrige in Education

reform initiative and its impact on students' learning.

CHAPTER TWO: REVIEW OF THE LITERATURE

The purpose of this study is to describe the conditions under which educational reform can be implemented and sustained. Specifically, this study seeks to identify the key reform implementation practices of middle schools and the mathematics teachers within those schools as they implement the Baldrige in Education reform initiative. In addition, this study seeks to identify some of the key drivers and restrainers in implementing this reform initiative in middle school mathematics classrooms.

The literature review for this study follows a conceptual framework (Figure 1) that begins with the examination of the historical context of education reform. The lack of significant progress in reform efforts provided the catalyst for parallel reform movements – reform movements that were specific to mathematics education; and reform movements that sought to improve schools on the whole. Within the mathematics education reform movement, several cycles of reform have taken place. This review of the literature will briefly address those, as well as describe the general focus and goals of the NCTM Standards and mathematics reform initiatives today. Within the school reform movement, a series of failed attempts to change schools led to the Effective Schools Movement, which paved the way for "whole school" reform, also known as the Comprehensive School Reform Movement. In the late 1990s, Baldrige in Education, a quality initiative that started in the business arena, became a popular comprehensive reform program that schools adopted in order to improve student performance and school effectiveness. This literature review will address how this sequence of movements led to what we know about the drivers, restrainers, and factors in implementing reform. What

follows is a discussion on the importance of coherence. An overview of how assessing

teacher concerns can help to identify and address some of the barriers to reform

implementation will conclude this review of the literature.

Figure 1: Conceptual Framework
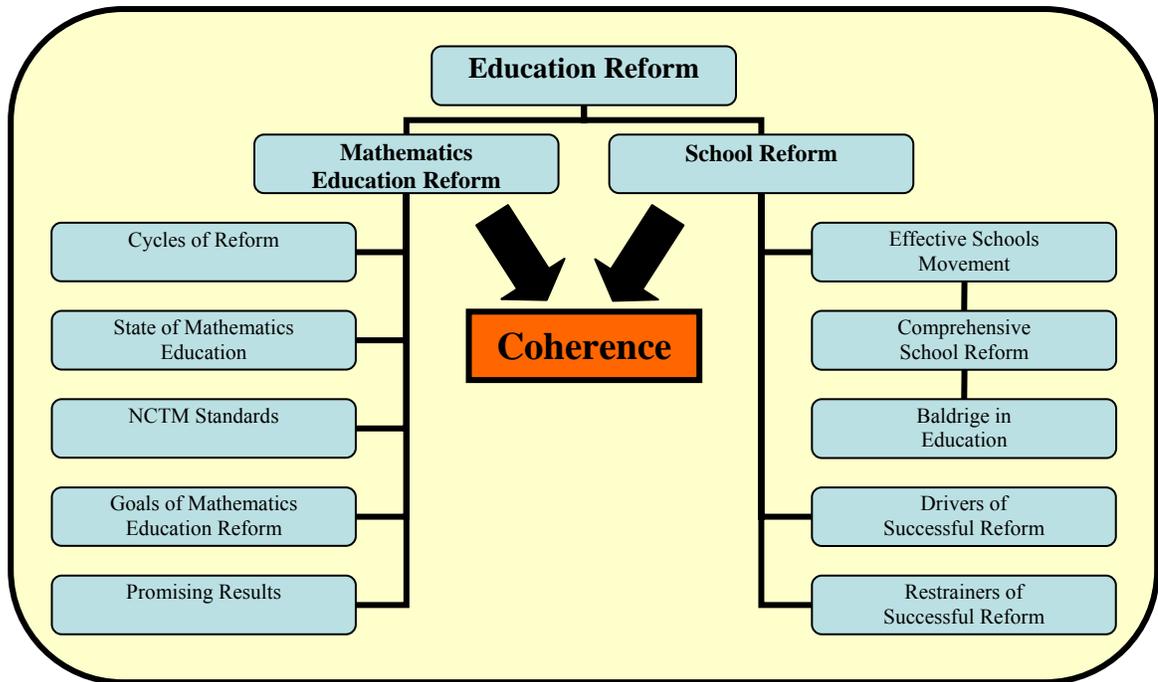
Education Reform

Education reform has been in existence since the beginning of education (Tyack

& Cuban, 1997). Policymakers and the general public have been involved in reforming

education since the one-room school house. However, since the 1950s, this involvement

has increased at a faster and unprecedented rate than ever before. After the launching of

Sputnik, Congress looked to the schools for improving our nation's global

competitiveness. The 1960s became known for the massive curriculum reform

movements that occurred during that time. The era of accountability came during the

1970s after so much innovation during the decade before. In 1983, *A Nation at Risk*

rocked the nation with the identification of deficiencies in public education. This resulted in the second outpouring of school reform initiatives aimed at improving student achievement. This marked the start of the *Excellence Movement*.

The 1983 report was a catalyst for three events took place in the 1980s that are of importance to this study. While the phrase *Excellence Movement* is usually used to describe the trends in education during this time period, the idea of excellence in competition with the world permeated every aspect of the United States economy. Driven by the need to improve, in 1987, President Ronald Reagan signed the *Malcolm Baldrige National Quality Improvement Act*. This provided a framework for businesses to help improve their quality and productivity. This movement toward competition for quality organizations would eventually impact the fields of health and education in 1999 when President Clinton expanded the Baldrige Criteria.

The second event of the 1980s that has direct relevance to this study was the first meeting of the directors of the National Council of Teachers of Mathematics (NCTM) in 1986 for the purpose of writing a reform document that would become known as the NCTM *Standards* document, published in 1989. This event marked the start of an organized vision for mathematics education reform. According to Wu (1997), "The NCTM *Standards* are the reform" (p. 12).

The third event of the 1980s that has direct relevance to this study took place in 1989 when President George Bush called the governors to a summit on education. From that meeting emerged *America 2000*, which then became known as *Goals 2000* in 1994 under President Clinton. This legislative movement continued the drive for whole-school reform in order to meet the rigorous academic goals for all students.

These three events led to the evolution of Baldrige in Education as a reform

model that provides the framework for whole school change being implemented in

thousands of schools across the country, and the parallel reform movement in

mathematics education which has also resulted in the implementation of new

mathematics methods and approaches in thousands of classrooms across the country.

This study seeks to examine the interplay of these two parallel reform movements at the

school level by gaining insight into the drivers and restrainers in implementing reform

initiatives at six individual middle schools.

<div align="center">Mathematics Education Reform</div>

Performance in mathematics is often used as the basis for measuring the quality of

teaching and learning of all subjects in a school. While there was growing discontent with

the state of mathematics education before the 1950s, the Sputnik launch drew national

attention to students' mathematics performance. After 1957, the public started to take a

close look at the state of mathematics education in the United States. New curriculum

was developed, legislation was passed, and special interest groups formed in order to

research best practices in mathematics education so that student performance could

champion that of other countries. What intensified after 1957 became the start of the

cycles of mathematics reform.

Cycles of Reform

Just as themes in general education have gone through many cycles of reform,

mathematics education has endured its share of pendulum swinging too (Figure 2).

Starting in the 1930s, emphasis was placed on practical problems and reasoning. In the

1940s and 1950s, there was increased importance placed on basic skills. The 1960s saw

new curriculum movements that embraced problem solving. This was the New Math movement. After such a vibrant movement, the pendulum swung back to basic skills in the 1970s. After the release of the NCTM Standards in the late 1980s, education saw the push again for emphasis on problem solving. Today, we are seeing a push for the best of both – that all students be able to solve challenging problems and perform the computations necessary to solve them.

Figure 2 Parallel Cycles of Reform

1960s	1970s	1980s	1990s	2000s
Opportunity Educating Top Students	Opportunity Educating Students at the Bottom	Opportunity Educating Gifted Students	Opportunity Raising Standards for Lowest Students	Opportunity Raising Standards for All Students
Instruction Teaching by Discovery	Instruction Behavioral Objectives	Instruction Student Centered	Instruction Specific Objectives	Instruction Specific Standards
Curriculum New Math Content-based	Curriculum Basic Skills	Curriculum Problem Solving, NCTM Standards	Curriculum Basic Skills	Curriculum Problem Solving, Computation

In his speech on the stages of change, Usiskin (1999) outlines eleven stages of change that reforms go through before they "fail" to last. A brief summary of the eleven stages is provided here.

Stage One: Work by the Pioneers

Work by the pioneers consists of a small group of people that develops the school of thought and works on the change. This work in only known to a small group of people.

Stage Two: Proselytizing of and by the Apostles

The apostles are the first people to use the reform.

Stage Three: Use by those disenchanted with the Old

Because of a growing disenchantment of the status quo, people seek new methods.

Stage Four: Acceptance by the Establishment

The reform movement becomes in vogue. Reports are written, presentations are given at conferences, and endorsements come from various establishments. The reform at this stage is available to anyone who wants it.

Stage Five: Joining by the Piggybackers

Many people join the movement, whether they agree with it or not. No one wants to be behind the times, so they "agree" with the ideas presented in the reform. By "agreeing" to the movement, teachers are able to get jobs and curriculum writers could get money.

Stage Six: Forcing of the Enchanted

There are always those people who are against the change. At this stage of change, those people are forced into accepting the new reform. Teachers that feel coerced into adopting these reforms do so unwillingly and are most likely to give up the new reform at the first chance.

Stage Seven: Oversimplification and Overapplication of the Change

Many mathematics reforms took years to create, learn, recreate, and practice. Those who were involved in the reform from the beginning had opportunities to do this. However, for those teachers who are unwilling or are just joining the reform movement, they don't have time to go through the entire development of the approach. Therefore, materials become over-simplified in an attempt to make them more accessible. Attempts are made to minimize the amount of change that is necessary in order to adopt the reform. In addition, at this stage, it becomes a natural human tendency to feel that if something works well for some people, it should work for many more. The reform becomes a solution to many more problems than what was originally intended.

Stage Eight: Failure of the Oversimplified and Overlapped Theory

At this stage, with over-simplified materials being used by many people, some of whom were coerced into the movement, using the materials to solve problems that were beyond the scope of the original reform, failure becomes inevitable. According to Usiskin (1999), "No reform is a panacea, but in order to institute reform those who are in favor make all sorts of claims for it, and they raise expectations. When those expectations are not met, the public — always skeptical of reform in mathematics — starts to perceive that the reform, just like the mathematics they took in schools, is not successful. So the public perception is of failure even if the overall situation is for the better" (p. 3).

Stage Nine: Test Scores that do not Bear out People's Desires

News reports surface about the poor performance of students on local, state, national, and international tests. This is a public signal that the state of mathematics education is not how we would like it to be.

Stage Ten: Public Perception of the Failure of Change

Once the public perceives the failure of change, the outcry for new change cannot be ignored. The public usually demands for things to return to the way things "used to be." At this stage, the pendulum starts to swing back to the era before, and at the same time swing forward to yet a new era.

Stage Eleven: Fatigue of the Establishment

Once the reform has run its course, the establishment moves on with a new change. Yet the experience of moving through a "failed" reform builds resentment toward future change.

When people talk of failed reforms, they fail to recognize that even when reforms fade from the popular arena, the reform initiative leaves its mark on classrooms. According to Tyack and Cuban (1995), when changes do occur, they tend to be incremental, adding to the existing mode of schooling rather than altering it. Classrooms become a compilation of pieces of reform practices from different eras.

As part of this study, my research seeks to gain insight into this phenomenon and the factors that help to contribute to and limit its impact on reform efforts. Usiskin's framework of stages of change in mathematics education reform has given me the background knowledge in order to place schools along the continuum of the implementation cycle. Specifically, while it will be relatively easy to identify reform practices in high implementation schools, it will be considerably more difficult to look for reform practices in low implementation schools. Tyack and Cuban's argument that

classrooms can be a compilation of pieces of reform practices is something I will use during my interviews.

The State of Mathematics Education

Even today, the accepted public perception of students in the United States is that our nation's students are not the mathematical thinkers and problem solvers they should be (Wu, 2007; Klein, 2005). National and international assessments of students' mathematics achievement yield the same distressing results: U.S. students fail to demonstrate the depth of knowledge, ability to reason and problem solve, and skill mastery that are expected of mathematically proficient students (Dossey, Mullis, & Jones, 1993; Schmidt, McKnight, & Raizen, 1997; Silver, 1998).

Examination of educational practices in the United States and other countries suggests that the source of this failure resides primarily in chronically low expectations for students and in approaches to curriculum and instruction that fail to yield active and independent mathematical thinkers (Stevenson & Stigler, 1993; Stigler & Hiebert, 1999). Teachers spend significant instructional time each year reviewing and reteaching topics from previous years. By eighth grade, students are still studying topics that students in other countries had finished studying as seventh graders (U.S. Department of Education, 1997).

However, recent trends in students' mathematics performance on international assessments show positive gains for U.S. students in both mathematics and science. According to the Trends in International Mathematics and Science Study 2003 (IEA, 2003), America's fourth- and eighth-grade students significantly outperformed many of their international peers, scoring well above the international average in both

mathematics and science. In addition, U.S. eighth-graders improved their scores compared to previous years, with gains across most student groups, including boys, girls, and minority students. Recent positive trends also indicate improvement in key areas such as closing the achievement gap between white and Asian students and African American and Hispanic students. Recent performance trends indicate that African American fourth-graders in the United States demonstrated an improvement in average mathematics achievement between 1995 and 2003. As a result, the gap in average scores between White and African American fourth-grade students narrowed, from 84 score points in 1995 to 69 score points in 2003. Also, according to the 2003 TIMSS results, eighth-grade boys and girls both showed improvement in mathematics compared to 1995. The United States was only one of five countries to show such improvement. Also at eighth grade, African American and Hispanic students demonstrated improvement in mathematics achievement during this time. As a result of this improvement, the achievement gap in average scores between White and African American eighth-graders narrowed.

Leaders and educators have realized that in order to continue the improvement of students' mathematics achievement, they must closely examine and make changes to what mathematics students learn and the way they learn it. As a result of this realization, the NCTM Standards documents evolved.

NCTM Standards

With the release of *Curriculum and Evaluation Standards for School Mathematics* in 1989, the National Council of Teachers of Mathematics (NCTM) moved to the forefront of efforts to improve mathematics education in the United States. The document

marked a historically important first step by a professional organization to articulate

extensive goals for teachers and policymakers in a school discipline. These goals

included increased emphasis on the learning of statistics, probability, and discrete

mathematics; increased attention to authentic applications of concepts; solving open-

ended problems using technology such as calculators and other computer technologies;

developing mathematical habits of mind; and integrating content strands instead of

teaching a collection of disjointed topics. In 2000, NCTM released the *Principles and*

Standards of School Mathematics, an updated and revised version of the 1989 document,

and continues today to be an influential force in mathematics education reform.

 According to Wu (1997), the *Standards* "gave the reform a voice and an identity"

(p. 12). The *Standards* promoted high quality mathematics curriculum, instruction, and

assessment for **all** [emphasis is the author's] students. The *Standards* have provided

focus, coherence, and new ideas to mathematics education.

Goals of Mathematics Education Reform

 The 1989 and 2000 NCTM *Standards* provided and articulated visions of school

mathematics across the various communities of education reform. These visions became

the focal point of mathematics reform and provided an avenue for different stakeholder

groups to unite in a common purpose. While not all leaders and educators agreed with the

direction and vision of the *Standards* (1989) or later, *Principles and Standards* (2000),

few could argue that they provided the mathematics reform community a voice and a

common direction. This document clearly articulated the goals of the mathematics reform

movement of the 1990s.

One important goal of the mathematics reform movement is that educators provide students with the opportunity to study challenging and coherent mathematics that emphasizes conceptual understanding, problem-solving capability, skill mastery, and competence in communicating mathematical ideas. A second goal is that educators must also provide students with the opportunity to develop higher order mathematical skills by investigating mathematics, making and testing conjectures, and learning to develop convincing arguments and proof. A third goal of the mathematics reform movement is to provide meaningful, rigorous mathematics instruction to all students, not just those that traditionally had been chosen for more comprehensive course work. For the first time, there was a clear expectation that all students would be expected to learn algebra, geometry, and other key conceptual ideas, starting in the elementary school. The integration of technology, hands-on materials, and problem-solving activities was an expectation of all teachers.

Additional publications of *Standards* stressed the importance of teachers' mathematical content knowledge, processes, and assessment practices. These documents outline the essential understandings teachers must have in order to provide quality mathematics instruction. These documents stemmed discussions at universities and teacher preparation programs across the country as these organizations examined how they prepared teachers for the field of education, and how they could improve their programs based on these criteria.

Reforming mathematics education in these ways involves changes throughout the education system. Schools and districts need to set clear goals and high expectations for achievement and apply these goals to all students (Mitchell & Willis, 1995; NCTM,

2000). They must plan a rigorous and challenging curriculum to meet these goals; adopting materials that address mathematical topics in greater depth and that are effective with diverse groups of students (NCTM 2000). The role of professional development has become essential to ensure that teachers are well-prepared to teach the more demanding mathematical content of the curriculum with a variety of instructional approaches that will engage students in learning to become mathematical thinkers and problem solvers (Fennema & Nelson, 1997; Ma, 1999; Stigler & Hiebert, 1999).

It is the NCTM *Standards* that are driving much of the current reform movement in mathematics education. They articulate a rationale for new approaches to mathematics teaching and learning and expectations for mathematical proficiency and make recommendations about curriculum content, instructional approaches, and assessment (NCTM 1989, 1991, 1995, 2000).

Promising Results

According to Swafford (2003), "there is considerable evidence that the promises of reform mathematics are real and the fears of the anti-reformers unjustified" (p.123). Researchers have spent significant time comparing mathematics achievement of those students involved in reform curriculum and practices with those students in more traditional mathematics education settings. Hiebert (2003) found that "students in alternative programs implemented with fidelity for reasonable lengths of time have learned more and learned more deeply than in traditional programs" (p. 20). Both conceptual and procedural understanding has been scrutinized as well. Schoenfeld (2002) concluded that "on tests of conceptual understanding and problem solving, students who learn from reform curricula consistently outperform students who learn from traditional

curricula by a wide margin. On tests of basic skills, there are generally no significant differences between students who learn from traditional or reform curricula" (p.15).

Even though the mathematics teachers in the school district in which the study was conducted were teaching from a relatively more traditional book and not from one of the reform curricula, this study seeks to gain insight into how the mathematics reform efforts play a role in middle school mathematics classrooms, and how the Baldrige reform initiative interacts with the mathematics reform initiatives.

School Reform

In an interview with writer John O'Neil, researcher and historian Larry Cuban describes school reforms as products of the cultural, political, and economic forces of their time (O'Neil, 2000). He explains that schools are extremely vulnerable to pressures from different constituencies, and this vulnerability is what contributes to the fast-paced changes in reform initiatives. While some researchers have characterized reform efforts like a pendulum swinging from one fad to the next (Slavin, 1989), Cuban and Tyack (1995) use the metaphor of fireflies to illustrate the ways in which changes or reforms frequently appear, shine brightly for a few moments, and then disappear.

The latter half of the 20th Century has been marked by recurring efforts of school reform and improvement in the United States. In an attempt to make sense of the multitude of reform initiatives over the last fifty years, researchers have created categories, looked for patterns, and developed themes to help make sense of this ever-growing field of research.

Little (1993) describes five streams of reform that present complex challenges for teachers. Little's five streams include: 1. reforms in subject matter and teaching; 2.

reforms centered on problems of equity among diverse student populations; 3. reforms in the nature and use of assessment; 4. reforms in social organizations of schools; and 5. reforms in the professionalization of teaching. She explains that these challenges are further complicated and systemic change is undermined when leaders attempt to reduce conceptual and practical complexities in the interest of fast-paced implementation (Little, 1993). Little's conclusions are essential to this study. One key element of this study is to look at the interplay of two large reform movements at the middle school level, and to understand the challenges that are presented during the implementation of these reforms.

The improvement of student performance is at the core of school reform. School-based reforms that do not affect classroom practices have little hope of making any significant change in the field of education. In the best examples of school reform, changes in goals, curricula, instruction and teaching, and assessment are significant. In these cases, teachers question their traditional approaches to teaching and learning, and spend significant time and energy designing new methods for reaching their students (Shields, 1995).

While school reform in general has been a hot topic for the last thirty years, focus on middle schools has been growing with each report of students' mathematics achievement on national and international tests. The focus on middle schools gained momentum after the release of the TIMSS data shed light on what Silver (1998) calls "a pervasive and intolerable mediocrity in mathematics teaching in middle grades" (p. 1). Because of this poor performance, middle grades reform has moved to the top of the list for educational policy.

While there have been some successes with school reform, education reform initiatives have not demonstrated the systemic transformational change that is needed on a large scale to bring about improvement in student achievement.

Effective Schools Movement

The lack of significant progress from reform efforts and criticism of education provided a catalyst for Effective Schools Research. Specifically, the Effective Schools research was a response to controversial findings reported from the Coleman report in 1966. The authors of that report, (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York, 1966), found that, "schools bring little influence to bear on a child's achievement that is independent of his background and general social context" (p. 325). In other words, family background and not schools had the greatest impact on student achievement. The Effective Schools research sought to challenge this view. What resulted from this research agenda (Brookover & Lezotte, 1979; Edmonds, 1979; Rutter, Maughan, Mortimer, Ouston, & Smith, 1979; Weber, 1971) was evidence that schools can and do make a difference. More specifically, Edmonds (1979) found that, "all children are eminently educable and that the behavior of the school is critical in determining the quality of that education" (p. 20).

The Effective Schools research identified key characteristics of schools that have become known as the Correlates of Effective Schools, shown in Table 1. The Correlates are the means to achieving high and equitable levels of student learning. It has been found that when school improvement processes based upon the Effective Schools research are implemented, the proportions of students that achieve academic excellence either improves, or at the very least, stays the same.

The Correlates "represent research-based leading organizational/contextual indicators that have been shown to influence student learning" and continue to provide a foundation for school improvement and student achievement (Lezotte, 2000, p. 8).

Table 1: Correlates of Effective Schools

Correlate	
Correlate One	Clear School Mission
Correlate Two	High Expectations for Success
Correlate Three	Instructional Leadership
Correlate Four	Frequent Monitoring of Student Progress
Correlate Five	Opportunity to Learn and Student Time on Task
Correlate Six	Safe and Orderly Environment
Correlate Seven	Home-School Relations

Source: Edmonds (1979)

Comprehensive School Reform

Only since the 1990s has the idea of school-wide reform emerged as a prominent strategy for school improvement. During the 1990s, there became a growing belief that school-wide reforms could better improve student performance; specifically the performance of at-risk students, instead of the piecemeal approach to reform that had existed until that time. This belief was encouraged in part by the findings from the Effective Schools research (Edmonds, 1979; Teddlie & Reynolds, 2000) and by the concept of systemic reform (Smith & O'Day, 1991). However, during the mid 1990s, several studies showed that in the short term, a number of these whole-school approaches to reform did not produce the desired student achievement gains and did not result in

desired reforms (Wong & Meyer, 1998, 2001). These findings suggested that this whole school approach needed some re-thinking.

At the same time, there was growing research on the successful efforts of external restructuring programs (Comer, 1998; Slavin et al, 1996; Slavin & Madden, 2001). This led to the idea that whole-school, externally developed reform programs for schools could have the potential to produce positive results. Today, these comprehensive school reforms are happening at an unprecedented rate. They are relatively easier to "scale-up" than other types of reform initiatives. Many comprehensive reform creators have developed packaged infrastructures for replicating and supporting these reform processes. The recent emphasis on systemic and standards-based reform has also served as a catalyst for the spread of these whole-school models.

Comprehensive school reform initiatives combine two of the most recent educational reform movements. Since the 1980s, competing and often contradictory reforms have combined top-down, centralized efforts to improve schools with efforts of decentralization and school-based management (Rowan, 1990). Today's reform spirit consists of top-down standards with strict accountability, but leaves the processes up to the individual school. The problem with this approach is that schools are not equipped with the necessary resources to create the changes that are needed in order to meet the increasing demands of state and national mandates. In many ways, expecting local schools and school districts to invent and reinvent the processes for school reform is perhaps unfair and unrealistic. Comprehensive school reform, or "whole-school" reform, seeks to provide schools with processes for whole school change.

While summaries of overall effectiveness and quality of comprehensive school reform models are important, they can also be misleading. Most researchers report that reform models vary in their effectiveness from school to school, with some working well and others not at all (Borman, Hewes, Overman, & Brown, 2003). For example, in 1999 and 2000, RAND researchers surveyed over 400 teachers and principals and conducted extensive phone interviews in order to understand how states' education reforms were being enacted at the school level. They found that while teachers and principals reported that they understood the reforms and were making changes to support them, the changes were not uniform and they were occurring gradually (Stecher & Chun, 2001). They also found that the teacher responses suggested that the state assessments were more of a factor in teacher behavior than the reform initiatives.

Baldrige in Education

During the 1990s, many organizations began adapting the Baldrige Criteria that had been established for businesses for their own purposes. In 1999, the Baldrige in Education Initiative (BiE IN) was established in order to promote a national effort to transform the American K-12 system using the Baldrige Criteria. The BiE IN consisted of twenty-six national education and business organizations. Six states were selected to pilot the Baldrige in Education Criteria with the support and encouragement of the BiE IN.

The Baldrige Criteria for Performance Excellence is a framework for continuous improvement aimed at getting the results that are important to an organization. For schools, this means student achievement. The Baldrige in Education Framework consists of eleven core values (Table 2).

Table 2: Core Values of Baldrige in Education

Visionary Leadership
Learning Centered Education
Organizational and Personal Learning
Valuing Faculty, Staff, and Partners
Agility
Focus on the Future
Managing for Innovation
Management by Fact
Social Responsibility
Focus on Results and Creating Value
Systems Perspective

Source: NIST (2005)

The Baldrige core values support a learning-centered, results-focused classroom culture by teaching students to: focus on their vision for the future; take responsibility for making decisions based on fact; be agile and innovative when the need for change arises; value the contributions of their peers; and take social responsibility. At the school level, these values should be demonstrated in the daily actions of principals, teachers, and students.

Baldrige in Education consists of seven criteria. The Criteria include: Leadership; Student and Stakeholder Focus; Strategic Planning; Process Management; Faculty and Staff Focus; Information and Analysis; and Results (NIST, 2000). Each of these Criteria is essential to the Baldrige system for quality improvement. The linkage chart (Figure 3) is a graphic organizer used to show the integrated nature of the seven Criteria. In other words, the linkage chart illustrates the Baldrige *system* for quality improvement. The Baldrige Criteria serve as a defining framework for quality and include everything necessary for effective organizational practice (Winn & Cameron, 1998).

Figure 3: Baldrige Linkage Chart
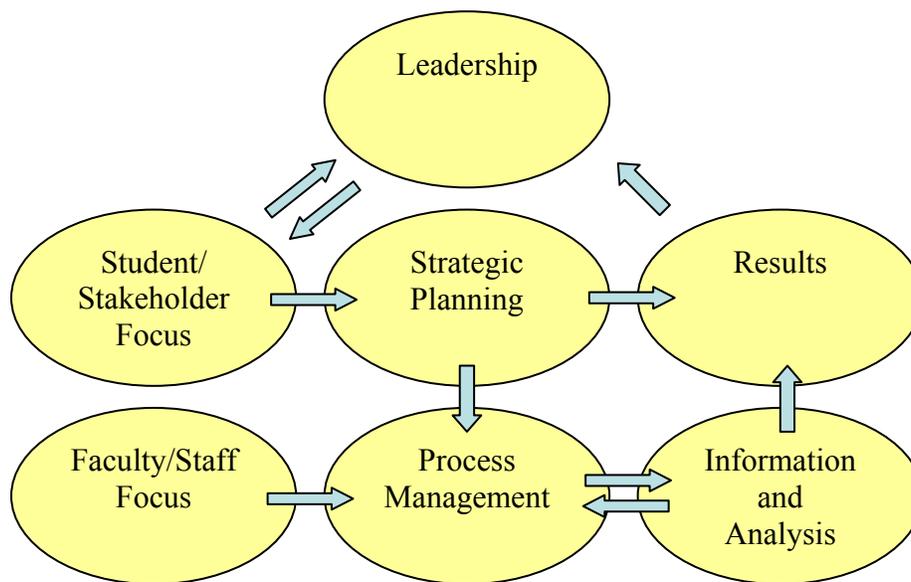
What does this system look like in the classroom? The following is the list of Criteria with specific classroom examples of how each play a role in the Classroom Management System (NIST, 2000).

Student and Stakeholder Focus – Teachers and students determine classroom and individual student needs. They build positive relationships with one another and monitor the levels of satisfaction with the teaching and learning process.

Leadership – Teachers and students develop classroom and individual mission statements that are aligned with their school's vision and mission. They establish good communication and ways to monitor student progress.

Strategic Planning – Teachers and students set goals and objectives based on needs, and develop action plans in order to accomplish these goals.

Performance Results – Teachers and students use summative assessment data to compare individual and class performance with similar classes.

Information and Analysis – Teachers and students decide how and when progress will be measured, and use the data collected to make decisions about what is working and what isn't.

Faculty and Staff Focus – Teachers and students will identify needed resources and materials in order to meet the goals.

Process Management – Teachers and students create well defined, well designed, and well deployed processes and systems. They revisit these processes and use quality tools and a plan, do, study, act process in order to make changes based on data.

Baldrige in Education was designed to enable school systems to focus all resources on aligning various goals into one single system based on this framework. Schools recognized the need for this long before formal systems for education were created. Even though the Criteria for education was not developed and released until 1999, many school districts were adapting the business Criteria as a guide to increase standardized test scores and reduce school violence (Broder, 1999). According to Karathanos and Karathanos (1996), educational institutions are faced with the same challenges businesses faced twenty years ago: finding it difficult to compete in the international market by not providing satisfactory education to all students. Education must find ways to meet higher performance expectations. The process for which to do this has yet to be determined and Baldrige is seen as having many possibilities (p. 272).

There have been seven recipients of the Malcolm Baldrige National Quality Award since the Education category was established in 1999. The recipients are: Jenks

Public Schools in 2005, a K-12 public school system located in Jenks, Oklahoma that serves about 10,000 students; Richland Community College, in 2005, located in Dallas, Texas and serves 14,000 students; Kenneth W. Monfort College of Business in 2004, a college within the University of Northern Colorado; Community Consolidated School District 15 in 2003, a kindergarten through eighth grade public school system in the Chicago suburbs that serves about 12,000 students; Chugach School District in 2001, a school district that spans over 22,000 square miles in south central Alaska and that serves 214 students mostly living in remote areas and accessible only by aircraft; Pearl River School District in 2001, a K-12 district 20 miles north of New York City that serves 2500 students; and University of Wisconsin-Stout in 2001.

While the Baldrige Award in education has captured the attention of education decision makers, there has been little empirical research examining the usefulness of the Baldrige criteria to guide the actions of organizations that seek to improve performance (Goldstein and Schweikhart, 2002; Arif and Smiley, 2004). Of the few studies that exist, there are some interesting findings that directly relate to this research study.

Several studies reported improved performance of schools that were implementing the Baldrige Criteria. Goldberg and Cole (2002) reported that the implementation of a quality management approach resulted in greater equity and higher student performance in the Texas school district. Similarly, Obisesan (1998) found that quality management practices facilitated communication, improved collaboration, and improved budgetary management in three school districts. Schwegler (1998) reported that the best managed school districts in New York were using practices which were "congruent with the processes recommended by Baldrige in Education" (p. 190).

A handful of studies explored the perceptions and implementation level of Baldrige in Education. Dale (2003) conducted a study of seven schools on probation. The purpose of the study was to explore the perceptions that principals, teachers, and other school staff had about the importance of Baldrige. She found that while the principals, teachers, and other school staff perceived the Baldrige categories as being important, none of the elements were perceived to be in existence at the same level of importance as educators reported they should be. Sommers (2004) examined the implementation of four of the Baldrige Criteria by surveying one hundred Ohio teachers. She found that the number of training sessions that the teachers attended was associated with an increased likelihood of implementing the four Criteria she studied.

There have been several critical reports by researchers who have either had negative experiences with the Baldrige in Education initiative, or are concerned with the limited number of rigorous research studies on this topic. After participating in and studying a four year attempt to implement the Baldrige Criteria in an elementary school, Banister (2001) concluded that, "The Baldrige Criteria is rigid and narrow and another complication for overwhelmed teachers and administrators" (p. 26). After an extensive review of Baldrige in Education, Walpole and Noeth (2002) concluded that research on the effectiveness of the Baldrige model indicated that findings were limited. They report, "Many published Baldrige articles which often describe a single school or district implementation and some of the results these implementations have achieved include surprisingly little detail" (p. vii). Further, they state that "empirical studies that detail how, why, or in which contexts an implementation can succeed are needed to substantiate the anecdotal reports that are associated with reported changes in performance" (p. ix).

Tyack and Cuban, in their book *Tinkering Toward Utopia,* wrote in extensive detail about the attempted influence of the business world on education. They state that the last century has been haunted by the "cult of efficiency." They pose that while these business strategies were tried by various governmental and educational organizations, they tended to be failures. Tyack and Cuban identify five reasons that contributed to this failure: 1. Educational goals are diffuse; 2. Educational "results" are hard to measure and quantify; 3.The methods for reaching educational objectives are often unclear; 4. Educational staff lack appropriate management skills; and 5. Educators question whether corporate style management is worthwhile (p. 114-120). In other words, Tyack and Cuban say that successfully applying some aspects of corporate management to education simply does not work because educational goals, styles, and methods are inherently political and value-laden and not coldly "scientific."

These studies and viewpoints on Baldrige in Education helped to inform my study. My proposed study will add to the literature already in existence on Baldrige in Education by providing the contextual details of implementation of this reform initiative that Walpole and Noeth call for. By seeking understanding of how and why reforms succeed or fail in individual contexts, this study will contribute additional information to the existing research base.

Drivers to Creating and Sustaining Reform

In an interview with John O'Neil, Larry Cuban posits that because school reforms are a product of cultural, political, and economic forces of the time, the innovations that have the best chance of "sticking" are those that have constituencies that grow around them. He elaborates that one of the biggest factors that affects the staying power of a

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reform seems to be that they reflect some deep-rooted social concern for democracy, equity, or for preparing students to lead fulfilling adult lives (O'Neil, 2000).

Shields (1995) found that successful examples of school-based reform share a set of core characteristics: A clear focus on creating more challenging learning experiences for all students; a school culture in which teachers worked collaboratively and had a voice in decisions; and opportunities for teachers and administrators to gain knowledge and build their professional capacity.

Malcolm, Abdallah, Chubin, and Grogan ((2005) conducted a study of high performing districts that have been implementing systemic reform initiatives in order to determine the factors that were critical to supporting sustainable system-wide change. After extensive interviews and a review of the relevant literature, they identified six factors that were common to all sites studied. They included: Ownership and accountability; resources; data and research-based practices; high expectations and standards; management and system capacity; implementation and technical assistance (going to scale).

Spillane (2005) identified a similar list of characteristics of reform successes and added an additional explanation for implementation differences between and among schools. He found that an important explanation for variation in implementation of reform was the variation in district policymakers' understanding of the ideas behind the reform. While many leaders understood the procedural changes, they lacked understanding of the conceptual ideas (Spillane, 2005). Those districts that had leaders who had a deeper level of reform understanding provided more support and stronger implementation than those districts that had leaders with only surface-level

understandings of the reform initiative (Spillane, 2005). Spillane also emphasized the importance of familiarity. He found that things that were more familiar got more attention in the district. Also, district leaders and teachers attended to superficial familiarities when they lacked a deeper understanding of the initiative (Spillane, 2005).

<div align="center">Restrainers to Creating and Sustaining Reform</div>

In his extensive study on comprehensive school reform, Cross (2004) identified common occurrences across school districts that limited the impact of reform initiatives at the school level. Challenges include negotiating comprehensive school reform within a hierarchical system, building capacity for school improvement, ensuring faculty acceptance, obtaining parental and community support, and supporting special populations (Cross, 2004). What follows is a brief description of each barrier with relevant research findings included.

Hierarchy of Education

Schools are nested within school systems, which are situated within states. States are under the influence of federal legislation more than ever before. Because of this hierarchy, local schools may experience tension when trying to implement a reform initiative that may or may not be in direct alignment with the internal system influences. For example, models of reform that focus on school processes not measured by accountability mechanisms may be abandoned in favor of approaches explicitly linked to reading and mathematics achievement. In a recent study of comprehensive school reform efforts in three states, Datnow (2001) reports that accountability systems are the main driver of reform. This negotiation between the expectations of the nested system and the goals of comprehensive reform serves a potential factor in creating and sustaining reform.

Capacity Building

Building capacity is a key factor in influencing reform that has been cited in numerous studies (Cross, 2004; Marsh, 2000; McLaughlin & Talbert, 2003; Spillane & Thompson, 1970). Cross (2004) defines capacity as, "the potential or ability of districts, schools, and teachers to undertake transformative school improvement efforts" (p. 114). Spillane (2005) calls this "resources for sense-making" and included human, social, and material resources that helped to create deeper understandings at the district, school, and teacher level.

District Capacity – Researchers have identified the many roles the district plays in supporting school reform (Elmore & Burney, 1997; Fullan, 2004; Massell & Goertz, 1999; Spillane & Thompson, 1997). These roles include financial, operational, and administrative. Marsh (2000) found that the district also plays these roles in influencing school reform. She describes these as human, physical, and social capital. Fullan (2004) found that the organization and structure of school districts hinders the ability of the district to help schools. He describes district curriculum and instruction offices as "silos," each functioning independently and without directly impacting what districts do. McLaughlin & Talbert (2003) describe five ways in which districts can support school reform. These include: Taking a systems approach to reform, creating a learning community in the district office, focusing on teaching and learning, supporting professional learning and instructional improvement, and using data to support accountability.

School Capacity – Newmann (2000) offers a framework for understanding school capacity. He defines school capacity as the collective ability to improve student achievement schoolwide. He describes five interacting components that are essential for building school capacity. These include: knowledge, skills, and disposition of staff; a school-wide professional community; program coherence; technical resources; and effective principal leadership.

Teacher Capacity – There is a tremendous amount of literature on the importance of teacher knowledge and professional development in order to meet the growing needs of teachers. Newmann (2000) underscores this importance and pinpoints professional development as the key to this knowledge development. Garet, Porter, Desimone, and Birman (2001) conducted the first large scale empirical study on the impact of professional development on instructional practice. They found three core features of professional development had positive effects on classroom practice. These include: focus on content knowledge; opportunities for active learning; and coherence with other learning activities. In addition to these features, they found three structural aspects of professional development that played a positive role in changing classroom practice. These are: the form of the activity; the collective participation of teachers from the same school or department; and the activity's duration.

Educator Acceptance

Getting teacher buy-in for a new reform initiative is difficult, especially during a time when teachers have seen so many reforms go in and out of style. Yet this factor is critical when trying to implement whole-school reform. If the very people responsible for

implementing a new reform are skeptical about its impact, there is little hope that the reform will be implemented and sustained. Several studies conducted by RAND have examined the reform adoption model. One key finding emphasizes the importance of securing acceptance of a reform initiative before it is implemented in the schools. Bodilly (1996) found that in many cases, firm commitment to the reform program was never obtained. Datnow (2000) found that power relations played a role in the acceptance of reforms. Many teachers described voting processes that were in fact an exercise until the "correct" vote was delivered in favor of the principal's wishes. Therefore, teachers expressed resistance to a reform they felt forced into. Even when teachers are first enthusiastic and accepting of a reform, over time this enthusiasm is not sustained and can lead to burnout, conflict, and disengagement in the reform (Little & Bartlett, 2002).

Community Support

While the research on parent and community support is mixed, Epstein (1996; 2001) presents a framework that includes six specific types of parental involvement that can help support reform initiatives for school improvement. These include: activities that support parenting; strategies that support communication; volunteer activities; activities that encourage learning at home; opportunities for involvement in decision making; and collaboration within the community.

Supporting Special Populations

Few studies exist that describe the impact of whole school reform on special populations. Of those studies, Hamann (2001) found that most school reform models fail to address the needs of special populations. In a large, mixed-methods comparison study of schools, Datnow (2003) found that while there was no significant increase on

achievement test results for ESL students, schools with better model implementation had better outcomes for ESL students. While the research on the effects of comprehensive school reform on special education students is scarce, since the research suggests that this model benefits all students, comprehensive school reform holds great promise for students with disabilities (McLaughlin, 2001).

Factors of Influence

Instead of dividing reform influences into the categories of drivers and restrainers, many researchers talk about factors that influence reform. These factors can be positive influences or negative influences on the implementation of a new initiative. Often they are seen at some level on a continuum instead of being just present or not present. Therefore, they have varying degrees of influence, and influence people who are within the same reform in different ways. Some of these factors include time, reform cycle, experience, assumptions about learning, and perceived behavioral control. Each of these factors is described below.

Time

When it comes to reform, often the factor of time surfaces both with teachers and with reform initiators. According to Cambone (1995),

> Reformers have focused their attention too tightly on ways to schedule or manage time that allows for school restructuring, and they have missed an important fact: Teacher time is not just a thing that is scheduled for them. Time is something that is constructed, to a large extent, by the individuals who live that time. (p.1)

Some of the types of time that teachers construct for themselves when they talk about their practice include: Time for students; Time for teaching; Time for learning; Time for innovation; Managed time; Administrative time; Cyclical time; Political time; and Experienced time (Cambone, 1995). These different time constructs often overlap and occur during the same space. They interact with each other and so it is sometimes difficult to differentiate what type of time is occurring at any moment of a teacher's day. The factor of time is a complex issue that is important when thinking about school reform because as Cambone (1995) argues, "Without a fundamental change in the ways we conceptualize time, especially for teachers, our best efforts at teacher participation in school reform will probably wither" (p.1).

Reform Cycle

Olsen and Kirtman (2002) describe reform cycle as "the chronological point in a school's restructuring process at which a teacher joins the staff" (p. 313). This produces an array of influences on the teacher's relationship and interaction with the reform. This is especially interesting when teachers enter a reform that is already in existence in a building, or has at least already begun to take hold. New teachers to the building have missed the initiation process and the introductory groundwork for the foundation of the reform. How teachers are exposed to the reform and the expectations that are in place for these teachers can influence how these teachers respond to reform initiatives.

Experience

Lortie (1975) first recognized teachers' experiences as being so influential on their teaching practices that he created the label "apprenticeship of observation." Since then, researchers have continued to comment on the outside experiences of educators and

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the influence they bear on classroom practice. Teachers' experiences outside the classroom influence beliefs about teaching, learning, school, classrooms, and students in general (Olson & Kirtman, 2002). Olson and Kirtman identify three categories of experiences that teachers reference when talking about their practice. These three types are: childhood experience, previous experiences within the teacher's career, and a teacher's family life. Each of these, and any combinations, helps to instill beliefs in teachers which influence behavior in the classroom. This includes behavior toward reform implementation.

Assumptions about Learning

Prior assumptions about learning and children have considerable influence over how he or she perceives, understands, translates, and ultimately implements the components of a pedagogical, curricular, or organizational reform (Olson & Kirtman, 2002). Certain learning styles that the teacher possesses lend themselves to different types of reform, and different approaches to reform. For example, some people who fully embrace reform describe themselves as liking change, or risk-takers ready for a new challenge. Therefore, the fact that they embraced a certain reform could be indicative of their personality and learning style, not indicative of the reform implementation procedures in general.

Perceived Behavioral Control

Perceived Behavioral Control has two components: self efficacy and locus of control. Self-efficacy is how much a person believes he or she is capable of doing something. Locus of control is how much a person believes he or she has the power to make decisions about doing something. These two components can be related, but they

are independent of each other. Although people may believe that how a future event turns out is under their control, they may or may not believe that they are capable of behaving in a way that will produce the desired result. For example, an athlete may believe that training eight hours a day would result in great improvement in ability (an internal locus of control) but not believe that he or she is capable of training that hard (a low sense of self-efficacy).

One finding that is directly relevant to educational reform and teachers' responses to it is that self-efficacy beliefs mediated changes in behavior and in fear-arousal (Bandura, 1986). This is important because levels of reform implementation can be influenced by the degree to which teachers feel they are capable of instituting the reform. Those teachers with low self efficacy are less inclined to implement reform because of a fear of failure. Conversely, those teachers with a high sense of self efficacy could be more likely to implement reform initiatives because of their beliefs that they are capable of learning and executing new ideas and practices within their classroom.

There are two types of locus of control: internal and external (Rotter, 1966). People who possess more of an internal locus of control attribute events to their own control. Those people who possess more of an external locus of control tend to attribute events in their life to external circumstances. While those with internal locus of control believe they possess the power to determine their course of action, those with external locus of control tend to feel others have the power to determine their course of action, and that they have less control over their fate (Rotter, 1966). They tend to exhibit a learned helplessness when it comes to their beliefs about their authority to make decisions on their own behalf. This is a powerful idea when thinking about reform

initiatives. Teachers are often confronted with external change forces. How much or how little a teacher feels they have the power to make decisions about the implementation of the reform can influence the degree to which the reform in initiated and implemented.

Both self efficacy and locus of control are different from self-esteem. Bandura (1986) has emphasized this by using the example that a person may have low self-efficacy for ballroom dancing, but that if ballroom dancing is not very important to that person, this is unlikely to result in low self-esteem (Bandura, 1986). Because self esteem speaks more to the relative importance someone puts on something, it not a component of perceived behavioral control.

The drivers, restrainers, and factors of influence that are mentioned in the last three sections had a direct influence on the kinds of questions I will ask during the interviews of my proposed study. Because this study seeks to gain insight into some of the drivers and restrainers in implementing reform at the middle school level, the lists provided from the research presented in these sections of the review of the literature provided me with the background knowledge necessary for teasing out these factors in addition to potential others.

<center>Coherence</center>

When researchers describe the failures of reform initiatives, all too often they describe a pattern of fragmented initiatives with no common vision among them. First, a school adopts many different initiatives in order to improve student achievement. The teachers, in an attempt to learn and embrace the initiatives, divide themselves among workshops, trainings, and lesson development. Over time, the school sees little to no gain

in student performance. This leads to fatigue and frustration. Eventually, the programs fade and new reforms begin (Newmann, Smith, Allensworth, & Byrk, 2001).

Darling-Hammond (1990) states, "policies don't land in a vacuum. They land on top of other policies" (p. 346). When these policies make their way to the school door, often they are presented as fragmented, disjointed, and unrelated to a more comprehensive approach to school improvement. Frazier (1997) notes that, "reforms at the school level, without involvement and support of the other components of the system, will more than likely not succeed in the long run. Successful transformation requires that the entire system share in a common vision, and then develop some very specific strategies to coordinate alignment up and down the organization" (p. 57).

What Frazier is talking about is the need for coherence. Instructional program coherence is defined as a set of inter-related programs that are guided by a common framework for curriculum, instruction, assessment, and learning climate, and are pursued over a period of time (Newmann, Smith, Allensworth, & Byrk, 2001). This contrasts with a school system that adopts a wide variety of programs that are uncoordinated or limited.

The need for coherence first surfaced in curriculum improvement initiatives (Cohen & Ball, 1996; Smith, Smith, & Byrk, 1998). Researchers emphasized the importance of building sensible connections between topics and grade levels. Coherence has also emerged in the research on organizational theory. These studies emphasize unity of practice, the importance of a clear vision, and the adoption of shared values (Byrk, Lee, & Holland, 1993; Coleman, Hoffer, & Kilgore, 1982; Hill & Celio, 1998; Sergiovanni, 1994).

The whole school reform movement also brings to light the idea that coherence is an important factor in educational reform. Claims about alignment of initiatives suggest the importance of coherence (Consortium for Policy Research in Education, 2000; Furhman, 1993; Smith & O'Day, 1991). While these reforms may foster restructuring efforts they may or may not address the relationships between supports.

Firestone (1992) reports "an important reason for limited progress in changing what and how well students learn is that the governance system is fragmented along two dimensions: the vertical one representing relationships between states and districts; and the horizontal one reflecting articulation among policies at each level" (p. 1). In his research, he identifies four patterns of behavior that illustrate the two dimensions of coherence. School districts fell into one of the following four patterns (p. 6):

1. Local Reform/Passive Response – These districts were predominantly in big cities that were consumed in their own problems and decline. These schools were focused on local issues and therefore had a passive response to state reform initiatives. This is a problem since often it was these schools that provided the impetus for reform in the first place.

2. Local Reform/Selective, Active Response – These school districts were mostly located in the suburbs and had their own local reform initiatives. In addition, they selected the state reforms that best fit with their agenda and fought the reform movements that didn't align with what they were doing.

3. No Local Reform/Selective, Active Response – The school districts located within this category were mostly small districts that lacked the resources to be

able to implement their own local reforms, but were enthusiastic to embrace state level reforms in order to foster improvement in teaching and learning.

4. No Local Reform/Passive Response – This last group had no local reforms and very low response to state reforms. Districts within this category lacked leadership to institute any kind of initiative.

Efforts to build coherence run into a number of obstacles. One obstacle is fragmentation at the state level where various policymakers, organizations, and boards of educations all advocate for different reforms. Firestone (1992) reports that, "under these circumstances the best that can be hoped for is complementary reforms, and the worst is conflict. Usually, the result is ambiguity" (p. 20).

While studies illustrate how states and districts contradict school improvement efforts with fragmented and disjointed policies, they fail to address how administrators and teachers might develop greater coherence within schools. This study seeks to understand the interplay of reform initiatives between two vertical reform constituencies – one from the mathematics education community and the other from the comprehensive school reform community –along the horizontal axis at the middle school level. With this study, I hope to better understand how the reform efforts specific to mathematics education align with and inter-relate with the efforts of the school system to promote a more comprehensive, systemic school reform initiative at the school level. By examining the interplay of these two parallel reform efforts, I hope to gain insight into the factors that help and hinder the full implementation of both reform initiatives.

Stages of Concern

The concept of change has been a central topic within the education reform discussions for decades. During the 1960s, Fuller conducted in-depth case studies of student teachers and educators in hopes of better understanding the change process that teachers go through. As a result of her studies, she created a conceptual framework of teachers' concerns as they evolve through a teacher's career. She found that teachers' concerns corresponded to their career stages and occur in a natural sequence (Fuller, 1969). Fuller's developmental sequence, as shown in Table 3, has three stages: Pre-teaching Phase, Early Teaching Phase, and Late Teaching Phase. During each of these phases, teachers have unique concerns that fit within the stage of their career.

Table 3: Fuller's Developmental Sequence of Concerns

Phase	Description
Pre-Teaching Phase: Non-Concern	This phase is a period of non-concern with specific aspects of teaching, or low involvement with teaching.
Early Teaching Phase: Concern with Self	During this phase, teachers expressed concerns about their adequacy and ability to execute a lesson, manage a class, and gather resources.
Late Teaching Phase: Concern with Pupils	This phase focuses on concerns about students' learning and teachers' professional development.

Source: George, Hall, & Stiegelbauer (2006). The Stages of Concern Questionnaire. Southwest Educational Development Laboratory: Austin, TX.

As research on teacher concerns evolved, so did these categories. Fuller's three phases were abstracted into four major clusters of concern (Hall & Hord, 1987). These clusters of concern are: unrelated concerns; self concerns; task concerns; and impact concerns. Researchers began to notice that teachers who were adopting a new initiative

underwent this same cycle of change concerns as teachers as they evolved through their

career. They hypothesized that there were definite categories of concerns and that these

concerns changed in what seemed to be a logical progression. Hall, George, and

Rutherford (1979) developed seven stages of concern based on these ideas, and

developed a questionnaire to determine someone's stage of concern profile. The seven

stages of concern are described in Table 4.

Table 4: Typical Expressions of Concern

Stage of Concern		Expressions of Concern
"Impact"	6	I have some ideas about something that would work even better.
	5	I would like to coordinate my effort with others to maximize the innovation's effects.
	4	How is my use affecting my students?
"Task"	3	I seem to be spending all of my time getting materials ready.
"Self"	2	How will using it affect me?
	1	I would like to know more about it.
"Unconcerned"	0	I am not concerned about it.

Source: George, Hall, & Stiegelbauer (2006). The Stages of Concern Questionnaire. Southwest Educational Development Laboratory: Austin, TX.

Early concerns (Stages 1 and 2) tend to focus on "self," while later concerns

(Stage 3) tend to focus on implementation "tasks." Still later concerns (Stages 4-6) relate

to program "impact." Teachers may have concerns in more than one stage at a time. For

example, they might have concerns about managing the implementation (Stage 3) as well

as how it will affect their students (Stage 4). The stage of concern profile identifies the

relative level of a teacher's concerns for each of the seven categories. A description of

each of the seven stages is reported in Table 5.

Table 5: The Stages of Concern about an Innovation

	Stage		Description
Impact	6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.
	5	Collaboration	The individual focuses on coordinating and cooperating with others regarding use of the innovation.
	4	Consequence	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students; the evaluation of student outcomes, including performance and competencies; and the changes needed to improve student outcomes.
Task	3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, and scheduling dominate.
Self	2	Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation.
	1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem to be worried about himself or herself in relation to the innovation.
	0	Unconcerned	The individual indicates little concern about or involvement with the innovation.

Source: George, Hall, & Stiegelbauer (2006). The Stages of Concern Questionnaire. Southwest Educational Development Laboratory: Austin, TX.

Hall and Hord (1987) developed this conceptual framework around seven change principles. They are:

1. Change is an ongoing process, not a short-term event.

2. Change occurs in individuals first, then in organizations.

3. People go through change at different rates and in different ways.

4. As people implement a new program, their concerns change.

5. Different interventions can be designed to support implementers' changing concerns.

6. Change agents need to adapt to different individuals' changing concerns over time in order to make effective organizational change.

7. Change agents need to take into account the larger system in which a program is being implemented, since a change in one part of the system could have effects in another.

By assessing teachers' concerns about an initiative, it is possible for leaders and reformers to then address these concerns in order to help foster a reform in moving forward. This process seems to be essential in implementing educational reform initiatives, and will play a central role in this study. By understanding teachers' concerns about the Baldrige in Education reform initiative, we can see where teachers are within the change cycle and we can identify key factors that help and hinder the reform from taking hold.

CHAPTER THREE: METHODOLOGY

The purpose of this study was to describe the conditions under which educational reform can be implemented and sustained, and the conditions under which educational reform can be hindered and restrained. Specifically, this study sought to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative. In addition, this study sought to determine the impact of this reform implementation on student achievement over time. In order to protect the identity of the school district, as well as the schools and individual participants in this study, pseudonyms were used throughout this paper.

In order to answer these questions, and the sub-questions within each of these, a mixed-methods design was utilized in order to fully collect and analyze data on the factors that help and hinder an educational reform taking hold and on the impact of this reform on student achievement. The first phase of this research study used quantitative methods in order to identify the factors that significantly contribute to the variability of reform implementation and teacher concerns about that reform. In addition, quantitative methods were used to assess the affect of reform implementation on student achievement over time. The second phase of this research study used qualitative methods in order to gain an in-depth perspective on the factors that contribute to reform implementation and teacher concerns, as identified by teacher questionnaire data, in a high and a low reform implementation school. Table 6 summarizes the data collection and analysis procedures used to answer each research question of the study. A full description of these procedures follows.

Table 6: Summary of Data Collection and Analysis

Research Question	Data Collection	Data Analysis
1. What factors contribute to the variability of teachers' reform practices?	Questionnaire	Hierarchical Linear Modeling for: • Level of Implementation • Teacher Concerns • Teacher Beliefs about Being Better Teachers • Teacher Beliefs about Students Learning More
2. What is the impact of the Baldrige in Education reform initiative on schools' student achievement?	Public data on individual schools' standardized test scores for 2003-2007.	Split-Plot Analysis of Covariance with Years of Implementation as the Between Subjects Variable, Student Achievement as the Repeated Measure, and Educational Load (poverty rate) as the Covariate.
3. What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative?	Interviews Observations	Transcribe Interview Data • Code Transcripts • Generate Categories and Themes • Name Themes as Factors • Triangulate Data

This study had ten stages:

Phase I:

1. Invite middle school mathematics teachers to participate in this study.

2. Administer questionnaire to all middle school mathematics teachers teaching mathematics during the 2006-2007 school year.

3. Gather publicly reported standardized test data for each middle school.

4. Collect and compile completed questionnaire data.

5. Analyze questionnaire data using quantitative methods.

6. Select two schools of interest – one school that reports significantly high levels of reform implementation and one school that reports significantly low levels of reform implementation.

Phase II:

7. Invite the two selected schools to participate in the second phase of this study.

8. Conduct interviews and observations at participating schools.

9. Code and analyze qualitative data.

10. Summarize findings.

This chapter outlines the research methodology used for this study. The first section of this chapter details the setting of the study. What follows is a detailed description of the participants, the instrumentation, the variables, quantitative data collection procedures, qualitative data collection procedures, and data analysis techniques for both quantitative, Phase I, and qualitative, Phase II, data. This chapter ends with a discussion on trustworthiness and ethical considerations.

Setting

This study was conducted within a large school district located outside a major metropolitan area. Green County School District is comprised of nearly 200 schools with 140,000 students. District-wide, approximately 42% of the students are white, 23% are African American, 20% are Hispanic, and 15% are Asian. More than 163 countries are represented within the student population of the school district. Even though 26% of the students attending schools in this district participate in the Free and Reduced Meals Services program, the district has access to resources in order to provide support for these students.

The Baldrige in Education reform initiative was introduced to Green County in 2000. The Baldrige in Education Initiative (BiE IN), a national effort to transform the American K-12 education system, uses the Baldrige Criteria as a framework for restructuring education and improving student performance. BiE IN, a network of 26 leading national education and business organizations, selected six states to participate in the pilot implementation of Baldrige in Education. Green County, located within one of these six states, applied to pilot the Baldrige program. The school system participated in a self-assessment in the fall of 2000 in order to assess the district's current strengths and identify opportunities for growth. The report from this self-assessment became one of the data points for setting the county's direction and making changes. This report set the district on its course for implementing Baldrige in each of the almost 200 schools and many central office departments within a three year period. Green County School

District adopted BiE IN "as the model for continuous improvement for all offices and schools" (Green County publication, 2003, p. 43).

Schools were divided into three groups, called cohorts, and each cohort began phasing in the Baldrige initiative over a period of three years. Each cohort began their Baldrige kickoff with two days of intensive training. All stakeholder groups, including administration, team leaders, department chairs, teachers, and parents, from each school were expected to attend. District-level personnel provided follow-up training throughout the school year. All schools were to meet the district expectation to implement the new Baldrige process by the year 2006. With the beginning of the 2005-2006 school year, all schools had participated in district-level training to integrate the Baldrige Criteria as the framework for school improvement planning. In 2005, the school district received the state's most prestigious award for organizational performance excellence. It is now a system-wide expectation that all schools use the Baldrige Criteria as their model for continuous improvement.

While it is a district expectation that all schools implement the Baldrige Criteria as their model for continuous improvement, there are varying levels of implementation across the county. Even within cohorts, there are some schools that have fully embraced and implemented the Baldrige reform initiative at levels that surpass the other cohort schools. There are also schools within each cohort where this reform initiative has not fully taken hold, even though schools and the educators within those schools were exposed to the same training. This variability between schools, and the factors that contribute to it, is what this study investigated.

Participants

The participants in the Phase I portion of this study were middle school mathematics teachers currently teaching mathematics in the school district. All of the 260 mathematics teachers in the district's thirty-six middle schools were invited to participate in this study (see Appendix C and Appendix D). The 179 teachers that agreed to participate in this study completed a fifteen minute questionnaire (see Appendix F) and also agreed to participate in an in-depth interview (see Appendix E) and classroom observations should their school be selected to participate in Phase II of this research study.

The participants included in the Phase II of this research study were middle school mathematics teachers, the staff development teacher, and the principal from two schools that were selected based on unusually high or unusually low implementation levels of the Baldrige reform initiative as reported by the mathematics teachers' questionnaire responses. Participants from the two selected schools agreed to participate in an in-depth case study, which included a one and one-half to two-hour long interview (see Appendix A, Appendix B, and Appendix E), a school walk-through, and classroom observations. Upon agreeing to participate, interviews and observations were scheduled.

All of the educators that were selected to be a part of this study had participated in the district training and shared responsibility for implementing the Baldrige reform initiative in their schools. These educators differed in number of years of teaching, background, experience, and attitudes toward this reform, and this information was collected and taken into consideration during the quantitative and qualitative data analysis procedures. No teacher was excluded based on any of these criteria.

Instrumentation

Two instruments were used in the quantitative portion of this study. The first instrument used in order to collect data from each participating teacher was a four-part questionnaire (see Appendix F). The second instrument used in this study in order to analyze mathematics achievement at the school level was the passing rate of each school on the mathematics state standardized achievement tests. Each of these instruments is described in this section.

Questionnaire

Part I: Demographics

The first part of the questionnaire was a page that asked each participant for demographic information. Participating teachers were asked to identify how many years they have been teaching, how many years they have been teaching in that particular school, and what mathematics courses they currently teach.

Part II: Level of Implementation

The second part of the questionnaire assessed participating teachers' level of implementation of the Baldrige reform initiative. The teachers were asked to identify their level of implementation of several key Baldrige criteria in their classroom practice. The purpose of this part of the questionnaire was to determine what parts of the Baldrige in Education reform initiative teachers are implementing, and at what levels. The items were modified from several different Baldrige checklists and implementation guides, including one from the district involved in this study. There were thirty two questions in this part of the questionnaire, all of which used a six-point Likert-scale rating system. The

Likert-scale ranged from zero to five, zero being the lowest level of implementation and five being the highest level of implementation.

The questions were arranged in seven categories. These categories reflect the seven parts of the Baldrige linkage chart model that were discussed in chapter two. Briefly, they are: Leadership; Strategic Planning; Student and Stakeholder Focus; Information and Analysis; Faculty and Staff Focus; Process Management; and Performance Results. What follows is a brief statement about each category with the corresponding items from the questionnaire presented in table format.

The Leadership category explains how the teacher creates and sustains clear and visible quality values along with a management system to guide all activities of the classroom toward educational excellence (See Table 7).

Table 7: Leadership Category

Leadership						
1. I have a classroom mission statement and incorporate it into my instructional program.	0	1	2	3	4	5
2. I involve students in developing and reviewing our classroom mission statement.	0	1	2	3	4	5
3. My students create their own individual mission statements and refer to them throughout the school year.	0	1	2	3	4	5
4. I post classroom expectations and goals.	0	1	2	3	4	5
5. I involve students in developing and reviewing classroom expectations, goals, and progress.	0	1	2	3	4	5
6. I monitor and communicate classroom progress to students and parents.	0	1	2	3	4	5
7. My students monitor the progress of the class and their personal progress using the classroom data center.	0	1	2	3	4	5
8. My students monitor the progress of the class and their personal progress using their personal data notebook or folder.	0	1	2	3	4	5

The Strategic Planning category describes how the teachers use short and long term goals within the classroom and how these goals are aligned to the school improvement plan (See Table 8).

Table 8: Strategic Planning Category

Strategic Planning

1. I involve students in writing classroom goals that are aligned with the school improvement plan.	0 1 2 3 4 5
2. My students develop their own action plans and personal goals.	0 1 2 3 4 5

The Student and Stakeholder Focus category examines the expectations of stakeholders. This category uses stakeholder input to set expectations, guide instructional planning, and set standards. Stakeholders may include the next grade level teachers, students, and parents (See Table 9).

Table 9: Student and Stakeholder Focus Category

Student and Stakeholder Focus

1. I analyze student data in order to determine the needs of my students.	0 1 2 3 4 5
2. I monitor student and parent satisfaction through the use of surveys.	0 1 2 3 4 5
3. I provide for students and parents to give their input in the development of objectives for the classroom.	0 1 2 3 4 5
4. My students know what the grade-level and next-level expectations are.	0 1 2 3 4 5

The Information and Analysis category describes the types of data that will be used to manage the classroom and student learning. These data sources of monitoring

tools serve as formative assessments so that teachers can continuously monitor student

performance (See Table 10).

Table 10: Information and Analysis Category

Information and Analysis

1.	I collect and use classroom data and information to monitor progress toward meeting our goals.	0	1	2	3	4	5
2.	I use data to compare class performance to other classes in my school and other schools.	0	1	2	3	4	5
3.	My students have personal data folders or notebooks where they record and monitor their progress.	0	1	2	3	4	5
4.	I have a data center displayed in my classroom that I use to track class progress.	0	1	2	3	4	5
5.	I use quality tools such as plus/delta, consensograms, and force field analysis in order to gather information and make decisions in the classroom.	0	1	2	3	4	5
6.	My students use quality tools such as plus/delta, force field analysis, and affinity diagrams in order to gather information and make decisions about their progress.	0	1	2	3	4	5

The Faculty and Staff Focus category describes the efforts to build and maintain

an environment that is conducive to full student participation, personal organization,

responsibility and cooperative interaction (See Table 11).

Table 11: Faculty and Staff Focus Category

Faculty and Staff Focus

1.	I systematically recognize student contributions toward meeting class goals.	0	1	2	3	4	5
2.	My students know where to locate resources in the room and know how to use those resources for learning.	0	1	2	3	4	5
3.	I monitor the level of student involvement, well-being, and satisfaction.	0	1	2	3	4	5

The Process Management category describes the instructional and operational process teachers use to achieve classroom goals. Instructional processes might include activities directly related to teaching and learning. Operational processes might include attendance, dismissal, or transition times. This category also includes the planning and monitoring systems that are put in place to ensure that management plans are working (See Table 12).

Table 12: Process Management Category

Process Management

1. I use the Plan, Do, Study, Act cycle to design and improve teaching and learning in my classroom.		0 1 2 3 4 5
2. My students use the Plan, Do, Study, Act cycle to help them make continuous progress with their goals.		0 1 2 3 4 5
3. I use quality tools in my instructional program (fish bone, affinity diagram, issue bin).		0 1 2 3 4 5
4. I use a plus/delta to evaluate the classroom work and use the information to make improvements.		0 1 2 3 4 5
5. My students use a plus/delta to evaluate their own and each other's work and use the information to make improvements.		0 1 2 3 4 5

The Performance Results category examines the performance levels and improvement trends. This category includes performance on summative assessments from class in addition to performance on standardized tests (See Table 13).

Table 13: Performance Results Category

Performance Results

1. I use summative assessment data to track progress over time.	0 1 2 3 4 5
2. My students and I compare our results with other classrooms.	0 1 2 3 4 5
3. My students and I communicate and display our results for parents and other people in the school.	0 1 2 3 4 5
4. My students analyze their progress of the class and individual goals.	0 1 2 3 4 5

Part III: Level of Concerns

The third part of the questionnaire assessed teachers' concerns about the Baldrige reform initiative. Only by understanding concerns and addressing those concerns is it possible to assess the extent of implementation of the initiative. This part of the questionnaire uses the Stages of Concern Questionnaire (SoCQ), which is part of the Concerns-Based Adoption Model developed by Hord and Hall (1987) and published by Southwest Education Regional Laboratory. The Stages of Concerns Questionnaire consists of thirty-five questions, all on an eight-point Likert scale. The scale ranged from zero to seven, with zero being "irrelevant" and seven being "very true of me now." Each of the questions corresponds to one of the seven stages of concern as mentioned in detail in chapter two. Briefly, they are: Unconcerned, Informational, Personal, Management, Consequence, Collaboration, and Refocusing. What follows is a brief statement about each stage with the corresponding items from the questionnaire in table format.

Stage Zero is the Unconcerned stage. A teacher is in stage zero when he or she indicates little concern about or involvement with the innovation being measured (See Table 14).

Table 14: Stage Zero Questions

Stage 0		
#3	I am more concerned about another innovation.	0 1 2 3 4 5 6 7
#12	I am not concerned about this innovation at this time.	0 1 2 3 4 5 6 7
#21	I am preoccupied with things other than this innovation.	0 1 2 3 4 5 6 7
#23	I spend little time thinking about this innovation.	0 1 2 3 4 5 6 7
#30	Currently, other priorities prevent me from focusing my attention on this innovation.	0 1 2 3 4 5 6 7

Stage One of the Stages of Concern is the Informational stage. During this stage,

teachers indicate an awareness of the innovation and an interest in learning more about it

(See Table 15).

Table 15: Stage One Questions

Stage 1		
#6	I have a very limited knowledge of the innovation.	0 1 2 3 4 5 6 7
#14	I would like to discuss the possibility of using the innovation.	0 1 2 3 4 5 6 7
#15	I would like to know what resources are available if we decide to adopt this innovation.	0 1 2 3 4 5 6 7
#26	I would like to know what the use of the innovation will require in the immediate future.	0 1 2 3 4 5 6 7
#35	I would like to know how this innovation is better than what we have now.	0 1 2 3 4 5 6 7

Stage Two is the Personal stage. Teachers in this stage are uncertain about the

demands of the innovation, their adequacy to meet these demands, and their role in

implementing the new initiative (See Table 16).

Table 16: Stage Two Questions

Stage 2		
#7	I would like to know the effect of the innovation on my professional status.	0 1 2 3 4 5 6 7
#13	I would like to know who will make the decisions in the new system.	0 1 2 3 4 5 6 7
#17	I would like to know how my teaching is supposed to change.	0 1 2 3 4 5 6 7
#28	I would like to have more information on time and energy commitments required by this innovation.	0 1 2 3 4 5 6 7
#33	I would like to know how my role will change when I am using the innovation.	0 1 2 3 4 5 6 7

The Management stage is Stage Three. During this stage, teachers are focused on the processes and tasks of the innovation. They are interested in how to organize and manage the initiative within their classrooms (See Table 17).

Table 17: Stage Three Questions

Stage 3		
#4	I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
#8	I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
#16	I am concerned about my inability to manage all the innovation requires.	0 1 2 3 4 5 6 7
#25	I am concerned about time spent working with nonacademic problems related to this innovation.	0 1 2 3 4 5 6 7
#34	Coordination of tasks and people is taking too much of my time.	0 1 2 3 4 5 6 7

The Consequence stage is Stage Four. Teachers in this stage are focused on the impact of the innovation on students, including student performance and attitudes (See Table 18).

Stage 4		
#1	I am concerned about students' attitudes toward this innovation.	0 1 2 3 4 5 6 7
#11	I am concerned about how the innovation affects students.	0 1 2 3 4 5 6 7
#19	I am concerned about evaluating my impact on students.	0 1 2 3 4 5 6 7
#24	I would like to excite my students about their part in this approach.	0 1 2 3 4 5 6 7
#32	I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7

Stage Five is the Collaboration stage. During this stage, teachers are focused on how to coordinate their efforts and cooperate with others using this innovation (See Table 19).

Table 19: Stage Five Questions

Stage 5		
#5	I would like to help other faculty in their use of the innovation.	0 1 2 3 4 5 6 7
#10	I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0 1 2 3 4 5 6 7
#18	I would like to familiarize other departments or people with the progress of this new approach.	0 1 2 3 4 5 6 7
#27	I would like to coordinate my efforts with others to maximize the innovation's effects.	0 1 2 3 4 5 6 7
#29	I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7

The final stage, Stage Six, is the Refocusing stage. Teachers in this stage are concerned with maximizing the benefit from the innovation, including the possibility of

implementing major revisions to the innovation or even replacing it with something

different (See Table 20).

Table 20: Stage Six Questions

Stage 6		
#2	I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
#9	I am concerned about my revising my use of the innovation.	0 1 2 3 4 5 6 7
#20	I would like to revise the innovation's instructional approach.	0 1 2 3 4 5 6 7
#22	I would like to modify our use of the innovation based on the experiences of our students.	0 1 2 3 4 5 6 7
#31	I would like to determine how to supplement, enhance, or replace the innovation.	0 1 2 3 4 5 6 7

Part IV: Additional Comments

The fourth and last part of this questionnaire was open-ended and allowed

teachers an opportunity to share any additional comments they may have had about the

Baldrige initiative.

The instrument took an average of fifteen minutes to complete. Teachers were

invited to complete the questionnaire and return it either directly to me or to their

department chair who in turn returned the questionnaires to me.

State Standardized Mathematics Achievement Tests

The state standardized achievement tests consist of assessments in reading,

mathematics, and science. The results of these tests provide educators, parents, and the

public annual information about student, school, school system, and state performance for

all students in grades three through eight. Each test includes both multiple-choice and

short-essay questions. For the purposes of this study, only the percent of students meeting standard on the mathematics achievement test for each school was used.

The state assessments are criterion referenced tests that measures student proficiency on the state content standards. The content standards for mathematics that are assessed on the state tests include seven standards: Algebra, Patterns, and Functions; Geometry; Measurement; Statistics; Probability; Number Relationships and Computation/Arithmetic; and Processes of Mathematics.

Meeting proficiency on state tests was determined through a rigorous process set by the state. School systems nominated teachers, principals, and school system staff with subject-matter and grade-level expertise to serve on four standard-setting groups, one each for grades 3, 5, 8, and 10. Standard-setting required several rounds of discussion and voting to establish cut scores. During the first round, the eight groups broke into smaller groups and took the test. Given a booklet in which test items are arranged from those that most students answer correctly to those that fewer and fewer students do — each member put a bookmark on the test item he or she considered the dividing line between basic and proficient performance. Each item correlates to a scale score, so that by choosing an item, the members actually chose a cut score. Members discussed their selected scores and established the median. During the second round, members voted again for a cut score, then reviewed their votes, and established a new median. They also examined impact data, which is the percentage of students (disaggregated by race/ethnicity and special services reported by state and school system) that would make the proficient cuts (pass/not pass cut) given the selected scores. During Round 3, members voted and discussed yet again, before logging a final vote.

The Psychometric Council reviewed the work of all groups, made sure that quality controls were followed, ensured the standard-setting process was technically sound, and forwarded the recommendations and comments to the Review & Articulation Committee. The Review & Articulation Committee reviewed the work of all groups and the Psychometric Council, ensured that rigor was equivalent across grades and subjects, reviewed the articulation among grades and subjects, and forwarded the recommendations to the state superintendent. The state superintendent reviewed the work of the groups, the Psychometric Council, and the Review & Articulation Committee and made a final recommendation to the State Board of Education. From there, proficiency levels were established.

Description of the Variables

Phase I of this study involved a number of variables in running different statistical analyses to determine the relationships among them. There were two levels of variables, teacher-level variables and school-level variables. A brief description of each of the variables used in this study is listed below.

Teacher-Level Variables:

1. Years Taught: The number of years a teacher has been teaching.

2. Total Implementation Level: The average of a participant's questionnaire responses in the Level of Implementation section of the questionnaire.

3. Total Concerns: The average of a participant's raw scale scores from their questionnaire responses in the Level of Concerns section of the questionnaire.

4. Better Teacher: A teacher's response to the question, "I believe I am a better teacher because of this initiative." This is question #36 on the questionnaire (see

Appendix F). The scale was 0-7, with 0 being not relevant and 7 being very true of me now.

5. Students: A teacher's response to the question, "I believe my students learn more and better as a result of participating in this initiative." This is question #37 of the questionnaire (see Appendix F). The scale was 0-7 with 0 being not relevant and 7 being very true of me now.

School-Level Variables:

1. Cohort: The number assigned to each group of schools which determines when a school began the reform initiative and thus the length of the school's involvement in Baldrige.

2. Educational Load: The percent of students within a school that are currently receiving Free and Reduced Meals Services or have ever received Free and Reduced Meal Services.

3. Pre-Test: A school's percent passing rate on state standardized mathematics achievement tests for the school year immediately preceding a school's implementation of the Baldrige reform initiative.

4. Post-Test 1: A school's percent passing rate on state standardized mathematics achievement tests for year one of a school's implementation of the Baldrige reform initiative.

5. Post-Test 2: A school's percent passing rate on state standardized mathematics achievement tests for year two of a school's implementation of the Baldrige reform initiative.

6. Post-Test 3: A school's percent passing rate on state standardized mathematics achievement tests for year three of a school's implementation of the Baldrige reform initiative.

7. Post-Test 4: A school's percent passing rate on state standardized mathematics achievement tests for year four of a school's implementation of the Baldrige reform initiative.

Data Collection Procedures

Quantitative

In order to collect the data used for the quantitative portion of this study, a questionnaire was distributed to 260 middle school mathematics teachers across all 36 middle schools in the school district. Once the questionnaires were returned, data from each participant were entered into an Excel spreadsheet. The participating teacher was linked to his or her school, which was linked to its years of implementation of the initiative through its cohort number.

In addition to questionnaire data, standardized test data were gathered from the public state website for each school. While individual student data was desirable, it was not accessible for this study. Therefore, the standardized test data used in this study included the percent passing rate for each middle school for the years 2003 to 2007. The data were entered into an Excel spreadsheet.

Participation in this study was completely voluntary. Participants could have withdrawn from participating in this study at any point during the completion of the questionnaire or even after returning the questionnaire. Participants were not asked to write their names on the questionnaire. Instead, I assigned a school-level code to their

questionnaires so that all data attached to a participant's questionnaire would only be linked to a particular school and not be directly linked to the teacher. Only I had access to the questionnaire data. At no time were individual responses made available to any personnel from a school, including the principal, or personnel from the school system.

Once all data had been collected and entered into Excel, the quantitative analysis for each research question began. This process is outlined later in this chapter.

Qualitative

This second phase of the research study was conducted using case study research techniques. As described by Stake (1988), "the case study is a study of a 'bounded system,' emphasizing the unity and wholeness of that system, but confining the attention to those aspects that are relevant to the research problem at the time" (p. 258). A *case* in this research study is defined as one school. This portion of the research study consists of two cases, one school reporting unusually high levels of implementation of the Baldrige in Education initiative as reported on the questionnaire responses by mathematics teachers within that building, and one school reporting unusually low levels of implementation of the Baldrige in Education initiative as reported on the questionnaire responses by mathematics teachers within that building. Both schools were chosen from the same year cohort group, which means they both had participated in the same county-wide training on the Baldrige initiative and they have been implementing the reform for the same amount of years.

The purpose of the case study was to identify some of the key factors that help and/or hinder a reform initiative in taking hold within a middle school mathematics classroom. In order to do this, in-depth interviews and observations were conducted

within each case. Principals, mathematics teachers, and the staff development teacher participated in these in-depth interviews, and agreed to short observations that were related to the implementation of the Baldrige initiative within each building.

While case study researchers use research methods that are similar to other forms of research, the difference is that in case studies, "the search is for an understanding of the particular case, in its idiosyncrasy, in its complexity" (Stake, 1988, p. 256). In other words, in case study research, the focus is on the uniqueness of the individual case, not necessarily on the whole population. Examination of each of the two selected cases included interviews with key school-based personnel, more in-depth analysis of the results of the questionnaire administered to mathematics teachers within each school, classroom observations, analysis of school-based artifacts, and a closer look at overall school performance in terms of access to higher level mathematics courses and student performance in those courses.

For purposes of triangulation, data were collected from a variety of sources. The importance of multiple sources of data to the reliability of the study is well established (Stake, 1995; Yin, 1994).Yin (1994) identified six primary sources of evidence for case study research. The six sources identified by Yin (1994) are: interviews; direct observation; participant observation; documentation; archival records; and physical artifacts. No single source has an advantage over the others; rather, they are complementary and can be used together to develop a holistic picture of the case. Thus, a case study should use as many sources as are relevant to the study (Yin, 1994). This case study incorporated as many of these components of data collection as were relevant to each case, and also included an in-depth questionnaire that was given to participants who

agreed to complete it. Through interviews from administrators and teachers, classroom observations, documents, and questionnaire results, I gathered a wealth of information in order to gain insight and a level of understanding into some of the key factors that help and hinder a reform in taking hold.

Interviews are one of the most important sources of case study information (Yin, 1994). Interviews with school-based educators including administrators, the staff development teacher, the mathematics resource teacher, and members of the mathematics department were conducted. According to Fontana and Frey (2000), "there is a growing realization that interviewers are not the mythical, neutral tools envisioned by survey research. Interviewers are increasingly seen as active participants in interactions with respondents, and interviews are seen as negotiated accomplishments of both interviewers and respondents that are shaped by the contexts and situations in which they take place" (p. 648). I used this information to think carefully about the construction of my interviews.

This study used a semi-structured interview process in order to maintain some consistency across interviews that might allow me to analyze responses across participants and potentially across the two cases. However, the interview structure allowed for flexibility so that the interviewer or interviewee could ask a follow-up question or elaborate on a specific point at some time during the interview. So that I was sure to ask the same key questions about the Baldrige implementation to each participant in the study, I constructed questions that I wanted to stay consistent across the cases in the study (See Table 21).

Table 21: Interview Protocol

#	Question
1.	Why don't you tell me a little bit about Baldrige in your classroom
2.	How do you choose which parts of Baldrige you're going to implement or not implement?
3.	Did you ever try a part of Baldrige that didn't go too well, and what did you do?
4.	I am wondering if there is something that is particularly "mathy" about Baldrige that you feel is easier to implement or more natural to implement, and does that have an impact on whether or not you do it? The flipside is, are there things that aren't particularly "mathy" but you feel they would be useful to do?
5.	What would you say was the single most important factor in you deciding whether or not you were going to use any part of Baldrige at all? Was it an option? Did someone come say you're going to do this? How did that work and how did that influence what you decided?
6.	What would you say were some of the things that helped you to implement Baldrige in your classroom?
7.	What would you say were some of the things that hindered Baldrige implementation in your classroom?
8.	What role did other math teachers play in helping or not helping to implement Baldrige? Was it ever a topic in your department meetings?
9.	What role did staff development play in whether or not you implemented parts or any of Baldrige?
10.	How about the role of the principal?
11.	What was the role of not making AYP - what role has that played in your life as a teacher in this building, teaching math and teaching students, implementing Baldrige, and all the decisions you have to make about how you spend the limited time that you have?
12.	Is there anything about Baldrige that just doesn't fit - with you, your vision of teaching and learning, with math, instruction, anything that you think is not worth the time to implement in the classroom, and if there is, what is it?
13.	If you didn't have any constraints, no AYP pressures, you could pick staff development topics, your kids are here ready to learn, how would your instruction change, or you as a teacher change? How you think about how you pick and choose what to do or not do in the classroom - how would that change? And would you do Baldrige in your ideal math class?
14.	Is there anything else you'd like to share about your implementation of Baldrige and the factors that influence what you do?

In addition to asking the pre-determined questions, I allowed additional questions to emerge as each of the interviews progressed.

Each participant was interviewed once, and the interviews lasted between one and one-half to two hours. Interviews were audio-taped to ensure accuracy during transcription and analysis. Notes were also taken during each interview so that I could ensure accuracy when interpreting the audiotapes. At any time, a participant could have chosen to stop participating in an interview. At no time was a participant's name recorded during the interview process. The participant was assigned a number that was linked to the school case. That way I could link the teacher to the school.

In addition to in-depth interviews, informal observations were conducted during several site visits. Direct observation in a case study occurs when the researcher makes a site visit to gather data (Yin, 1994). The observations can be formal or casual activities. During my visits to each site for interviews, I asked to visit classrooms in order to see Baldrige in action or not in action. For example, I wanted to see if any quality tools were being implemented during the instructional program. In addition, I was interested in looking at teachers' data centers and the students' interaction with them. I also looked for evidence of other initiatives that may have been taking place within the school in order to assess the overall goals of the school and the role Baldrige did or did not play in developing those goals.

Data Analysis

Quantitative

In order to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education

reform initiative and to determine the impact of this reform implementation on student achievement over time, the data were analyzed using statistical procedures best suited for each research question. Descriptive statistics and frequencies were calculated for each of the variables. As part of the descriptive statistics, a Stages of Concern Profile for each cohort was developed in order to compare concern profiles across cohort groups. One would expect that a group's Stages of Concern Profile would change as years of involvement in a reform initiative increased. According to George, Hall, and Stiegelbauer (2006),

> As individuals move from nonuse and scant awareness of an innovation to beginning use and, eventually, more highly sophisticated use, their concerns move through the defined stages. They begin with their concerns being most intense at Stages 0, 1, and 2, then shift to Stage 3, and ultimately register their highest levels of concern at Stages 4, 5, and 6. If the innovation is appropriate an well designed, and if there is adequate support for its implementation, an individual's concerns profile plotted over time should look like a wave moving from left to right. (p. 37)

Once descriptive statistics were calculated and reported, specific data analysis procedures were conducted in order to answer each of the two research questions for Phase I of this study. Outlined below are the data analysis procedures that were used in order to answer research question one and two of the study. The individual sub-questions for each larger question are addressed in detail in chapter four along with the research findings.

Research Question One: What factors contribute to the variability of teachers' reform practices?

The data collected from the teacher questionnaire were used in order to answer this question and the sub-questions within this question. Data from the questionnaires were taken from the spreadsheet and imported into SPSS. After frequencies and descriptive statistics were run on the data set in order to identify and eliminate any outliers or problem areas in the data, the data was then imported into HLM 6.0. Hierarchical Linear Modeling was used to analyze the data. This statistical procedure was most appropriate for this data set because the study has a nested design. In other words, teachers are nested within schools. Four analyses were conducted using this procedure, one for each of the four dependent variables: Level of Implementation, Teacher Concerns, Teacher Beliefs about Students Learning More, and Teacher Beliefs about Being Better Teachers as result of the Reform Implementation. The teacher-level variables used for each of these four analyses included Years Taught, Total Implementation, Total Concerns, Better Teacher, and Students Learn More. The school-level variables used in these analyses included Cohort, Educational Load, and Pre-Test Scores.

Research Question Two: What is the impact of the Baldrige in Education reform initiative on schools' student achievement in mathematics?

In order to answer this research question, public data sources were accessed to gather each school's cohort identification, which determines years of implementation of the reform initiative; each school's educational load, which is the poverty rate; and the percent passing rate on standardized tests for each school for the years 2003 through

2007. Frequencies and descriptive statistics were calculated. Four split-plot Analysis of Covariance (ANCOVA) were conducted in order to determine the impact of Baldrige on student achievement using time as the dependent variable. Years of Implementation was the Between Subjects Variable, Student Achievement as measured by the school's percent passing rate was the Repeated Measure, and Educational Load (poverty rate) was the Covariate. The first ANCOVA assessed the effect of time after one year of Baldrige implementation. This ANCOVA used two levels of the repeated measure, Pre and Post test data. The second ANCOVA assessed the effect of time after two years of Baldrige implementation. This ANCOVA used three levels of the repeated measure: Pre, Post, and Post-2 data. The third ANCOVA assessed the effect of time after three years of Baldrige implementation. This ANCOVA used only cohort 1 and 2 schools since cohort 3 has not implemented Baldrige for three years. This ANCOVA used three four levels of the repeated measure: Pre, Post, Post-2, and Post-3 data. The fourth ANCOVA assessed the effect of time on after four years of Baldrige implementation. This ANCOVA used only data from cohort 1 because this is the only cohort to have implemented Baldrige for four years. This ANCOVA used five levels of the repeated measure: Pre, Post, Post-2, Post-3, and Post-4 data.

Qualitative

Qualitative data analysis consisted of examining, categorizing, tabulating, and re-combining the evidence to address the initial questions of the study (Yin, 1994). Although analysis of case study is one of the least developed aspects of the case study research technique, Yin (1994) encourages researchers to make every effort to produce an analysis of the highest quality. In order to accomplish this, he presents four principles that

should attract the researcher's attention: Show that the analysis relied on all the relevant evidence; include all major rival interpretations in the analysis; address the most significant aspect of the case study; and use the researcher's prior knowledge to further the analysis. During this phase of the research study, I adhered to these guidelines.

The research question answered by the qualitative portion of this study is as follows.

Research Question Three: What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative?

In order to answer this question, the data collected from the interviews and observations were analyzed using qualitative procedures that are outlined below. The process involves transcribing the interview data, coding that data, and generating clusters of codes that can be categorized into themes or factors that influence reform implementation.

When it comes to coding, Miles and Huberman (1994) state, "coding is analysis" (p. 55). According to researchers Ryan and Bernard (2000), "coding is the heart and soul of whole-text analysis" (p. 769). Codes can be defined as "tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study" (Miles & Huberman, 1994, p. 56). The data from the interviews were transcribed immediately following each interview, and the coding process was initiated soon after.

Because "grounded theorists want to understand people's experiences in as rigorous and detailed a manner as possible" (Ryan & Bernard, 2000, p. 770), I wanted to use this approach for data analysis for this study. According to Ryan and Bernard,

"grounded theorists suggest a careful line by line reading of the text while looking for processes, actions, assumptions, and consequences" (p. 771). As I read through each line of the interviews, I used open-coding methods and began to generate codes as they emerged. Because "the analyst becomes more grounded in the data and develops increasingly richer concepts and models of how the phenomena being studied really works" (Ryan & Bernard, 2000, p. 771), I hoped to be able to begin clustering common codes together after reading through the data several times. Coding categories were developed as patterns emerged.

Further, I used constant comparison techniques to look at various types of data coming from the same participants and from the same case. For example, did the questionnaire data match the observation data? Did it match the interview data? Did participants from the same site describe similar experiences? Why or why not? Are there patterns within participants' responses, and across participants' responses? Within the cases, and across cases?

Once data was categorized, I went through the data again, this time creating subcategories within each category. These subcategories emerged as the data was reorganized and read through more carefully. Last, the subcategories were analyzed to see what themes emerged.

<div align="center">Trustworthiness</div>

Smith and Deemer (2000) write, "as knowing subjects we are intimately a part of any understanding we have of what counts as knowledge or of any claims we make to knowledge" (p. 880). Not only was I intimately involved with this study, I was also a colleague of many of my participants. Therefore, the issue of trustworthiness was

especially important to me. To ensure trustworthiness of my data analysis and conclusions, I used two techniques.

First, I used crystallization to study the data. As Janesick (2000) describes, "crystallization recognizes the many facets of any given approach to the social world as a fact of life. What we see when we view a crystal depends on how we view it" (p. 391). By blending field notes, questionnaire data, observation notes, and interview transcripts, I was able to create categories and themes that emerged from that blending.

Second, I used thick, rich description in an attempt to describe the culture that was present in each of the cases studied. Clifford Geertz (1973) coined this term when describing in great detail his experiences in various cultures. Stake (2000) states, "thick description would include conflicting perceptions, recent program changes…In these particularities lie the vitality, trauma, and uniqueness of the case" (p. 453). By capturing the detail of each case, it is possible to create a visual image of the events of each school, describing intentions, thought-process, interactions, and activities.

<center>Ethical Issues</center>

According to Christians (2000), there are four guidelines that overlap among various organizations' code of ethics. These four guidelines include informed consent, deception, privacy and confidentiality, and accuracy. I was sure to adhere to each of these four guidelines throughout my study. First, all of the participants were asked to participate in the study and were informed of the nature of the study. Participants had the opportunity to stop participating in this study at any time. Second, I was careful to ensure confidentiality of all disclosures and observations that were collected throughout the study.

The largest ethical issue that I considered was that I worked in the school system where the study took place. Many of the teachers were colleagues of mine, and I was acquaintances with many of the participants. During this process, I needed to be very clear about my intentions in pursuing this research project. I needed to be sure that I honored any specific requests from my participants.

A second ethical issue I had involved the easy access that I had to teachers, classrooms, and data that I would not have had as the researcher in this study if I was not employed in this school district. I needed to be mindful of my role in this study as the researcher so that I did not "over-step" access privileges that were readily available to me.

CHAPTER FOUR: QUANTITATIVE RESULTS

The purpose of this study was to describe the conditions under which educational reform can be implemented and sustained, and the conditions under which educational reform might be hindered and restrained. Specifically, this study sought to identify the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative. In addition, this study sought to determine the impact of this reform implementation on student achievement over time.

There were three research questions for this study, and the purpose of this chapter is to outline the findings for the first two of those questions, along with their sub-questions. The chapter begins with the descriptive statistics related to those participants, their questionnaire responses, and the schools that were included in this study. Following this section is each of the two research questions and their sub-questions with the statistical findings under each. Findings for the third research question, addressing the qualitative portion of this study, will be outlined in chapter five.

Descriptive Statistics

Questionnaires were sent out to 260 middle school mathematics teachers spread across 38 middle schools. Of the 260 possible participants, 179 teachers responded; they represented 29 schools. This resulted in a 68.8% return rate on participant questionnaires. Each middle school had been randomly assigned to a cohort by the school district. The cohort to which schools were assigned denotes when that group of schools started the Baldrige initiative. Shown in the table below (see Table 22) are the number of

participants, the educational load, and the standardized test data from 2003 to 2007 for

each school grouped by cohort.

Table 22: School Descriptive Statistics

School by Cohort	# of Participants	% of Possible Participants	Ed Load	Test Scores 2003	Test Scores 2004	Test Scores 2005	Test Scores 2006	Test Scores 2007
Cohort 1 (4 years)								
1	5	62.5	9	86.0	87.9	87.0	89.2	92.3
2	5	71.4	53	51.3	56.6	64.4	60.8	58.7
3	7	87.5	24	80.1	78.5	74.1	73.9	79.3
4	8	100.0	9	87.1	82.4	90.8	93.3	94.7
5	8	100.0	13	74.0	81.4	82.7	86.6	91.7
6	8	100.0	15	69.6	71.2	79.6	84.7	84.1
7	8	100.0	17	69.2	70.1	79.6	78.7	80.1
8	7	100.0	60	48.9	63.8	62.4	67.1	71.4
9	0	0.0	56	49.7	45.6	55.9	57.1	57.8
Cohort 2 (3 years)								
10	6	75.0	54	49.7	51.8	58.9	66.0	70.4
11	7	100.0	40	60.3	61.1	65.4	66.5	67.8
12	6	85.7	65	47.7	47.0	60.2	66.9	70.4
13	5	71.4	50	49.0	56.4	64.9	73.2	73.0
14	7	100.0	72	45.5	49.6	60.3	70.5	72.1
15	7	100.0	3	89.5	86.1	91.1	93.4	93.6
16	7	100.0	17	69.6	73.1	78.9	82.5	85.6
17	8	100.0	43	37.9	32.2	63.7	70.5	72.1
18	0	0.0	32	66.7	67.5	67.7	74.8	81.5
Cohort 3 (2 years)								
19	7	100.0	64	31.2	35.1	54.8	58.0	56.1
20	6	100.0	61	51.3	45.0	60.1	59.5	57.5
21	7	100.0	49	48.7	47.8	53.6	51.2	56.2
22	6	100.0	6	90.9	91.0	93.0	94.6	96.3
23	4	57.1	18	68.6	79.1	83.2	87.1	83.7
24	9	100.0	47	59.0	51.6	63.9	68.3	72.4
25	7	100.0	68	35.6	40.5	54.0	51.6	67.0
26	7	100.0	44	51.6	54.8	64.0	65.8	67.8
27	2	25.0	32	58.9	59.1	66.2	71.0	79.4
28	3	42.9	39	66.9	72.4	73.8	78.3	77.9
29	4	83.3	44	66.6	61.7	70.3	76.5	73.6
30	2	28.6	62	38.5	35.2	40.4	58.5	56.6
31	6	100.0	62	41.4	38.3	44.2	56.7	58.8

School by Cohort	# of Participants	% of Possible Participants	Ed Load	Test Scores 2003	Test Scores 2004	Test Scores 2005	Test Scores 2006	Test Scores 2007
32	0	0.0	46	58.6	58.9	60.9	61.3	61.0
33	0	0.0	66	52.3	46.6	51.2	56.5	60.4
34	0	0.0	20	60.9	62.4	78.6	79.7	84.0
35	0	0.0	27	57.3	56.5	66.5	77.7	74.7
36	0	0.0	65	35.7	39.2	48.7	62.8	69.2
37	0	0.0	26	NA	NA	NA	73.2	70.1
38	0	0.0	68	NA	NA	NA	56.0	64.9

Note: Educational Load represents a school's poverty rate, as determined by the percent of students currently or ever receiving free or reduced meal services.

Because the number of years of implementation of the reform initiative was important to this study, the cohort to which schools were assigned was critical information. In addition, it was important to gather a representative sample of participants from schools within each cohort in order to conduct cohort analyses. Shown in Table 23 are the number of participating schools from each cohort, the number of participating teachers from each cohort, and the percent of the total cohort population they each represent along with the percent of the total study population.

Table 23: Participation by Cohort

Cohort	Schools			Teachers		
	#	% of Possible	% of Study Population	#	% of Possible	% of Study Population
1	8	89	27.6	56	81	31.3
2	8	89	27.6	53	83	29.6
3	13	65	44.8	70	55	39.1
Total	29	76	100	179	68.8	100

Demographic Questionnaire Data

On the first part of the questionnaire, teachers who participated in this study were asked to identify how many years they had been teaching, how many years they had taught in their current school, how many years they had been implementing the Baldrige

in Education reform initiative, and the extent of the implementation in their classroom.

Shown in Table 24 below are the response statistics for each of these items by cohort and

for the total population.

Table 24: Teacher Demographic Data by Cohort

Category	Mean	SD	Min	Max
Years Taught				
Cohort 1	13.38	7.37	2	28
Cohort 2	12.70	8.35	2	37
Cohort 3	10.57	8.32	1	36
Total	12.08	8.10	1	37
Years Taught in Current School				
Cohort 1	7.29	4.83	1	22
Cohort 2	6.60	6.50	1	33
Cohort 3	4.64	3.44	1	16
Total	6.05	5.05	1	33
Years Implemented Baldrige Reform [a]				
Cohort 1	1.77	.76	0	3
Cohort 2	1.57	.69	0	3
Cohort 3	1.29	.70	0	3
Total	1.52	.74	0	3
Extent of Implementation [b]				
Cohort 1	1.20	.59	0	2
Cohort 2	1.04	.48	0	2
Cohort 3	.87	.48	0	2
Total	1.02	.53	0	2
Educational Load				
Cohort 1	28.44	21.46	9	60
Cohort 2	41.78	22.04	3	72
Cohort 3	42.06	20.52	3	68
Total	38.58	21.36	3	72

[a] Based on the following scale: 0 = Not at all; 1 = 0-1 year; 2 = 2-3 years; 3 = 4-5 years
[b] Based on the following scale: 0 = Not at all; 1 = Somewhat; 2 = Regularly

The number of years of implementing this reform in their classrooms that teachers

specified is of particular interest to this study. Cohort 1 schools were introduced to this

reform initiative during the school year 2003-2004, which means the schools have been

involved in implementing the initiative for four years. Cohort 2 schools were introduced

to the reform initiative during the school year 2004-2005, which means they have been

involved in implementing the initiative for a total of three years. The last cohort to

receive training on the initiative was Cohort 3 during the school year 2005-2006. These

schools are expected to have been involved in implementing Baldrige for the last two

years. Table 25 contains the frequencies of responses by cohort to the question, "How

many years have you been implementing the Baldrige in Education Reform initiative?"

This gives a sense of how long teachers indicated that they have been using Baldrige

regardless of cohort or school implementation times. One interesting finding is that only

14% of the teachers in Cohort 1 indicated that they had been implementing the reform

initiative for four years, the number of years their schools had been involved in the

reform initiative. Possible explanations for the distribution of responses include teacher

transfers, teacher turn-over, and delays in teacher implementation.

Table 25: Teachers' Reported Years of Implementation of Baldrige Reform

Cohort	Not at All (0)		0-1 Years (1)		2-3 Years (2)		4-5 Years (3)	
	#	% of Cohort Response	#	% of Cohort Response	#	% of Cohort Response	#	% of Cohort Response
Cohort 1	3	5	15	27	30	54	8	14
Cohort 2	4	8	17	32	30	57	2	4
Cohort 3	7	10	39	56	21	30	3	4
Total	14	7.8	71	39.7	81	45.3	13	7.3

Participants in this study were asked to identify their extent of implementation of

the Baldrige initiative. This question was part of the demographic information that was

collected from teachers. Table 26 shows the frequency of responses and the percent of the

total cohort responses across the continuum for each cohort. An interesting finding is that

even though all schools have been required to implement the reform initiative for at least

two years, only 15% of participants claimed to implement it regularly, and a startling

13% indicated that they were not implementing the reform at all.

Table 26: Teachers' Extent of Implementation of Baldrige Reform

Category	Not at All (0)		Somewhat (1)		Regularly (2)	
	#	% of Cohort Response	#	% of Cohort Response	#	% of Cohort Response
Cohort 1	5	9	35	62.5	16	28.5
Cohort 2	5	10	41	77	7	13
Cohort 3	13	18	53	76	4	6
Total	23	12.8	129	72.1	27	15.1

Baldrige Implementation by Category

First, Cronbach's alpha reliability coefficients were calculated for each category

of the Baldrige level of implementation questionnaire, along with a total level of concerns

questionnaire alpha. The reliability coefficients are reported in Table 27.

Table 27: Cronbach's Alpha Reliability Coefficients for Level of Implementation

Category	Reliability Coefficient	# of Items
Leadership	.63	8
Strategic Planning	.52	2
Student and Stakeholder Focus	.15	4
Information and Analysis	.55	6
Faculty and Staff Focus	.64	3
Process Management	.77	5
Performance Results	.63	4
Total Level of Implementation Questionnaire	.85	32

Participants were asked a series of questions in the Baldrige Implementation

portion of the questionnaire in order to assess their level of implementation for each of

the seven Baldrige categories (Leadership, Strategic Planning, Student and Stakeholder

Focus, Information and Analysis, Faculty and Staff Focus, Process Management, and

Performance Results). Averages for each category by cohort participants were calculated.

Descriptive statistics relating to this portion of the questionnaire are found in Table 28.

With few exceptions, the means for Cohort 1 were greater than the corresponding means

for Cohort 2, and the means for Cohort 2 were greater than the corresponding means for

Cohort 3.

Table 28: Teachers' Baldrige Implementation by Category

Category	Mean	SD	Min	Max
Leadership				
Cohort 1	3.19	.60	1.88	4.38
Cohort 2	2.76	.81	1.0	4.60
Cohort 3	2.74	.76	1.0	5.00
Total	2.89	.75	1.0	4.63
Strategic Planning				
Cohort 1	2.44	1.16	0	4.50
Cohort 2	2.10	1.17	0	5.00
Cohort 3	1.87	.96	0	4.00
Total	2.12	1.11	0	5.00
Student and Stakeholder Focus				
Cohort 1	3.14	.59	1.0	4.00
Cohort 2	2.87	.83	1.0	5.00
Cohort 3	2.98	.69	1.75	4.50
Total	3.00	.71	1.0	5.00
Information and Analysis				
Cohort 1	3.15	.74	1.17	4.67
Cohort 2	2.85	.80	1.0	5.00
Cohort 3	2.56	.88	0	4.83
Total	2.83	.85	0	5.00
Faculty and Staff Focus				
Cohort 1	3.83	1.05	0	5.00
Cohort 2	3.28	1.18	1.0	5.00
Cohort 3	3.60	.97	1.0	5.00
Total	3.58	1.08	0	5.00
Process Management				
Cohort 1	2.62	1.03	0	4.40
Cohort 2	2.20	.94	0	5.00
Cohort 3	1.70	.93	0	4.40
Total	2.14	1.04	0	5.00
Performance Results				
Cohort 1	3.85	.62	2.5	5.00
Cohort 2	3.27	1.00	1.0	5.00
Cohort 3	3.06	1.09	.75	5.00
Total	3.37	1.00	.75	5.00

Total N = 179

Note: Scale = 0:Irrelevant; 1:Not yet; 2: Rarely; 3:Sometimes; 4:Usually; 5:Regularly

Stages of Concern

First, Cronbach's alpha reliability coefficients were calculated for each stage of

the Concerns questionnaire, along with a total Concerns questionnaire alpha. The

reliability coefficients are reported in Table 29.

Table 29: Cronbach's Alpha Reliability Coefficients for Concerns

Category	Reliability Coefficient	# of Items
Stage 0	.45	5
Stage 1	.65	5
Stage 2	.68	5
Stage 3	.74	5
Stage 4	.63	5
Stage 5	.73	5
Stage 6	.62	5
Total Concerns Questionnaire	.89	35

In this part of the questionnaire, participants were asked a series of questions in

order to assess the intensity of their concern for each of seven stages as identified by the

Concerns Based Adoption Model (CBAM). Averages were calculated using the raw scale

scores for each participant, as recommended by the CBAM scoring manual. For each

category, higher scores indicate greater concerns. However, it is the relationship of

relative high and low scores across the stages that is of primary importance within the

CBAM scale. The descriptive statistics relating to this part of the questionnaire are found

in Table 30.

Table 30: Teachers' Stages of Concern by Cohort

Category	Mean	SD	Min	Max
Cohort 1 (N = 56)				
Awareness	13.41	5.44	2	24
Informational	17.05	6.30	4	29
Personal	17.05	5.35	2	28
Management	16.59	5.13	5	28
Consequence	16.32	4.91	4	25
Collaboration	16.23	5.82	3	30
Refocusing	17.54	4.57	5	29
Total Concerns Level	16.31	3.73	4.86	22
Cohort 2 (N = 53)				
Awareness	14.92	4.56	5	26
Informational	15.62	5.47	3	28
Personal	16.00	6.58	0	30
Management	15.47	4.99	5	25
Consequence	15.13	5.01	4	28
Collaboration	14.96	4.53	0	26
Refocusing	16.42	4.51	8	25
Total Concerns Level	15.49	3.96	5	24.14
Cohort 3 (N = 70)				
Awareness	15.40	5.56	2	28
Informational	17.44	6.71	2	31
Personal	18.03	7.59	4	31
Management	15.46	7.14	0	31
Consequence	16.91	5.50	5	30
Collaboration	14.97	6.69	2	29
Refocusing	17.44	5.68	7	28
Total Concerns Level	16.52	4.87	6.86	27.43
Total (N = 179)				
Awareness	14.64	5.28	2	28
Informational	16.78	6.25	2	31
Personal	17.12	6.67	0	31
Management	15.82	5.95	0	31
Consequence	16.20	5.20	4	30
Collaboration	15.36	5.84	0	30
Refocusing	17.17	5.01	5	29
Total Concerns Level	16.15	4.27	4.86	27.43

Note: Scale = 0: Irrelevant; 1-2: Not true of me now; 3-4: Somewhat true of me now; 5-7: Very true of me now.

Once average raw scale scores for each stage for each cohort were calculated, the scale scores were converted to percentile scores by using the conversion chart provided in the CBAM manual (see Table 31). After converting each cohort's scale scores for each stage, those percentile scores were plotted in order to create a Stages of Concern Profile for each cohort (see Figure 4).

Table 31: Scale and Percentile Scores for Each Stage of Concern by Cohort

Stage	Cohort 1		Cohort 2		Cohort 3	
	Raw Scale Score	Percentile Score	Raw Scale Score	Percentile Score	Raw Scale Score	Percentile Score
Stage 0	13	75	15	87	15	87
Stage 1	17	63	16	60	17	63
Stage 2	17	63	16	59	18	67
Stage 3	17	65	15	56	15	56
Stage 4	16	19	15	16	17	21
Stage 5	16	31	15	28	15	28
Stage 6	18	57	16	47	17	52

Figure 4: Stages of Concern Profile for Each Cohort
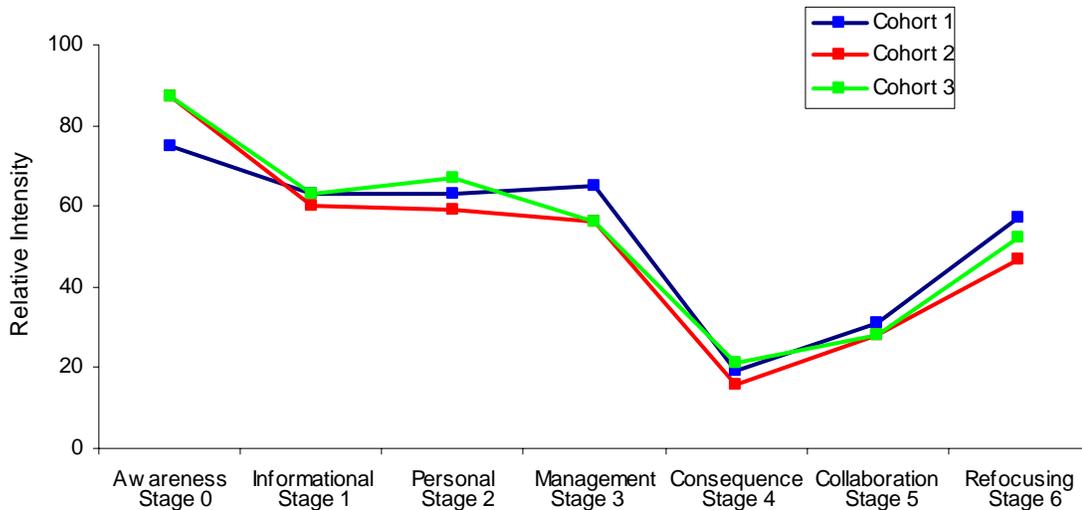
An interesting observation in the Stages of Concern Profiles for the different cohorts as shown in Figure 4 is that they have very similar profiles. It appears that years

of involvement in the Baldrige reform initiative have little influence on changing teachers' concerns about the initiative, as reported by the participants in this study. However, perhaps this shouldn't be so surprising given that teachers reported using Baldrige in the classroom for about the same number of years regardless of cohort.

In looking more closely at the individual parts of the profiles, the first observation that can be made about all three cohorts is that Stage 0, the Awareness Stage, is the highest stage. This typically denotes non-users of the initiative. Stage 0 scores indicate the degree of interest in the initiative. A low score at this stage indicates that the teacher views the initiative as an important part of his or her work and is interested in learning more about it. The higher the score is at Stage 0 indicates that other things, be it another initiative or different activities, are of greater concern than the initiative being studied.

The second part of the CBAM profile analysis is to look at the relationship between Stage 1, the Informational Stage, and Stage 2, the Personal Stage. When Stage 1 is higher than Stage 2, individuals most likely have a positive, proactive perspective on the initiative because their desire for information on the reform is higher than their personal concerns and fears about the initiative. When Stage 2 is higher than Stage 1, participants usually express various degrees of doubt and resistance to an initiative. This is because the individual's concerns about the personal ramifications outweigh the desire to learn more about the initiative. According to the cohort profiles, Cohort 1 and 2 have relatively high Stage 1 and Stage 2 scores, and these scores are either the same or relatively close. However, Cohort 3 is showing a significantly higher Stage 2 than Stage 1. This is called a "negative one-two split" and often signals some resistance to a reform initiative.

All three cohorts are showing a high Stage 3 score, with Cohort 1 being the highest. A high score for Management concerns indicates that participants are expressing relatively intense worries about time, logistics, and other managerial problems associated with the initiative. As can be seen in Chart 4.1, all three cohorts have fairly intense concerns in this area.

The scores for Stage 4 for all three cohorts are relatively less intense than the other stages. This is interesting because this stage, the Consequence Stage, deals with concerns about the impact of the initiative on students. A low score for this stage suggests that the participants from all three cohorts are not intensely concerned about the impact of this reform initiative on their students.

Stage 5 for all three cohorts is relatively low in terms of level of concern. This indicates that teachers are not very concerned with the impact of the initiative on students. They are relatively more concerned with other aspects of the reform than the implications for students and their learning.

The final portion of the profile analysis looks at Stage 6, the Refocusing Stage. We can look at Stage 6 as "tailing up" or "tailing down" from Stage 5 in order to gain additional insight into participants' attitudes about the reform. A tailing down from Stage 5 (i.e., a lower score for Stage 6 than for Stage 5) indicates that usually the participant does not have ideas that would compete with the innovation being implemented. When Stage 6 tails up from Stage 5 (i.e., a higher score for Stage 6 than for Stage 5), this is usually a signal that participants have ideas that they see as having more merit than the reform initiative being studied. A pronounced tailing up should be considered an alarm

for reform initiators. As shown in Chart 4.1, all three cohorts have pretty severely pronounced tailing up, as denoted by their relatively higher Stage 6 scores.

Better Teacher/Students Learn More

The last part of the questionnaire asked teachers to rate how much they believed they were better teachers as a result of participating in the Baldrige reform and if they thought their students learned more as a result of this reform. It is interesting to note that after schools participated in this reform initiative for two or more years, only 10% of the teachers responding to this questionnaire believe it is very true that they are better teachers as a result of this reform, and approximately one-half of the teachers responding to this questionnaire believe their students do not learn more as a result of this reform (See Table 32 and Table 33).

Table 32: Better Teacher/Students Learn More Frequencies

Category	Not True Now		Somewhat True Now		Very True Now	
	#	% of Cohort Response	#	% of Cohort Response	#	% of Cohort Response
Being a Better Teacher as a Result of Reform Practices						
Cohort 1	22	39	28	50	6	11
Cohort 2	20	38	30	57	3	5
Cohort 3	41	59	20	29	9	12
Total	83	46	78	44	18	10
Students Learn More as a Result of Reform Practices						
Cohort 1	28	50	21	38	7	12
Cohort 2	21	40	25	47	7	13
Cohort 3	38	54	22	32	10	14
Total	87	49	68	38	24	13

Table 33: Better Teacher/Students Learn More Descriptive Statistics

Category	Mean	SD	Min	Max
Being a Better Teacher as a Result of Reform Practices				
Cohort 1	2.86	1.67	0	7
Cohort 2	2.72	1.61	0	7
Cohort 3	2.29	1.73	0	7
Total	2.59	1.68	0	7
Students Learn More as a Result of Reform Practices				
Cohort 1	2.63	1.74	0	7
Cohort 2	2..74	1.76	0	7
Cohort 3	2.41	1.81	0	7
Total	2.58	1.77	0	7

Findings for Research Question One

Research Question One: What factors contribute to the variability of reform implementation between schools?

To answer this question, hierarchical linear modeling (HLM) was used because it is an apprpriate statistical method available for analyzing data that has a nested structure – teachers nested within schools. Once the data had been imported into HLM 6.0 (SSI, 2007), the teacher level variables, level-1, and the school level variables, level-2, were selected. The teacher-level variables included Years Taught, Total Concerns, Better Teacher, and Students Learn More. The school-level variables that were used to create this model included Cohort, Educational Load, and Pre-Test Scores. These were entered into the model as grand mean centered. Descriptive statistics for each of these variables are shown in Table 34.

Table 34: Descriptive Statistics for Level-1 and Level-2 Variables

Variable Name	N	Mean	SD	Min	Max
Teacher Level (Level-1)					
Years Taught	179	12.08	8.10	1	37
Total Implementation	179	2.85	0.60	1	4.31
Total Concerns	179	16.15	4.27	4.86	27.43
Better Teacher	179	2.59	1.68	0	7
Students Learn More	179	2.58	1.77	0	7
School Level (Level-2)					
Educational Load	29	39.31	21.63	3	72
Pre-Test Scores	29	63.62	15.49	32.2	93

In order to answer each of the four sub-questions listed below, four different HLM analyses were conducted. The findings for each sub-question are reported below.

a. What factors contribute significantly to the variability of teacher implementation levels of the Baldrige in Education reform initiative?

The first step in answering this question was to enter the dependent variable, Total Implementation, into the model and run the *Fully Unconditional Model* in order to determine the total amount of variance of teachers' levels of Baldrige implementation between schools. The intra-class correlation coefficient for the unconditional model was calculated to be 0.24, which means that 24% of the variance in Baldrige implementation can be attributed to differences between schools. In order to explain some of this variability, teacher-level and school-level variables were entered into the model. The final estimation of fixed effects for this model is shown in Table 35.

Table 35: *Total Implementation Final Fixed Effects*

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
Intrcpt1					
Intrcpt2	2.83	0.05	57.78	25	0.000
Cohort	-0.27	0.07	-3.86	25	0.001*
Educational Load	0.01	0.00	1.14	25	0.264
Pre-Test Scores	0.01	0.01	1.32	25	0.198
Years Taught	0.00	0.00	0.22	171	0.827
Better Teacher	0.05	0.03	1.51	171	0.132
Students Learn More	0.08	0.03	2.54	171	0.012*
Total Concerns	0.00	0.01	0.49	171	0.626

As seen in the table above, the school-level variable Cohort ($p = 0.001$) and the teacher-level variable Students Learn More ($p = 0.012$) are significant contributors to the variability of teacher implementation of the Baldrige in Education reform initiative. In other words, years of implementation as designated by which cohort teachers are in, is one significant factor in teacher implementation levels of this reform initiative. In addition, whether or not teachers feel their students are learning more as a result of this initiative is a significant factor in teacher implementation levels of the initiative. Interestingly, a school's poverty level as represented by Educational Load played no significant role in teachers' implementation levels. Similarly, schools' performance on standardized test scores before implementation and the number of years participants had been teaching also had no significant impact on the extent to which teachers implemented the reform initiative.

The variance component representing the variation between schools decreases greatly (from 0.087 to 0.028) after entering these variables. This means that these variables explain a large portion of the school-to-school variation in mean Baldrige

implementation levels. More specifically, the proportion of variance explained by these variables is $(0.087 - 0.028)/0.087 = .68$. That is, about 68% of the explainable variation in teachers' Baldrige implementation levels can be explained by these variables, with Cohort and Students Learn More contributing at significant levels. There will always be unexplained variance in correlation studies, and the challenge for future research is to identify additional variables both at the teacher and school level in order to explain the variability of teachers' implementation practices between schools.

b. What factors contribute significantly to the variability of teacher concerns about the Baldrige in Education reform initiative?

In order to address this question, the dependent variable, Teacher Concerns, was entered into the model and the unconditional model was run in order to determine the total amount of variance of Teacher Concerns between schools. The intra-class correlation coefficient for the unconditional model was calculated to be 0.095, which means that 10% of the variance in Teacher Concerns about the reform initiative can be attributed to differences between schools. Interestingly, this statistic is important because it indicates that changing teachers' concerns about this reform initiative requires a close look at within school variables since 90% of the variance can be attributed to differences within individual schools.

In order to account for some of the variability of teachers' concerns between schools, teacher-level and school-level variables were entered into the model. The teacher-level variables included Years Taught, Total Implementation, Better Teacher, and Students Learn More. The school-level variables that were used to create this

model included Cohort, Educational Load, and Pre-Test Scores. The final estimation of

fixed effects for this model is shown in Table 36.

Table 36: Total Concerns Final Fixed Effects

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
Intrcpt1					
Intrcpt2	16.22	0.39	41.74	25	.000
Cohort	-0.21	0.57	-0.36	25	0.721
Educational Load	0.06	0.04	1.48	25	0.151
Pre-Test Scores	0.06	0.05	1.14	25	0.267
Years Taught	-0.10	0.04	-2.68	171	0.008*
Total Implementation	0.30	0.61	0.49	171	0.625
Better Teacher	0.27	0.25	1.07	171	0.286
Students Learn More	0.233	0.24	0.97	171	0.333

The only significant factor in this model for the variance in teacher concerns is

Years Taught ($p = 0.008$). In other words, how many years someone has been teaching

significantly influences their concerns about an initiative. Because the coefficient for

this variable (-0.10) is negative, we can say that for each year of teaching, a teacher's

concerns decrease by one-tenth on the raw scale score for the Teacher Concerns

Questionnaire. This is interesting because teachers that have been teaching longer and

presumably have more experience with educational practices and reform have lower

levels of concern than those teachers with fewer years of experience. The lower levels

of concern represent non-users of a reform initiative, and can sometimes show insight

into resistance to a reform effort.

The variance component representing the variation between schools decreases

only slightly (from 1.75 to 1.73) after entering these variables. This means that all of

these variables explain only a small portion of the school-to-school variation in mean

levels of teacher concerns. More specifically, the proportion of variance explained by all of the variables is (1.75 – 1.73)/1.75 = .011. That is, only 1% of the explainable variation in school teacher concern levels can be explained by all of the variables, with only the variable Years Taught contributing at a significant level. The remaining 99% of the variance between schools can be explained through exploration of additional factors not included in this study.

c. What factors contribute significantly to the variability of teachers' beliefs that they are better teachers because of the Baldrige in Education reform initiative?

In order to answer this question, the dependent variable, Better Teacher, was entered into the model and the unconditional model was run in order to determine the total amount of variance in beliefs about being a better teacher as a result of this initiative that can been attributed to differences between schools. The intra-class correlation coefficient for the unconditional model was calculated to be 0.102, which means that 10% of the variance in beliefs about being a better teacher as a result of the reform initiative can be attributed to differences between schools. In order to account for some of this variability, teacher-level and school-level variables were entered into the model. The teacher-level variables included Years Taught, Total Implementation, Total Concerns, and Students Learn More. The school-level variables that were used to create this model included Cohort, Educational Load, and Pre-Test Scores. The final estimation of fixed effects for this model is shown in Table 37.

Table 37: Belief of Being a Better Teacher Final Fixed Effects

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
Intrcpt1					
Intrcpt2	2.59	0.13	20.47	25	0.000
Cohort	-0.21	0.18	-1.17	25	0.254
Educational Load	0.01	0.01	0.51	25	0.616
Pre-Test Scores	-0.004	0.02	-0.22	25	0.832
Years Taught	0.01	0.01	0.48	171	0.634
Total Implementation	0.27	0.18	1.51	171	0.132
Total Concerns	0.02	0.02	1.04	171	0.302
Students Learn More	0.59	0.06	10.32	171	0.000*

The results of this model indicate that whether or not teachers believe their students learn more as a result of this reform initiative is a significant factor ($p = .000$) in whether or not teachers believe they are better teachers as a result of the reform initiative. With a coefficient of 0.59, we can say that for each unit increase of Students Learn More, the belief teachers have about being a better teacher increases 0.59 units. One interesting finding from this model is that school level performance on standardized test scores before Baldrige is not a significant factor in whether or not teachers within those schools believe they are better teachers as a result of participating in the Baldrige initiative. Similarly, the number of years teachers have been teaching is not a significant factor in influencing teachers' ideas about the quality of their teaching due to this initiative.

The variance component representing the variation between schools decreases from .290 to 0.229 after entering these variables. This means that the proportion of variance explained by all of the variables is $(0.290 – 0.229)/0.290 = .209$. That is, about 21% of the explainable variation between school levels of teachers' beliefs about being better

teachers as a result of this initiative can be explained by all of the variables, with Students Learn More contributing significantly.

d. What factors contribute significantly to the variability of teachers' beliefs that students learn more as a result of the Baldrige in Education reform initiative?

In order to answer this question, the dependent variable, Students Learn More, was entered into the model and the unconditional model was run in order to determine the total amount of variance of teachers' beliefs about students learning more as a result of this initiative that can been attributed to differences between schools. The intra-class correlation coefficient for the unconditional model was calculated to be 0.049, which means that only 5% of the variance in beliefs about students learning more as a result of this reform initiative can be attributed to differences between schools. This is interesting because that means that 95% of the variance in these teacher beliefs can be attributed to factors that reside within schools. This alone has interesting ramifications for reform efforts and the people who are charged with organizing them since most of the variation in teacher beliefs about students' learning can be influenced by changing factors within individual schools, and not necessarily changing policy at the district level.

In order to account for some of the variability between schools, teacher-level and school-level variables were entered into the model. The teacher-level variables included Years Taught, Total Implementation, Total Concerns, and Better Teacher. The school-level variables that were used to create this model included Cohort, Educational Load, and Pre-Test Scores. The final estimation of fixed effects for this model is shown in Table 38.

Table 38: Final Fixed Effects for Belief that Students Learn More

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
Intrcpt1					
Intrcpt2	2.60	0.13	19.95	25	0.000
Cohort	0.17	0.19	0.87	25	0.391
Educational Load	0.00	0.01	0.38	25	0.706
Pre-Test Data	0.01	0.02	0.54	25	0.596
Years Taught	-0.004	0.01	-0.29	171	0.773
Total Implementation	0.48	0.19	2.53	171	0.013*
Total Concerns	0.02	0.02	0.99	171	0.325
Better Teacher	0.65	0.06	10.29	171	0.000*

As seen in the table above, the teacher-level variable Total Implementation ($p = 0.013$) and the teacher-level variable Better Teacher ($p = 0.000$) are significant contributors to the variability of teachers' beliefs that students learn more as a result of the Baldrige in Education reform initiative. In other words, the extent to which teachers implement the reform initiative is one significant factor in teachers' beliefs about whether or not their students learn more as a result of the initiative. Teachers reporting higher levels of Baldrige implementation reported higher levels of belief that their students learned more as a result of this initiative. In addition, whether or not teachers feel they are better teachers is a second significant factor ($p = 0.000$) in teachers' beliefs about their students learning more as a result of this initiative. When teachers expressed high levels of belief about their own effectiveness and quality, they also reported believing that their students are learning more.

It is interesting to note that according to the results from this model, a school's poverty level as represented by Educational Load played no significant role in teachers'

beliefs about students learning more. Similarly, schools' performance on standardized test scores before Baldrige implementation and the number of years participants had been teaching also had no significant impact on the extent to which teachers believed their students learned more.

<p style="text-align:center">Findings for Research Question Two</p>

Research Question Two: What is the impact of the Baldrige in Education reform initiative on schools' student achievement in mathematics?

In order to answer this research question, along with its sub-questions, public data sources were accessed in order to gather each school's cohort identification, which determines years of implementation of the reform initiative; each school's educational load, which is the poverty rate; and the percent passing rate on standardized tests for each school for the years 2003 through 2007. The descriptive statistics for these school level variables are presented in Table 39.

Four separate split-plot Analyses of Covariance (ANCOVAs), each with different numbers of levels of the repeated measure, were conducted in order to determine the impact of Baldrige on student achievement over time, as measured by schools' percent passing the state standardized achievement tests. All four ANCOVAs used the same variables. Cohort (with 3 levels) was the Between Subjects Variable, Time (with 2 to 5 levels) was the Repeated Measure, and Educational Load (poverty rate) was the Covariate. For all four ANCOVAs, Educational Load had a significant effect on group differences such that it was important to include as the covariate for each analysis.

<p style="text-align:center">114</p>

Table 39: School Level Variables Descriptive Statistics

Category	N	Mean	SD	Min	Max
Cohort 1 (N = 9)					
Educational Load*	9	28.44	21.46	9	60
Pre-Test	9	68.43	15.22	48.9	87.1
Post Test 1	9	70.83	13.62	45.6	87.9
Post Test 2	9	75.17	11.89	55.9	90.8
Post Test 3	9	76.82	12.92	57.1	93.3
Post Test 4	9	78.90	13.84	57.8	94.7
Cohort 2 (N = 9)					
Educational Load	9	41.78	22.04	3	72
Pre-Test	9	58.31	15.87	32.2	86.1
Post Test 1	9	67.9	10.55	58.9	91.1
Post Test 2	9	73.81	8.97	66.0	93.4
Post Test 3	9	76.0	8.86	67.8	93.6
Post Test 4	NA	NA	NA	NA	NA
Cohort 3 (N = 20)					
Educational Load	20	42.55	20.63	3	68
Pre-Test	20	62.83	13.29	40.4	93.0
Post Test 1	20	67.50	11.81	51.2	94.6
Post Test 2	20	69.59	11.62	56.1	96.3
Post Test 3	NA	NA	NA	NA	NA
Post Test 4	NA	NA	NA	NA	NA
Total (N = 38)					
Educational Load	38	39.03	21.42	3	72
Pre-Test	38	63.09	14.41	32.2	93.0
Post Test 1	38	68.39	11.74	45.6	94.6
Post Test 2	36	72.04	11.08	55.9	96.3
Post Test 3	18	76.41	10.75	57.1	93.6
Post Test 4	9	78.90	13.84	57.8	94.7

Total N = 38
* Notice the educational load for Cohort 1 is relatively lower than the educational load for Cohorts 2 and 3.

The first ANCOVA was run using two levels of Time: the pre-test data which was each school's percent of total students passing the state standardized tests for the year immediately preceding the reform implementation; and the post-test 1 data, which consisted of each school's percent of total students passing the state standardized tests following the first year of the reform implementation. For this ANCOVA, all thirty-eight

schools were included in the analyses since all cohorts had implemented the reform

initiative for at least one year. Educational Load had a significant effect on group

differences such that it was important to include as the covariate. The β-weight for

educational load for Pre-test was -.52 and the β-weight for educational load for Post-test

was -.43.

The results indicated no significant main effects of Time or Cohort, and no

interaction between the two independent variables (See Table 40). In other words, there

were no significant differences in student achievement or in achievement between

cohorts before or after one year of implementing this reform initiative.

Table 40: ANCOVA for Pre-Post Achievement

Source	df	SS	MS	F	p
Between Subjects					
Ed Load	1	7132.75	7132.75	56.13	.000
Cohort	2	101.88	50.94	.40	.673
Error	34	4320.97	127.09		
Within Subjects					
Time	1	17.66	17.657	.83	.370
Time x Ed Load	1	67.55	67.55	3.16	.084
Time x Cohort	2	97.45	48.72	2.28	.118
Error(Time)	34	726.58	21.37		

The second ANCOVA was run using three levels of Time: the pre-test data which

was each school's percent of total students passing the state standardized tests for the

year immediately preceding the reform implementation; the post-test 1 data, which

consisted of each school's percent of total students passing the state standardized tests

following the first year of the reform implementation; and the post-test 2 data, which

consisted of each school's percent of total students passing the state standardized tests

for the second year of reform implementation. For this ANCOVA, all but two of the

thirty-eight schools were included in the analyses since all cohorts had implemented the

reform initiative for at least two years. However, the two schools that were excluded did

not have student achievement data for those three years because they were new schools

that had not been open at that time. Educational Load had a significant effect on group

differences such that it was important to include as the covariate. The β-weight for

educational load for Pre-test was -.53; the β-weight for educational load for Post-test was

-.45; and the β-weight for educational load for Post-2 was -.40.

The results for this analysis indicated no significant main effects of Time or

Cohort. However, there was a significant interaction effect between the two independent

variables Time and Educational Load, and a significant interaction effect between the

two independent variables Time and Cohort (See Table 41). This indicates that the effect

of the years of implementation (Time) has on a school's student achievement depends on

the educational load or cohort of the school.

Table 41: ANCOVA for Three Levels of Time

Source	df	SS	MS	F	p
Between Subjects					
Ed Load	1	9444.14	9444.14	56.52	.000
Cohort	2	35.61	17.81	.11	.899
Error	32	5346.79	167.09		
Within Subjects					
Time	2 (1.91[a])	93.62	49.15	2.43	.099 [a]
Time x Ed Load	2	128.02	64.01	3.32	.042*
Time x Cohort	4	248.54	62.14	3.22	.018*
Error(Time)	64	1233.42	19.27		

[a] A Mauchly's test revealed a significant departure from Sphericity for testing the within subjects effect of Time. The degrees of freedom and p-value for this effect has been adjusted accordingly using the Huynh-Feldt correction.

In order to further understand the effects of these interactions, we can examine the

interaction between time and educational load, and also the interaction between time and

cohort. Figure 5 illustrates schools' percent passing rate on standardized tests by

educational load over time. As we can see from this chart, while all schools'

standardized test performance increase over time, the performance of the schools that

have the highest educational load, in other words are most heavily impacted by poverty,

increases more than that of those schools not as heavily impacted by poverty.

Figure 5: Schools' Percent Passing by Educational Load over Time
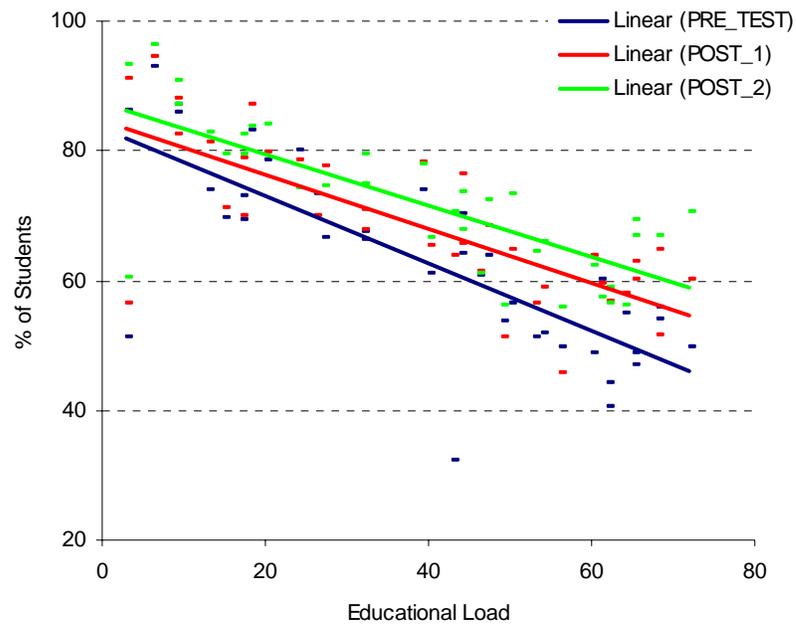
To examine this more closely, it is interesting to look at schools' performance on

standardized achievement tests over time by educational load by cohort (See Figure 6,

Figure 7, and Figure 8).

*Figure 6: Cohort One Percent Passing by Educational Load over Time*
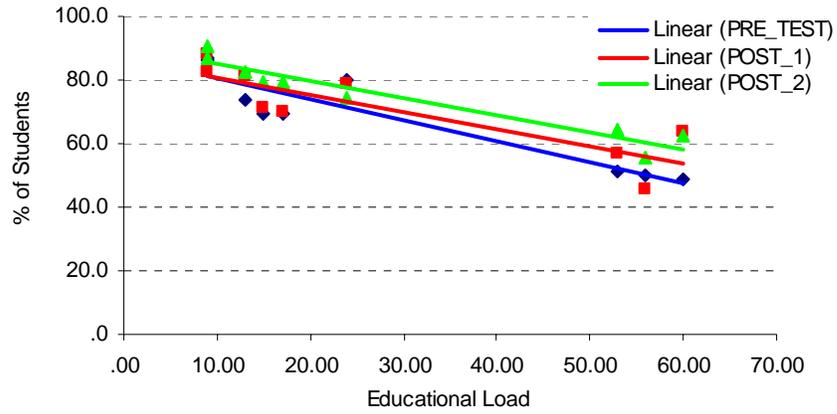
*Figure 7: Cohort Two Percent Passing by Educational Load over Time*
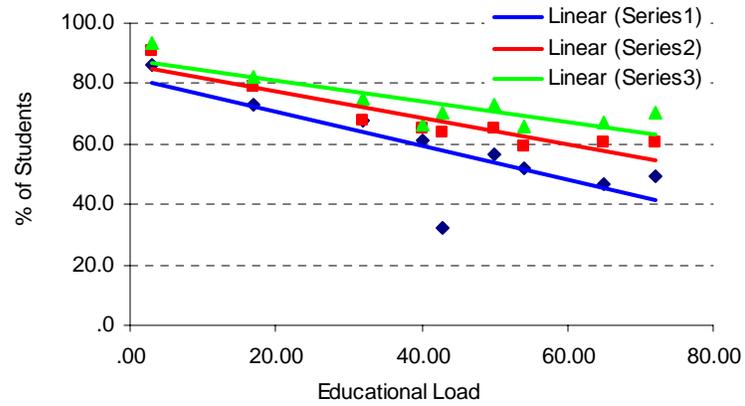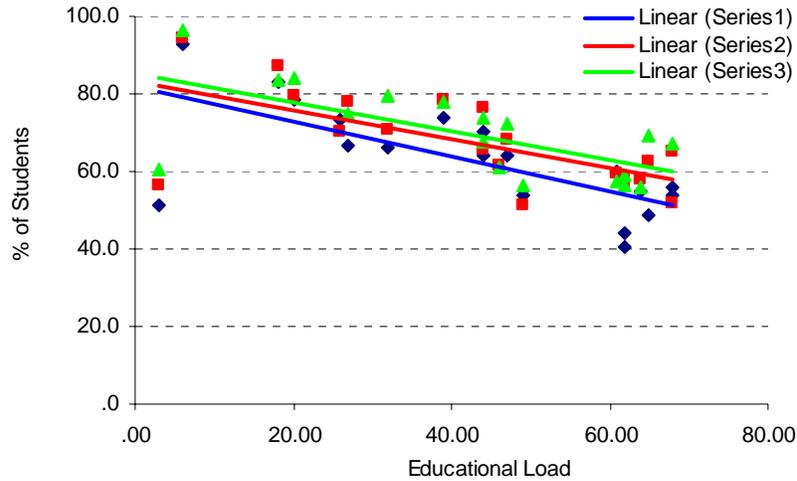
As you can see, while all three cohorts show the same trend in performance over time with respect to the percent of students passing standardized test scores by schools' educational load, the performance of the Cohort 2 schools with higher educational load seems to increase more than the performance of the schools with higher educational loads within Cohorts 1 and 3.

In order to examine the interaction between time and cohort, we can compute the adjusted means for standardized test performance for each cohort in order to account for the effect of educational load. When we plot the performance of cohort over time adjusting for educational load, the plot shows that students who attend schools within Cohort 2 show an increase in their achievement levels at a steady rate across both years of the reform implementation, surpassing the other two cohorts (See Figure 9). While Cohort 1 and Cohort 3 also show gains in the student achievement levels, they are not at the same rate as Cohort 2.

Figure 9: Plot of Estimated Marginal Means for Three Levels of Time
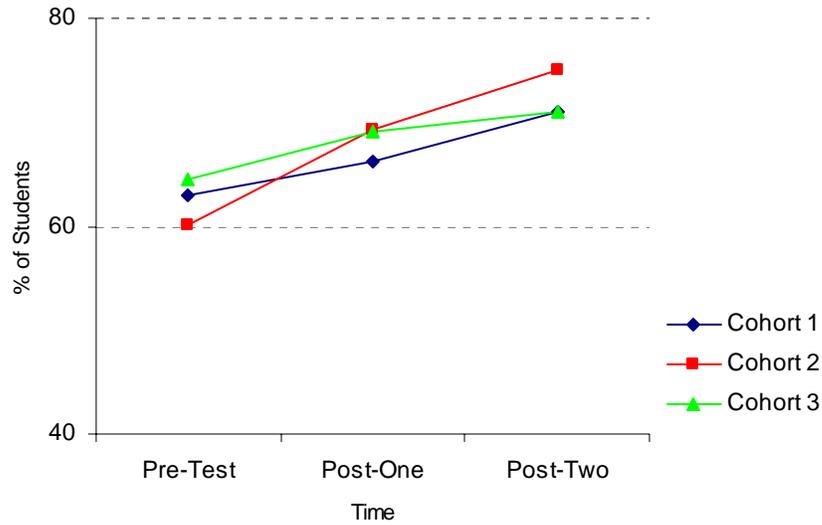
We know from the descriptive statistics that educational load was relatively different (lower) for Cohort 1 compared to Cohort 2 and 3. Because Cohort 1 was relatively less impacted by heavy educational loads, it is interesting to see that even when accounting for this adjustment, Cohort 1 is performing at the same level as Cohort 3, which has a similar educational load as Cohort 2. In other words, over time, student achievement for one of the two cohorts most heavily impacted by educational load (Cohort 2) is increasing at a faster rate than the student achievement rate for the other two cohorts, one of which is the least impacted by educational load (Cohort 1).

To test for significant differences between cohorts at each given time and also significant differences between the three levels of time within each cohort, follow-up tests were conducted.

One way ANOVAs for cohort were conducted using the adjusted means in order to determine significant differences between cohorts at each time level. The results, shown in Table 42, reveal no significant differences between cohorts at each given time

level. Therefore, even though all cohorts make gains over time, and cohort 2 seems to be making greater gains over time, the achievement levels of cohort 2 are not significantly different from cohort 1 and cohort 3.

Table 42: Follow-up ANOVAs for Cohort Effect

Source	df	SS	MS	F	p
Pre-Test					
Contrast	2	119.910	59.955	.667	.520
Error	32	2877.887	89.934		
Post-1					
Contrast	2	52.602	26.301	.416	.663
Error	32	2022.482	63.203		
Post-2					
Contrast	2	111.641	55.821	1.063	.357
Error	32	1679.838	52.495		

Dependent t-tests for time within each cohort were conducted in order to determine significant differences between time levels for each cohort. The results (shown in Table 43, Table 44, and Table 45), indicate that Cohort 1 made significant gains in student achievement after three years of Baldrige implementation. Cohort 2 made significant gains after one year, two years, and three years of Baldrige implementation. Cohort 3 made significant gains in student achievement after one year and after three years of Baldrige implementation.

Table 43: Follow-up Paired t-tests for Cohort One

	Paired Differences		df	t	p
	Mean	SD			
Pre-Test vs. Post-Test 1	2.40	6.1386	8	1.173	.275
Post-Test 1 vs. Post-Test 2	4.33	5.6249	8	2.311	.050
Pre-Test vs. Post-Test 2	6.73	6.3127	8	3.200	.013*

An $\alpha = .05/3 = .0167$ was used in order to determine significance.

Table 44: Follow-up Paired t-tests for Cohort Two

	Paired Differences		df	t	p
	Mean	SD			
Pre-Test vs. Post-Test 1	9.59	9.0367	8	3.183	.013*
Post-Test 1 vs. Post-Test 2	5.91	2.9553	8	6.001	.000*
Pre-Test vs. Post-Test 2	15.50	10.2801	8	4.523	.002*

An $\alpha = .05/3 = .0167$ was used in order to determine significance.

Table 45: Follow-up Paired t-tests for Cohort Three

	Paired Differences		df	t	p
	Mean	SD			
Pre-Test vs. Post-Test 1	4.68	5.7743	19	3.621	.002*
Post-Test 1 vs. Post-Test 2	2.08	4.8374	17	1.827	.085
Pre-Test vs. Post-Test 2	6.96	6.3711	17	4.632	.000*

An $\alpha = .05/3 = .0167$ was used in order to determine significance.

The third ANCOVA was run using four levels of Time: the pre-test data which was each school's percent of total students passing the state standardized tests for the year immediately preceding the reform implementation; post-test 1; post-test 2; and post-test 3 data, which consisted of each school's percent of total students passing the state standardized tests for the third year of reform implementation. For this ANCOVA, eighteen schools were included in the analyses since only Cohorts 1 and 2 had implemented the reform initiative for three years. Cohort 3 was not included in this analysis because they had only implemented the reform for two years. Educational Load had a significant effect on group differences such that it was important to include as the covariate. The β-weight for educational load for Pre-test was -.61; the β-weight for educational load for Post-test was -.49; the β-weight for educational load for Post-2 was

-.44; and the β-weight for educational load for Post-3 was -.45. Therefore, the impact of educational load is decreasing over time.

The results for this analysis indicated no significant main effects of Time or Cohort. In addition, there were no significant interaction effects between the two independent variables Time and Educational Load, or the two independent variables Time and Cohort (See Table 46). Schools' student achievement did not change significantly over the three years of Baldrige implementation or by cohort.

Table 46: ANCOVA for Four Levels of Time

Source	df	SS	MS	F	p
Between Subjects					
Ed Load	1	7441.76	7441.76	73.37	.000
Cohort	1	127.71	127.71	1.26	.279
Error	15	1521.45	101.43		
Within Subjects					
Time	3 (2.29 [a])	144.56	63.08	2.48	.091 [a]
Time x Ed Load	3	144.26	48.09	2.48	.073
Time x Cohort	3	129.63	43.21	2.23	.098
Error(Time)	45	873.04	19.40		
Total	70.29	10444.78			

[a] A Mauchly's test revealed a significant departure from Sphericity for testing the within subjects effect Time. The degrees of freedom and p-value for this effect has been adjusted accordingly using the Huynh-Feldt correction.

The fourth and final ANCOVA was run using four levels of Time: the pre-test; post-test 1; post-test 2; post-test 3; and the post-test 4 data, which consisted of each school's percent passing of total students passing the state standardized tests for the fourth year of reform implementation. For this ANCOVA, only nine schools were included in the analysis and cohort was not included as a variable, as only Cohort 1 had implemented the reform initiative for four years. Educational Load had a significant effect on group differences such that it was important to include as the covariate. The β-

weight for educational load for Pre-test was -.66; the β-weight for educational load for

Post-test was -.55; the β-weight for educational load for Post-2 was -.53; the β-weight

for educational load for Post-3 was -.56; and the β-weight for educational load for Post-4

was -.59.

The results for this analysis indicated a significant main effect of Time. There was

no significant interaction effect between the two independent variables Time and

Educational Load (See Table 47).

Table 47: ANCOVA for Five Levels of Student Achievement Repeated Measure

Source	df	SS	MS	F	p
Between Subjects					
Ed Load	1	6130.43	6130.43	58.86	.000
Error	7	729.08	104.15		
Within Subjects					
Time	4	180.51	45.13	2.88	.041
Time x Ed Load	4	35.96	8.99	.57	.684
Error(Time)	28	439.17	15.69		
Total	44	7515.15			

Follow-up tests were conducted on the main effect of Time. Although we know

that student achievement increased each year, dependent t-tests were run in order to

determine whether or not the increase for each year was significant. The results can be

seen in Table 48.

Table 48: Follow-up Paired t-tests

	Paired Differences		df	t	p
	Mean	SD			
Pre-Test vs. Post-Test 1	2.40	6.14	8	1.17	.275
Pre-Test vs. Post-Test 2	6.73	6.31	8	3.20	.013
Pre-Test vs. Post-Test 3	8.39	7.13	8	3.53	.008
Pre-Test vs. Post-Test 4	10.47	6.90	8	4.55	.002*
Post-Test 1 vs. Post-Test 2	4.33	5.63	8	2.31	.050
Post-Test 1 vs. Post-Test 3	5.99	5.73	8	3.13	.014
Post-Test 1 vs. Post-Test 4	8.07	4.60	8	5.26	.001*
Post-Test 2 vs. Post-Test 3	1.66	2.85	8	1.74	.120
Post-Test 2 vs. Post-Test 4	3.73	4.52	8	2.48	.038
Post-Test 3 vs. Post-Test 4	2.08	2.59	8	2.41	.043

An $\alpha = .05/10 = .005$ was used in order to determine significance.

The results from the paired t-tests show that there are significant differences in student achievement for the students within Cohort 1 schools between their pre-test scores and post-test 4 scores and between their post-test 1 scores and post-test 4 scores. In other words, the only significant increases in student achievement occurred after four years of implementation, and also between year one and year four of implementation. While there were increases in student achievement between all years of the reform implementation, they were not significant. Similarly, the increases in student achievement from year two to year three were not significant.

Summary

There were two quantitative research questions for this study, and the purpose of this chapter was to outline the findings for each of those questions, along with their sub-questions. The chapter began with a description of the participants and the schools in which they teach. Also included in this section were the descriptive statistics related to those participants, their questionnaire results, and the schools that were included in this study. The second section of this chapter presented the findings for the first research question and identified key factors at the teacher and school level that significantly

influenced teachers' reform practices and beliefs about the reform. Teachers' beliefs about whether or not their students learned more as a result of the initiative was found to be a key significant factor across several analyses. The third section of this chapter presented the findings for the second research question and assessed the impact of the reform implementation on student achievement. There was found to be no significant change in students' mathematics performance at the school level over time that can be attributed to Baldrige alone. In addition, it appears that schools that are more heavily impacted by poverty, while still underperforming compared to their less impacted counterparts, are making larger gains in student performance at the school level as measured by standardized tests than schools not so heavily impacted by poverty. Findings for the third research question, addressing the qualitative portion of this study, are outlined in chapter five.

CHAPTER FIVE: QUALITATIVE RESULTS

In keeping with the purpose of this study, questionnaires were distributed to all 260 middle school mathematics teachers within the 38 middle schools in the school district. Of the 260 questionnaires that were distributed, 179 were returned, representing twenty-nine schools. In order to identify a high and low implementation school for Phase II of the study, questionnaire data, along with student achievement data on standardized tests and performance data on enrollment and passing rates in higher level mathematics courses, specifically algebra one, were analyzed for each school. A high and low implementation school was identified, and a case study was conducted on each school in order to identify key factors that helped and/or hindered the implementation practices of teachers and leaders as they attempted to implement the Baldrige in Education reform initiative. The purpose of this chapter is to describe the selection process for each of the cases and to present the research findings for this qualitative portion of the study.

The primary research question for the qualitative portion of this study was: What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative? In order to answer this question, two schools that had participated in Phase I of the study were identified using student performance data and questionnaire results. Mathematics teachers, the staff development teacher, and the principal from each school were interviewed, and a case study of each school was conducted.

The chapter begins with a description of how the two cases were selected. Following this section is a description of each of the two cases. Identified influential factors that emerged from the data are described in the third section of this chapter. The

final section of this chapter discusses the role that these factors played across both schools involved in this study.

<center>Description of Case Selection</center>

There were several considerations for selecting two cases for this portion of the study. First, I was interested in looking at schools that have been implementing the reform initiative for the same amount of time. Second, I was interested in looking at schools with different implementation levels of the reform, preferably one with a reported higher level of implementation and one with a reported lower level of implementation so that I could look at the factors that may have contributed to these differences. For the same reason, I was interested in differences in teachers' level of concerns. I chose to examine schools within Cohort three because there were thirteen schools from which to select two contrasting schools, whereas in each of the other two cohorts there were nine. Also, the schools within that cohort represented a range of demographic make-up and student mathematics performance as measured by standardized test scores and placement and completion in higher level mathematics courses. Finally, I wanted to select schools that had a high rate of return from the questionnaires so that I could be certain that the results from the questionnaire data represented the majority, if not all, of the mathematics department within that school.

The first step in selecting two cases that fit my criteria was to compare questionnaire results for level of reform implementation and level of teacher concerns about the reform (see Figure 10). As can be seen in the chart, two schools had relatively higher levels of reform implementation and relatively higher levels of teacher concerns about the reform than the others. When examined more closely, one of these schools had

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a low rate of return on the teacher questionnaire, which meant the questionnaire data may not have been representative of the entire department. Therefore, one school was left as the "high level" school. This was Prescott Middle School. When looking for a representative "low level" school, it was important to me to identify a school with similar performance data and demographic make-up. That school was Wilson Middle School.

Figure 10: Questionnaire Results for Cohort Three
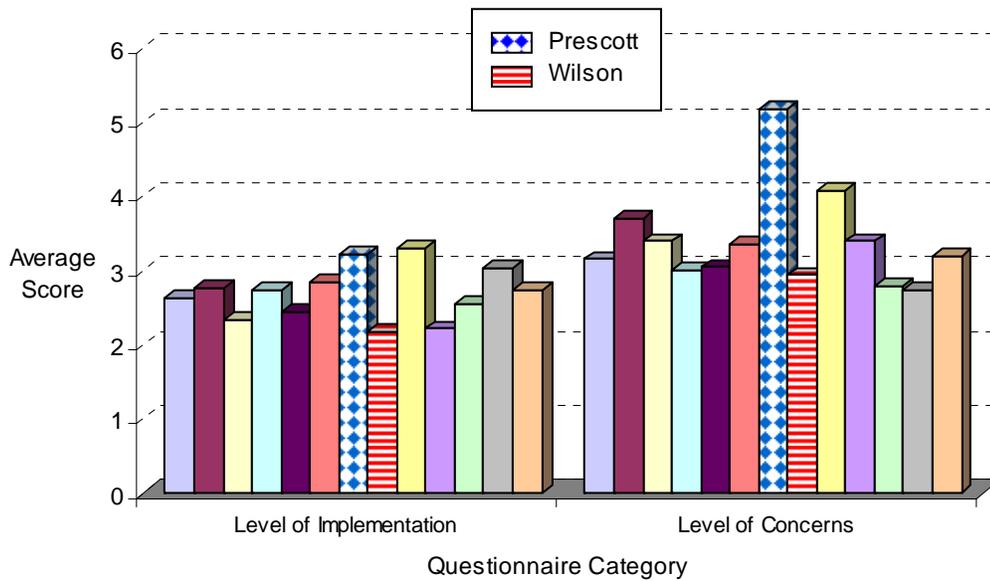
In order to make sure these two schools met my criteria, I examined the trends in passing rate on state standardized test scores for mathematics for each of the thirteen schools within Cohort three (See Figure 11). Prescott Middle School and Wilson Middle School show similar growth patterns in their passing rates over time, with Prescott Middle School performing at the same level as Wilson by the year 2007. The 2007 data was released toward the end of this study and is an interesting finding that will be discussed later in this chapter.

Figure 11: Mathematics Standardized Test Scores for Cohort Three Schools
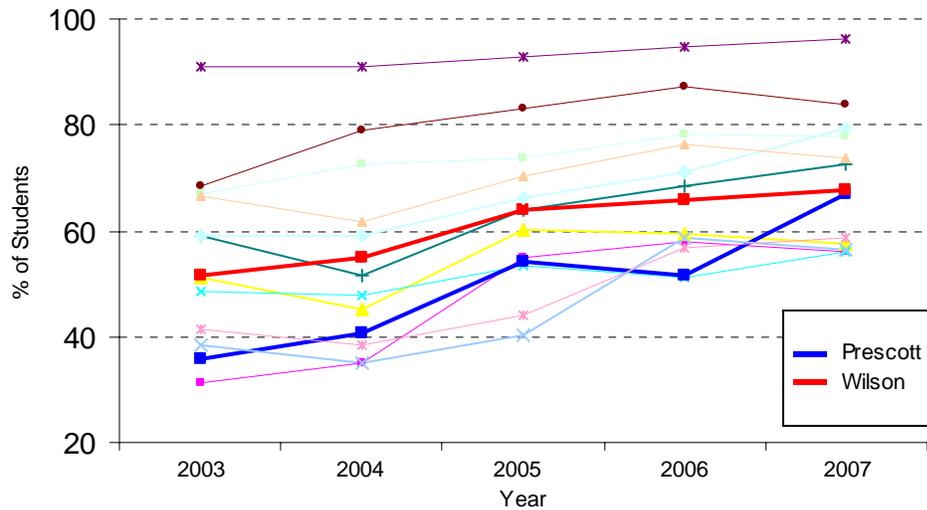
Another critical performance measure for middle schools within this school district is the enrollment and completion rate for algebra one by eighth grade. Figure 12 shows the algebra one completion rate by educational load for each middle school for the year 2005-2006. The trend line is what would be expected, with schools with a lower educational load showing relatively higher algebra completion rates by the end of eighth grade than those schools with a higher educational load. Even though Wilson Middle School is less impacted by poverty than Prescott, both schools show low algebra one completion rates during the year 2005-2006, the first year of the reform implementation for both schools. Figure 13 shows the algebra one enrollment by the end of grade eight by educational load for each middle school for the year 2006-2007, the second year of the reform implementation. An interesting observation is that Prescott Middle School made significant changes in their enrollment rate, while Wilson stayed relatively similar in their

algebra one enrollment. This was an interesting observation and one that I wanted to

explore further through this case study.

Figure 12: Algebra One Completion by Eighth Grade for 2005-2006 by Middle School
*Educational Load*
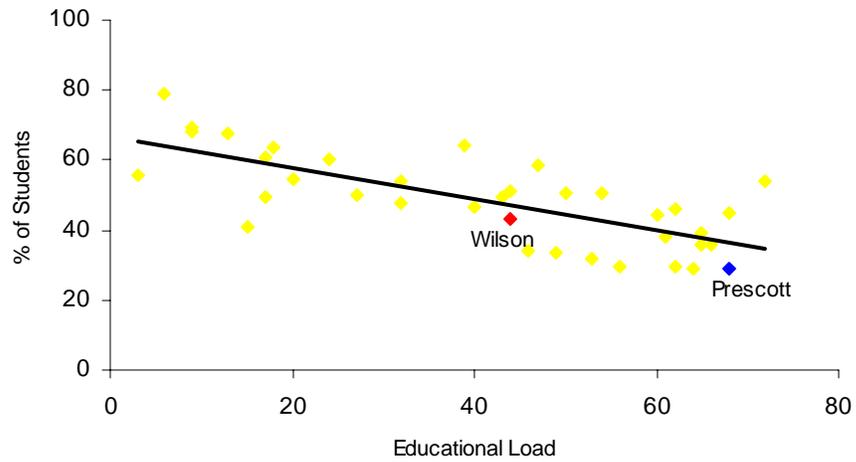
Figure 13: Algebra One Enrollment for 2006-2007by Middle School Educational Load
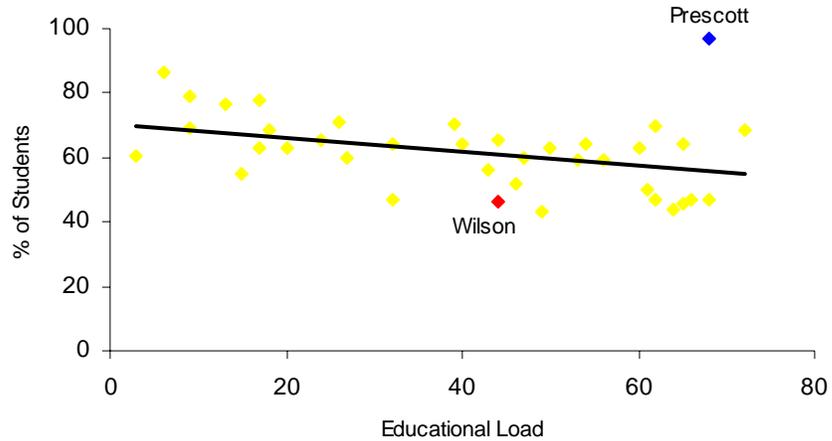
The last criteria used for selecting the two schools for this case study was a similar demographic make-up. While the two schools are not identical in make-up, they face similar challenges. For example, even though Wilson Middle School is larger than Prescott Middle School, Prescott has a higher poverty rate, as indicated by educational load. Further, while Prescott has a higher percentage of students whose first language is something other than English, Wilson has a higher percentage of students receiving special education services. So while these schools are not identical in demographic make-up, they face considerable challenges within their student population. (See Table 49).

Table 49: Demographic Data for Case Study Schools

	Prescott	Wilson
Total Students	679	816
Demographic Make-Up		
African American	27.8%	18.4%
Asian	12.4%	11.2%
Hispanic	46.2%	26.5%
White	13.5%	43.6%
Free and Reduced Lunch	53.0%	28.2%
English Speakers of Other Languages	12.8%	4.4%
Special Education	10.9%	15.1%
Educational Load	67.7%	44.2%
Mobility Rate	21.7%	16.3%
Attendance Rate	95.0%	94.7%
Suspension Rate	13.7%	11.8%

Source: *MCPS Schools at a Glance 2006-2007*

Because Prescott Middle School and Wilson Middle School show relatively different levels of reform implementation and teacher concerns; and because these schools have interesting mathematics performance data; and because these schools have

comparable demographic make-ups, they were chosen for this case study. The next two sections of this chapter describe in more detail each of the two schools.

Description of Prescott Middle School

Two years ago, Prescott Middle School underwent several changes. One of the biggest changes has been a new principal and new staff development teacher. The turn-over in these two key leadership positions was a result of failing standardized test scores for three consecutive years. Instead of contributing to low morale and a negative school climate, the challenges of new leadership and increasing passing rates on standardized test scores before being taken over by the state have served as powerful, uniting influences on the teachers and students within the building. When asked to participate in this study, the teachers and leaders within the building were enthusiastic, accommodating, and more than willing to give their time and open their classrooms.

Over the last two years, Prescott has introduced and initiated several programs and reform initiatives. Before initiating and implementing any of them, the principal and staff development teacher, along with other members of the leadership team, met on numerous occasions to determine the short term and long term focus for the school. They agreed that the focus should be on "not to focus on the floor, but to take care of the floor by focusing on the ceiling" (Prescott principal, 5/07 interview). In other words, the focus for Prescott was to move away from remediation and instead focus on acceleration, or exposing students to higher level, more rigorous material, specifically in mathematics.

The area of mathematics was of great concern for this new leadership, and the school as a whole. Prescott had not met the state standards in mathematics for the previous three years and was showing no signs of improvement for the upcoming years. The county school system was also pushing for increased enrollment in more rigorous courses. Specifically, the school system was measuring enrollment in and completion of algebra one by the end of grade eight. Prescott was far below the county benchmarks in this measure with enrollment at 47% and completion at 29%. In addition, the county school system was pushing schools to close the achievement gap between white and Asian student achievement and African American and Hispanic student achievement. Up until these leadership changes took place at Prescott, this school was able to hide from these benchmarks. With the new leadership came new core beliefs about students and learning, new expectations, and a new level of risk-taking in order to make positive changes within the school.

The first problem the new principal discovered and addressed was the inequities in placement in higher level mathematics courses, specifically algebra one. When looking at the master schedule, he saw close to 100 eighth grade students, mostly African American and Hispanic, shut out of algebra one. They were scheduled, instead, to be enrolled in the remedial course for eighth grade mathematics. The principal recognized this as a problem, and shared his core beliefs about mathematics learning:

> I have done some reading of studies that talk about back-filling, which is when you expose kids to higher level math and skills and calculators, the back skills - they almost magically start to happen. And I can understand

that. My background is in English and reading, and when I try to make the comparison, I have seen lots of kids when they become interested in a topic to read, as they hit a certain age and all of a sudden they've discovered American literature or *Sports Illustrated*, the act of reading itself sort of backfills itself and all the things they've missed - the skills of reading. I've seen that happen in reading and so it made sense to me that if you can get kids exposed to higher level math and get them interested in higher level math, that some of those basic skills would take care of themselves. (Prescott principal, 5/07 interview)

The principal's core beliefs about students' learning of mathematics did not necessarily reflect the core beliefs of the teachers, the actual implementers of this decision. The principal described the process he went through with the teachers in order to address the problem and come to some shared agreement about the course of action:

I put them in the room and I put the problem on the table. And they said, 'Let's do it.' I couldn't have forced them to do it. It was them. We sat in a room and I wrote up on the board the problem. And I showed them who the kids were. And someone would come up with a suggestion, and someone would shoot it down. Or they said this idea wouldn't work, and finally they threw up their hands and said, 'Let's put them all in.' (Prescott principal, 5/07 interview)

After coming to a shared agreement to put all eighth graders into algebra one, the Prescott principal communicated this decision to the county officials. He was confronted

with much resistance from the county central office, specifically the mathematics curriculum and instruction office. Still, this principal pushed forward with his and his teachers' decision to enroll every eighth grader in algebra one. He explains his decision in this way:

> I'm really big on…I need the obstacles to be real. I can't deal with shadow obstacles. I can't deal with people saying, 'you're going to put these kids in algebra one and they're going to fail because they're only on a second grade math level.' And I say, 'well, why aren't you saying I can't put them in Math C [on-grade level math for eighth grade] because they're obviously going to fail that too?' What is it that's so sacred about algebra one that they can't fail algebra one? So if your point is that they need to be placed where they are then they should be placed in a second grade math class. If that's your point, which I don't think it is because that's sort of absurd. So then the next question is why not algebra one? What is so special about Math C? And the lack of answers to those questions is what I kept coming back to. Well, if you can't answer that, then you're not much of an expert. (Prescott principal, 5/07 interview)

The decision to enroll all eighth graders in algebra one increased the need for professional development for the mathematics teachers. However, the program changes in mathematics were not the only changes the school implemented. Other reform initiatives were being instituted at the same time. Baldrige in Education was one of them. This made the need for professional development much broader than mathematics.

Professional development became an integral part of the school infrastructure. The vehicle of professional development served several purposes: "To equip the people to be ready to implement; to build the skills they needed in order to implement; and then monitor and adapt the implementation. So it wasn't something where we said, ok, everybody, pre-service, we're going to do this. Time was used to go in and help people do it and do it effectively" (Prescott staff development teacher, 5/07 interview).Time was re-organized so that teachers met during one period every day for professional development. During this time, groups of teachers focused on data and systems planning. According to the staff development teacher,

> The biggest issue was realizing that even though people were putting
> lots of things in place, to me was that the bottom line was it needed to
> start back at the beginning and say, 'do we have a way to assess current
> practices and current needs and then make decisions based upon what
> those needs actually are?' And so that premise directed everything we
> did this year. (Prescott staff development teacher, 5/07 interview)

With this goal in mind, the teachers spent their professional development time learning how to backwards-plan, or start with the assessment and what students needed to know and then work backward to the actual planning of the lesson and activities to support student learning at a variety of levels. The staff development teacher describes the role of staff development further:

> Staff development was used for a number of things: To equip the people
> to be ready to implement; And to build the skills they needed in order to

implement; and then monitor and adapt the implementation. So it wasn't something where we said, ok, everybody, pre-service, we're going to do this. Time was used to go in and help people do it and do it effectively. And then from that we moved to instruction, and ok, what's the impact on student learning, what's the data we have on that? (Prescott staff development teacher, 5/07 interview)

This approach required analyzing individual student and class data. Teachers spent a significant amount of professional development time looking at this data, analyzing it as a small group, and developing lesson plans specific to their content that met the student needs identified from the data analysis. The idea of using data to make informed decisions was a key component of the Baldrige reform initiative, and also helped the mathematics teachers with some of their new challenges.

When I asked the staff development teacher what other components of Baldrige or any other initiative she had focused on or spent time developing within the staff development period, she thought for a moment and responded with an interesting comment:

For me, it's developmental. There are certain core principles that if people can get on board with then - it's really the systems thinking and backward thinking from a needs assessment. I really go for the core beliefs. For me, the reason I go with that approach is because if you lay out Baldrige and the parts of Baldrige, people tend to go, 'oh it's just another thing. Another initiative, it'll be gone in a few years,' or 'we've

done this,' or 'it sound gimmicky,' or 'it's some little tools that you use' and then people use the little tools. What happens is it's happenstance when something is used: 'Oh, we haven't used a cute little consensogram lately, so let's use a consensogram' - not because people have come to the belief that consensus building is something we need as an organization, but just because this tool is a nice little tool. So for me, before I get down to the nitty gritty levels of what it might look like in the classroom, or tools that you might use, you have to get people to believe in this systems way of thinking. And once you're there, it's easy to then provide – 'here's some ways to get there, here are some tools to help you.' And then they truly are just that - a tool - a way to get there - and there may be five other ways that aren't listed there that are just as effective. (Prescott staff development teacher, 5/07 interview)

I was curious to know how the staff development teacher juggled the balance between subject-specific professional development and content-free, more general staff development, particularly in the area of mathematics. Often these two foci are kept separate in schools and I wondered how one person charged with providing professional development for an entire school and all its initiatives thought about this dilemma. The staff development teacher shared her thoughts on this topic:

Yeah, math is truly an issue. Our approach has been if people do not have the universals, you need the universals. So even if you have content knowledge, if you don't have instruction, and assessment, and

differentiation, responding to student needs, then there's still a problem

there. So our goal this year has been that there are core things that all

teachers have and that goes across content. And there are still some that

haven't been touched. So that's allowed me to say my focus is more global

strategic. It becomes content-oriented though, because for everything I do,

they have to immediately respond within their content. So how would you

plan lessons for what you're going to be teaching next week? So that's the

job-embedded part - the content becomes linked. So I may not be teaching

the sub-skills for algebra. Instead, I'm teaching them how to break a

content standard down to look at pre-requisite knowledge. They are going

to have to be the ones to do it. (Prescott staff development teacher, 5/07

interview)

As she continued to think about this issue, the staff development teacher began

sharing some examples of how the separation of subject-specific professional

development and more general, content-free professional development, particularly in the

area of mathematics, was not as clear as some would like to think. One example she

provided is shared below:

I went into the grading system because there was a flaw and I pull up this

teacher and every kid failed an exam. I go to the next class, every kid. Out

of four classes, only two kids passed. Now it could have been a crappy

exam, it could have been, whatever, you would not put that in. You

wouldn't count it. Let's say you realized it was a crappy exam. You

wouldn't count that exam. Let's say you realized you didn't teach well. You wouldn't put that in. You go back and you re-teach them until the kids get it. You use it as a marker maybe, a pre-assessment for where you're going to go next. You don't use it as a grade for kids. She couldn't recognize that. So is that a content issue, or a pedagogical issue? In some cases it's hard to distinguish. When I talked to the teacher, I asked, 'tell me what you think about this,' and she said the kids cannot compute. Well what do you mean by that? She said that was the non-calculator part of the test so when you take the calculators away from the kids, they can't do it. So I said, 'ok, can I see the exam? Maybe we can work something out. Maybe there were certain items they got and we could analyze what they didn't get.' Well, I looked at the exam. The exam wasn't straight computing. It was in words, they would have to take the statement in words, translate the words into a problem and then solve it. So my question to her was 'Was it step one, setting up the problem that they had a problem with, or step two - the computing of the problem?' No, she didn't check. So I don't know if the problem is mathematical knowledge or pedagogical knowledge. Because to me, it's a generic thing - I don't have to be a math teacher to realize there are two steps that are needed there to determine what it is that kids need. Is it transferring the statement to a problem or the computing? So sometimes there is a clear link there and other times you weren't sure which one. (Prescott staff development teacher, 5/07 interview)

It became clear that the by focusing on a more generic set of skills that all teachers should know and be able to do, the staff development teacher believed she was adequately meeting the needs of the mathematics teachers, or at least helping them to better meet the needs of their students. She expressed that while there may be a need for some content-specific training, many needs could be me through this focus on the universals. And the Baldrige reform initiative focused on some of these universals.

Because I had already reviewed the results of the Baldrige questionnaire for Prescott, I was interested in what the staff development teacher had articulated as the focus of the teachers' professional development time in terms of Baldrige (see Figure 14). The mathematics teachers had reported relatively high levels of implementation in the areas of Faculty and Staff Focus, Performance Results, and Student and Stakeholder Focus. The categories of Leadership and Information and Analysis were not far behind in terms of level of implementation. When looking at these sections of the questionnaire, it was interesting to see that several questions within these categories related to using and sharing individual and class data to make decisions about instruction.

Figure 14: Level of Baldrige Implementation for Prescott Middle School
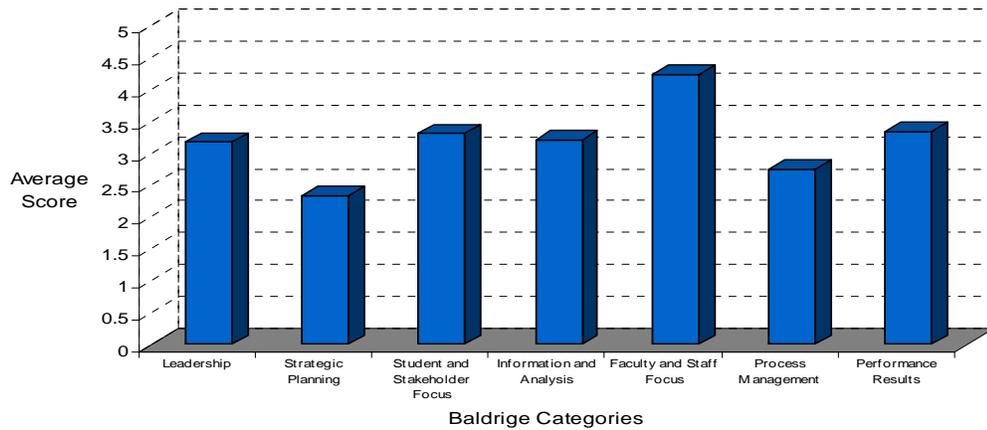
Because Prescott has had to undergo many changes in the last two years in order to avoid a state takeover, I was particularly interested in how mathematics teachers reported their levels of concern about the Baldrige reform initiative. Using their responses from the Stages of Concern portion of the questionnaire, I created Prescott's Concerns profile (see Figure 15).

Figure 15: Stages of Concern Profile for Prescott Middle School
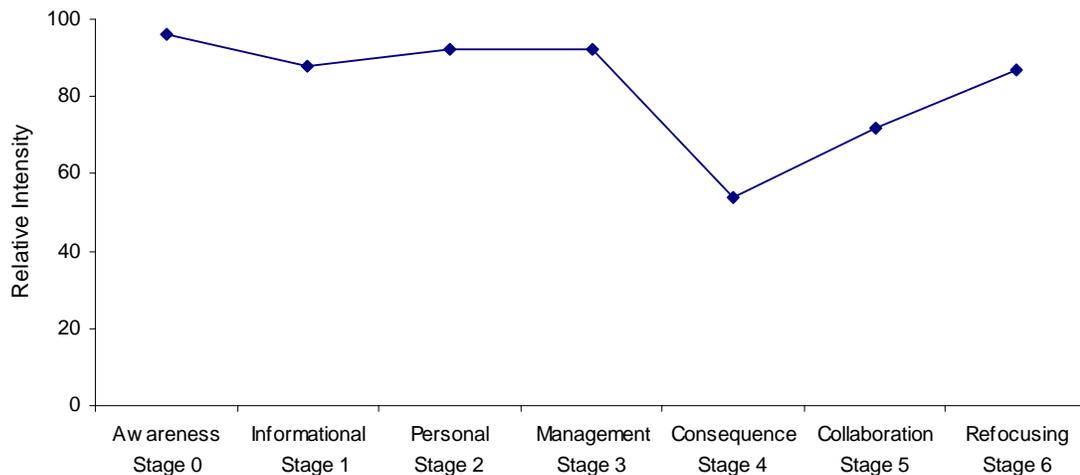
In looking at the individual parts of the profiles, the first observation that can be made about Prescott is that there are relatively high levels of concern about the Baldrige reform initiative at all stages except Stage 4 and Stage 5. This overall high level of concern may be a result of the stress the school has been under to perform.

Because the Stage 0 scores indicates the little concern about or involvement with an initiative, Prescott's high score at this stage indicates that things other than this reform initiative, be it another initiative or different activities, are of greater concern than the Baldrige initiative. While teachers and leaders at Prescott spoke about the Baldrige initiative, it was always as a part of a bigger cause. As the principal stated,

> I mean, I'm not going to do it just for Baldrige sake - if you say this is one thing with data notebooks, I'd say, 'oh that sounds very interesting. That's going to fit into our needs. I'm going to use it.' The PDSA [Plan, Do, Study, Act planning tool] - that's a good way to evaluate and judge what we're doing, so I'm going to take that and use that. We're not going to do things just for the sake of doing them. So someone has to point out, 'you're trying to accomplish this goal, this is a tool that you can use for that.' And then if we buy into it, then we say, 'yes it is.' (Prescott principal, 5/07 interview)

And so while the teachers may be using parts of the Baldrige reform initiative in their daily practice, they are using these parts as a piece of a larger vision and mission within the school.

Stage 2 and Stage 3 of the Prescott profile show relatively high levels of concern. This means that teachers are highly concerned with both the personal ramifications and the management aspects of implementing the reform. A high score for Stage 2 indicates that teachers are worried about how this initiative will affect them as teachers – how much will they need to change, learn, and implement in order to be successful? What happens if they don't? A high score for Stage 3, management concerns, indicates that participants are expressing relatively intense worries about time, logistics, and other managerial problems associated with the initiative.

The scores for Stage 4 and Stage 5 are relatively less intense than the other stages. This is interesting because Stage 4, the Consequence Stage, deals with concerns about the impact of the initiative on students. A low score for this stage suggests that the teachers at Prescott are not intensely concerned about the impact of this reform initiative on their students. A low score at Stage 5, the Collaboration Stage, indicates that teachers are not overly concerned with how this reform initiative will impact their collaboration with other teachers.

The final portion of the profile analysis looks at Stage 6, the Refocusing Stage. The "tailing up" is usually a signal that participants have ideas that they see as having more merit than the reform initiative being studied. This pronounced tailing up for Prescott is interesting because I believe it speaks to the high levels of self-efficacy and locus of control that were exhibited in almost every interview within Prescott. This topic will be discussed further in the last section of this chapter.

Description of Wilson Middle School

Two years ago, Wilson Middle School also underwent changes in key leadership positions. After their longtime principal retired, the school district seized the opportunity to recruit a new principal and new staff development teacher who would be charged with "fixing the school" (Wilson principal, 6/07 interview). The school had exhibited failing standardized test scores for two consecutive years, student behavior problems were at an all-time high, staff morale was low, and staff was known throughout the school district as being negative and resistant to change. Whereas the change in leadership and similar challenges served as a uniting force for Prescott, these changes and challenges served to increase the levels of distrust, uncertainty, and learned helplessness that had already manifested itself throughout Wilson Middle School.

When asked to participate in this study, the teachers and leaders within the building were resistant and reluctant. They were first worried about why they were selected. They then wondered how the data would be used and who would have access to it. The teachers agreed to meet with the promise of food, gift certificates, and professional letters for their files. The principal agreed to meet after two months of contacting her through email, over the phone, and visits to her office. Once the interviews began with the educators in the building, they seemed much more forthcoming and relaxed with sharing information about their practice, their beliefs, and their involvement with the Baldrige reform as well as the mathematics instructional goals and program at their school.

One of the first things I asked the principal and teachers from Wilson was to describe the vision and focus of the school. Because I interviewed each educator individually, the responses to this question were interesting. According to the principal, the vision she has for Wilson Middle School is, "Excellence as a school – turning the school into a place where students feel safe, they learn at high levels, and teachers teach well," (Wilson principal, 6/07 interview). I asked her to elaborate on the focus for the school in order to achieve this. She thought for a moment and explained:

> I was hired to fix the school. Everybody here knows that the school has been just barely hanging on in many areas and so I am working on fixing that. We need to pass the state tests, we need to weed out some of the bad contributors to this problem, and we need to fix behavior. Sometimes the teachers don't like all of this change, but it's necessary in order to make this school a place of excellence. (Wilson principal, 6/07)

When I asked individual teachers about the vision of the school, they all agreed that there was one. They agreed that while they thought there was a vision, it wasn't always clearly articulated or enacted. When I asked them what it was, one teacher claimed the school vision and focus was equitable practices. Another teacher cited behavior of students as the school vision and focus. A third teacher stated that it was student achievement. I asked individual teachers to elaborate on their thoughts about the school focus, and many of them had a similar reaction. They expressed a level of cynicism about what they perceived to be hypocrisy across the levels of leadership. One teacher described in this way:

I think the vision is there but it isn't seeing some of the obstacles. Just because we don't talk about them doesn't mean they aren't there. There is a difference between talking the talk and walking the walk. There's a lot of talking here at school. Our motto is responsibility and respect and I think it's really just about talk the talk and not walk the walk. (Wilson teacher, 6/07 interview)

Comments of discouragement and almost a learned helplessness were pervasive during the interviews with teachers. When I asked about Baldrige and the role it plays in the school, most teachers expressed that they didn't use it. When I asked them to elaborate, one teacher stated, "It was just one more thing to do. And I think it's funny that Baldrige is pushed on us when I don't think the hierarchy uses it. The upper people don't use it. They make the decisions but don't do it," (Wilson teacher, 6/07 interview).

I was curious, then, to ask them about their responses on the Baldrige questionnaire. If the teachers really were not using Baldrige, then their questionnaire results should have been much lower than what they were. However, teachers did indicate on the questionnaire that they used some aspects of Baldrige at least some of the time (see Figure 16).
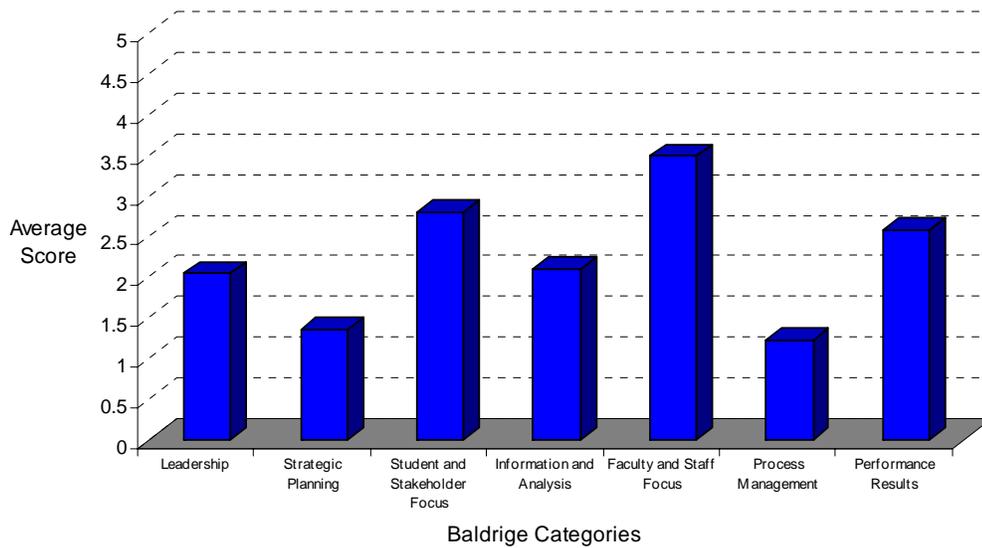
Teachers looked back at the questionnaire again, and reflected on their responses. They indicated that several questions were very generic and so they weren't necessarily exclusive to just the Baldrige initiative. One teacher mentioned that they "were probably using it more than they thought and they just didn't know it" (Wilson teacher, 6/07 interview). They stated several reasons for this, one being the lack of professional development centered on Baldrige. One teacher describes the professional development on Baldrige in this way:

> We had one or two trainings on it. I think we even did a pre-service on it last year. But then it just stopped. And that was where the information came from. It came from her [the staff development teacher] but then there was nothing. And I haven't heard anything about it at all recently. I think the last time I heard anything was when at the beginning of the year they

told us someone was coming to observe us using Baldrige and we all

freaked out. It was because the county was up for a Baldrige award and

they wanted to make sure all the schools were using it and so we were told

that someone might come and observe us and so we better know what it is

and try something. So it was kind of this Baldrige pushed down our throat

when they were evaluating the county. And then we went on to something

else. (Wilson teacher, 6/07 interview)

Wilson's Stages of Concern profile that was created from the teachers' questionnaire

responses was not surprising (see Figure 17).

Figure 17: Stages of Concern Profile for Wilson Middle School
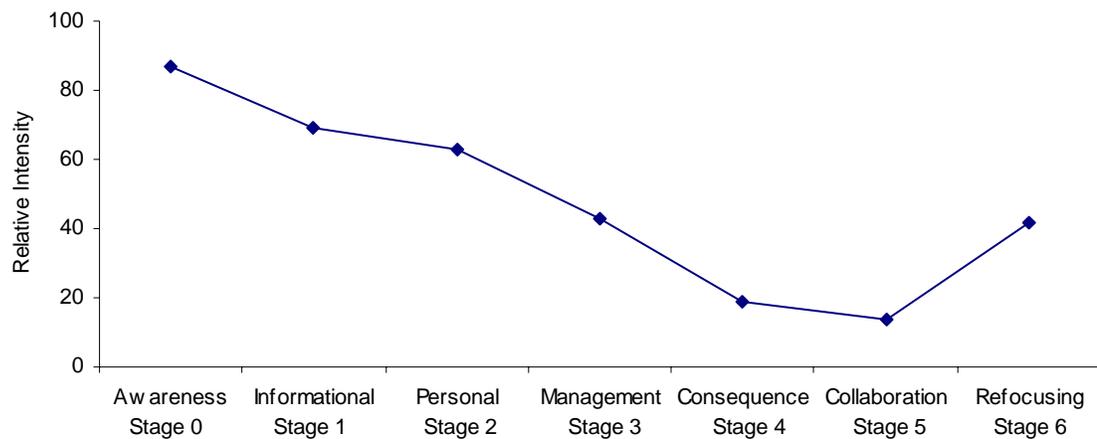
The first observation that can be made about the Wilson profile is that Stage 0, the

Awareness Stage, is the highest stage. This typically denotes non-users of the initiative.

Stage 0 scores indicate the level of non-interest and unconcern about the initiative.

Wilson's high score at Stage 0 indicates that other things, be it another initiative or

different activities, are of greater concern than the Baldrige initiative. This would make sense because to date, the school has not shown significant growth in student performance and therefore has yet to meet state standards on standardized achievement test data. In addition, the school is still showing significant student behavior problems, as reported by having one of the highest suspension rates in the county this year.

When we look at the relationship between Stage 1, the Informational Stage, and Stage 2, the Personal Stage, we can see that Stage 1 is higher than Stage 2. This indicates that teachers most likely have a positive, proactive perspective on the Baldrige reform initiative because their desire for information about the reform is higher than their personal concerns and fears about the initiative. This is interesting because it reflects the teachers' comments about implementing the reform. When asked if they would implement Baldrige in their classrooms if they had training, one teacher responded by saying,

> If someone told us it was effective, we'd do it. We'd try it and see how it worked. When I was in another school, they did a pretty good job of modeling it, and I liked it. But they never said we had to do it. Here, it's kind of dropped and we've moved on to other things. So if someone showed us how to do it, we'd try it. (Wilson teacher, 6/07 interview)

Wilson's profile shows a low Stage 3 score, which means that teachers are expressing relatively low worries about time, logistics, and other managerial problems associated with the initiative. While teachers at Wilson expressed much concern about time and the lack of it to do a good job with their curriculum, this low score makes sense

in that they are basically not using the Baldrige reform initiative. Therefore their concerns about it taking up time are relatively low.

The low score for Stage 4 for Wilson shows that the teachers' concerns about the impact of the initiative on students are not very intense. Again, if they aren't using the reform, this result is to be expected. Teachers expressed many concerns about students and the impact of other programmatic issues on students, but the impact of Baldrige was really not a factor.

Stage 6, the Refocusing Stage, is significantly "tailing up" from Stage 5 for Wilson. When Stage 6 tails up, this is usually a signal that participants have ideas that they see as having more merit than the reform initiative being studied. A pronounced tailing up should be considered an alarm for reform initiators. Wilson has so far chosen to not engage in the Baldrige reform initiative. However, while the tailing up is usually a signal that there are competing ideas, I am not convinced that the teachers and leadership at Wilson have ideas about what initiatives and priorities would be more useful in their school, and I believe they are still trying to find their way.

Professional development at Wilson Middle School seemed to lack a single focus over the last two years. When I sat down and talked with the staff development teacher, she seemed frustrated and overwhelmed by all of the demands placed upon her. When I asked what her focus has been for Wilson, she explained:

> I have tried to implement all that the county has asked. I was new to the
> job two years ago and it has been a lot to learn. And there are so many
> things I need to think about. I mean, the county has a literacy push, and
> so I need to do literacy with the teachers. But then I hear about equitable

practices, and so now we're doing that. It's been really hard to make sense of it all, plus the teachers really aren't that open to all of this. They don't really have time to do more, and they see it as more, even when it's really good stuff. They're nice, and they try it sometimes, but when no one makes them do it, they don't have to. Hopefully this summer we'll talk about what we want to focus on for next year. (Wilson staff development teacher, 6/07 interview)

I asked her about Baldrige and what role that has played with professional development. She laughed a little and responded:

Well, that's just one more thing that we've tried! I try to do little things with them, like the quality tools. We use the plus/delta at meetings and so I know some teachers do it in their classroom. Some teachers tried some of the tools, but I'm not sure how much they are really doing it. My guess is some are and some aren't. We really haven't spent much time on that since other stuff has come up and taken the time. And teachers are really not that open to it. (Wilson staff development teacher, 6/07 interview)

I was curious about the vision and goals for mathematics at Wilson Middle School. I asked the educators there about the mathematics program and what the focus was related to that. One teacher's comments summed up almost all of the comments about this topic. He said,

The pressure is always on math. And there's always something else being thrown at us so we need to make sure we're getting through it successfully. Our biggest concern is that we have all these students that

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have to take the state tests and they don't even know their multiplication facts. In the end, it's getting our kids to be proficient on state tests because that's how we are judged as a department. We're alone in this so if our students don't make proficiency in a certain area, then they're going to look at the math department and say, 'what happened?' (Wilson teacher, 6/07)

Another teacher elaborated more on what he believes is part of the issue with students not meeting standard on state tests.

It can be terribly frustrating. I've got a daughter in third grade doing the fourth grade curriculum and a lot of my students couldn't pass the fourth grade state test. So how do you get them ready for the eighth grade test? And I don't have anything close to an answer for that. How do you get a student to factor 21 when they don't know that 3 times 7 is 21? You can tell in football, how do you get 21? And they say, oh, 3 touchdowns, and yet they don't make the connection from that to be able to factor 21. I don't know how many times I've been told 21 is a prime number. And it's like I ask them, how do you get 21 points in football? Oh, 3 touchdowns. Well, how do you factor 21? It's prime. I'm even talking in algebra one - sometimes they just don't make the connection. And how do you get them where need to be when some of them are down here, and some of them are here and you can't get manipulatives or anything out because they'll be flying around the room. It seems like the kids that need it most are the ones that you can't do that with. (Wilson teacher, 6/07 interview)

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Because I was particularly interested in algebra one and the focus to put more students into algebra one by grade eight, I asked teachers to talk about that a little bit. Most teachers responded with much concern about this push, expressing that many students are not ready for this acceleration. One teacher described her thoughts about this push for algebra one in this way:

> They want us to have 80% above grade level by eighth grade but they're only sending us 40% above grade level into sixth grade. So they want us, in three years, which are difficult years for many students, they want us to double, to accelerate students that haven't been accelerated in the past. And we have all these kids that have gaps and we aren't given the time to go back, we're not allowed to come off our alignment to meet their needs. This idea about changing the curriculum so that they aren't focusing on so many topics, hopefully that will help. The other thing is that when you get the kids ready for algebra, it's not what the state test covers. And so you spend all this time preparing kids for one thing but it doesn't match with the other. It's like robbing Peter to pay Paul. There aren't that many instructional days to get it done. And the high school teachers are saying we're getting kids in algebra 2 that don't know a lick of algebra from algebra 1 because they were just kind of run through it too fast when they were too young. You hear a lot of complaining from the high school about kids getting

pushed too fast and they aren't getting it. (Wilson teacher, 6/07

interview)

Overall, the teachers at Wilson Middle School expressed concern about the

pressure to accelerate students too quickly. In addition, while they weren't sure if

Baldrige was a good fit for helping them achieve better results, they really didn't have

any alternatives for things that could help them. Their comments revealed a level of

distrust, skepticism, and helplessness with the decisions being imposed upon them and

their predicament as implementers of these external forces. At the same time, the staff

development teacher expressed frustration with the lack of focus from the school system

in terms of county priorities, and frustration with the circumstances within the school that

hindered her ability to make a difference with teachers. The principal expressed similar

frustrations as the staff development teacher, but her concerns were directed at the level

of apathy and resistance among teachers within the school. She also expressed a certain

determination in fixing these issues within the building in order to create a better learning

environment for all.

<center>Findings for Research Question Three</center>

The third research question for this study was: What are some of the key factors

that influence reform implementation practices of middle school mathematics teachers as

they implement the Baldrige in Education reform initiative? In order to answer this

question, case studies were conducted on two middle schools that reported different

levels of reform implementation and different levels of concerns about the reform.

Seven factors that influenced teachers' reform implementation practices emerged from the data. They are: Leadership, Accountability, Knowledge, Coherence, Time, Core Beliefs, and Perceived Behavioral Control. These factors showed themselves in varying degrees in both schools. They served to help foster reform practices in some cases, and hinder reform practices in other cases. While each factor has its own influence, most often it was the inter-relationship between these factors that educators shed light on as they talked about their reform practices. Each factor influenced the others and was influenced by the others, often simultaneously. Each of these factors along with specific examples from each school is described below.

Leadership

The influence of leadership on reform implementation is well documented (Elmore, 2004; Fullan, 1991; Leithwood, 2002; Teddlie and Reynolds, 2000).Even though no teacher at any time during any interview used the actual word "leadership," the role of the principal, the importance of communication, and the necessity of creating a unified vision and shared purpose were pervasive topics within every interview that was conducted in these case studies. The importance of leadership within the school building cannot be ignored. When teachers spoke about these leadership aspects, they didn't always think of these tasks as jobs for the principal. Even though many teachers did speak about the role of the principal, when they talked about communication and creating a unified vision and shared purpose, their definition of leadership was much broader than just the principal. The three leadership categories that emerged from the data within the factor of Leadership are described below.

Role of the Principal

The role of the principal emerged as a critical component of the leadership factor. Teachers had very definite ideas about how the principal's role shaped their daily experiences at school and how the principal's vision, or lack of an articulated vision, shaped whether or not they participated in school initiatives and the extent to which they participated. Teachers at Prescott spoke very differently about their principal than the teachers at Wilson. While neither group of teachers spoke negatively about the leadership within their buildings, the Prescott teachers were able to attribute their sense of purpose and direction to their principal's planful and deliberate actions.

The Prescott principal provided a clear direction specific to mathematics, and every initiative and decision made for the school was funneled through this lens. Baldrige, and all other reforms, were or were not implemented in order to support the focus on mathematics. While Prescott's principal lacked a background in mathematics education and did not understand much of mathematics education reform, he relied on his limited knowledge and access to research in order to take an active role in making change to the mathematics program within his school. After setting the clear direction of placing all eighth grade students in algebra, he left the teachers to solve the problem of how to get the students to pass. He viewed his role as protecting and sheltering the teachers from unnecessary initiatives so that they could focus on the goal of improved mathematics teaching and learning at high levels for all students. He also saw his role as providing resources for the teachers in order to accomplish this goal, even when he admitted he wasn't sure what those resources were. He depended on his teachers to tell him what they needed in order to accomplish their goal.

At Prescott, one teacher described the principal's role as "the same as a vice president of a private company. He's visible, he articulates the vision and the expectations, and comes into the classroom to monitor what's going on" (Mike, 5/07 interview). Another Prescott teacher describes the principal's influence by stating,

Well, I think that he oversees everything that we're doing in our professional development period. I think he has a say in what we're going to focus on next. My idea of the school is that when we get instruction from the staff development teacher we're really getting instruction from him. It's not a different type of feel. I guess I recognize that ultimately everything that we do is coming from the administration. (Sue, 5/07 interview)

The staff development teacher expressed the important role the principal at Prescott played in implementing change in the school:

There's a block in attitude and willingness - teacher buy-in - for any implementation. I think this year that our principal was very clear in what needed to be done. He was clear in saying you need to do x, y, and z, but it was more you need to make sure students don't fail. So immediately people said what does that mean? What do I do? What do I not do? And he would say if there are kids that are failing in your class you need to do things to make them not fail. And teachers would say, 'Does that mean I have to have kids stay after school?' And he kept saying, 'It doesn't matter. It doesn't matter what method you use, but what matters to me is that if kids are not succeeding then that is not acceptable to you.' And so a

result of him reiterating that vision of what he wanted, there wasn't a

specific method and so teams had to kind of figure out what that means for

them. People, whether they agreed with it or not, were real clear on what

needed to be done. And there were some people that decided they couldn't

live with that. And so they needed to either choose to leave and work

someplace else or whatever. (Dawn, 5/07 interview)

Unlike Prescott, Wilson Middle School has yet to determine a clear focus and

direction for the school through which to funnel all other initiatives. It seemed their

overall goal was to "increase student achievement" and the way to accomplishing that

was to implement as many initiatives as possible. However, what happened in actuality

was the teachers at Wilson were implementing little to no initiatives because of the lack

of focus, prioritizing, and coherence making that will be discussed later in this section.

As a result, mathematics teachers were left in a state of paralysis, unable to initiate any

reform, be it mathematics, Baldrige, or anything else, because they were charged with

doing everything and yet nothing at the same time.

The teachers at Wilson were not necessarily able to attribute their lack of

engagement in reform initiatives partly due to the limited role their principal played in

influencing their sense of purpose and direction within the school. However, when

specifically asked about the role the principal played in their level of Baldrige

implementation, one teacher responded, "She came in with no knowledge of it. And she

admitted that this year. But she's learning" (Kate, 6/07 interview). The limited role of the

principal was also evident when I asked teachers to articulate the vision and focus for the

school. The responses to that question ranged from increasing student achievement, to

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equitable practices, to improved student behavior. When asked about what the principal expected to see in mathematics classrooms, one teacher responded, "She wants to see students learning. Students making progress, and us checking to see if they are doing that" (Megan, 6/07 interview). I asked another teacher the same question, and he responded, "I'm not sure she cares what we do, just whether or not we're making a difference with the kids. She wants the kids to pass. And she doesn't want to see them in the office instead of in our classroom" (Joe, 6/07 interview). It seemed from teachers' responses that the Wilson principal lacked a comprehensive vision about what should or should not be happening with respect to mathematics teaching and learning within her building. Her expectations were viewed as much more basic and general, involving only checking for student understanding and good behavior.

When asked about their principal's visibility within the school, one Wilson teacher replied that "She's around, but usually in the cafeteria. We've had four food fights in the last week and she's dealing with that and trying to get that under control. It's a real problem. Discipline is a huge deal in the school right now and she spends most of her time dealing with problem kids and putting fires out" (Dale, 6/07 interview). Even how teachers described the principal's visibility was very different between the two schools.

The principal of Wilson saw her role as bringing initiatives into the building, implementing them, and making sure teachers do them. Although she admitted that many of these initiatives had to take hold, she said her plans for this summer and the next school year included getting the county initiatives underway. She explained:

When I first got here, there was a lot stuff that had been going on for a long time here. Many teachers had been here for awhile and the previous principal sort of allowed things to continue and didn't do a whole lot with some of the things the county is asking for now. So I've assessed what's been going on and this summer I am ready to begin acting on it. I plan on getting Baldrige underway this year and getting us caught up as much as we can. (Wilson principal, 6/07 interview)

Unlike the principal at Prescott who viewed his position as one of sheltering teachers from random initiatives in order to keep them focused on the goal, the Wilson principal saw her role as introducer and implementer of all county initiatives in order to improve her building. The idea of implementing everything led to the teachers at Wilson not implementing much of anything in terms of reform.

Teachers at Prescott who were implementing change from various reform initiatives could clearly articulate a purposeful and meaningful role that the principal played in instituting and sustaining that change, while teachers at Wilson who were not engaged in the change process could not. Teachers that could articulate the important role of the principal specifically mentioned setting a clear vision, reiterating that vision throughout the school year, being a visible presence within the classrooms, monitoring what's happening within instructional and professional development time, and placing teachers in the active role of choosing whether to embrace change or find other places to teach.

<u>Communication</u>

Communication about decisions being made at the leadership level of the school emerged as an important component within the leadership factor. For teachers at Wilson, there was a level of distrust that emerged when they were given directives without the background information associated with the goals. For example, with respect to the county's goal of having at least eighty percent of all students enrolled in algebra one by the end of grade eight, one teacher commented, "Where is this number coming from? Are they just pulling it out of a hat? Or do they want to compare favorably to Orange County, CA, or what?" (Dale, 6/07 interview). Another teacher from Wilson had similar concerns: "I guess I just don't understand. Where do the goals come from? This goal of 80%?" (Ann, 6/07 interview). With this lack of communication of the larger vision and mission came a certain level of distrust and skepticism. A third teacher from Wilson phrased it this way: "Communication – a two way sword - going both ways. Lack of it hinders everything, and more of it helps. If the county would let us know what it is they really want to achieve, they would have better buy-in, less turmoil…but there is a bit of secrecy" (Kate, 6/07 interview).

Constant communication about decision making at Prescott seemed to be an active decision on the part of the leaders within the school. The leaders and teachers spoke about the role communication played in helping to foster a deeper understanding on the part of all teachers in terms of decisions that were being made and why. This understanding gave teachers the ability to develop their own justification for changing practices, instead of changing practice because some told them to. The staff development teacher describes her role in this increased and open communication:

One thing I did on purpose but didn't plan it in the staff development plan was helping people to see the system as a whole. What teachers said was that they learned more about how the school operates and why and how decisions are made than anyplace else. So more than faculty meetings, department meetings, for the first time they understood what we were doing and why we were doing what we were doing. A lot of these people are those that aren't necessarily involved in the leadership team. There was this layer of no matter what we did in professional development, I laid out this PDSA [Plan, Do, Study, Act planning tool] cycle and said, ok, here's the data, here's the plan, and then when people say why are we changing this, I'd go back and explain the data and the plan. (Dawn, Prescott staff development teacher, 5/07 interview)

As the staff development teacher from Prescott continued to share her technique for communicating the big picture and the thinking behind the decision making, I realized that she actually was using a component of the Baldrige reform initiative to foster the reform. She continued to explain this technique:

I think most often I used the thinking process [of Baldrige] and said these are the things we put in place and here's how we had to adjust. And teachers felt, 'Oh, I can get on board because I understand now why it was instituted.' The second thing that I shared was what the process was and what the background data was. And then when there are adjustments made, it's not like someone just sent out an email and said, 'oh we're going to do this differently.' And I think that's critical when you are trying to

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institute change. The users or the implementers are not necessarily in on

the decision making or the data analysis. So you really need to make sure

that you have someone who can give them the big picture. And I think the

PDSA was intended to do that, but it's not always used that way. Often it's

only used as a little tool that we use. (Dawn, 5/07 interview)

Actually using the techniques within the reform to help provide the rationale for

the change is quite clever, and appeared to be quite effective at Prescott Middle School.

As a result of communication of the big picture, specifically related to the state of

mathematics, the factors that went into certain decisions, and how practice will need to

change as a result, helped teachers understand the rationale for making changes to their

practice. It gave them the ability to justify for themselves why they needed to change, and

allowed them to ground their changes in a logical and meaningful process, even if they

didn't agree with it. The lack of communication about the larger picture at Wilson

hindered reform from taking hold, and actually created a level of distrust and skepticism

among the teachers who were told to implement changes and strive to reach goals without

justification.

Unified Vision and Shared Purpose

Taking time to create and foster a unified vision and shared purpose among the

leaders and teachers within a school emerged as a clearly articulated component of the

leadership factor in the school where reform was taking place. Prescott actively engaged

the mathematics teachers in the decision making process for placing students in algebra

one. By engaging in this process, teachers were able to more fully understand the

implications of this decision on their practice and how it would need to change in order to

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accommodate students' needs. And because these teachers were a part of the change process, they didn't exhibit resistance to changing that could have occurred if the decision had been made without involving them. The mathematics department chair from Prescott elaborated on this process:

> One thing that we've done in looking at data statistically is to have teachers gain a unified vision about students and what it means to be successful. That came about - started through our model of assessment planning. And again, instead of just saying everyone is going to use the same assessment for their course, we came together at the [leadership table] and talked about the importance of consistency. And we actually listed out the reasons why we are making this decision. We made a shared agreement, almost like a vision. And we listed the things about why we are doing this. So we said we as an organization agree and we feel these are important and we're going to do them. Then we developed the form with the teachers. (Amanda, 5/07 interview)

Once the leadership from Prescott had that unified vision and shared purpose, it was easier to communicate that to the staff and provide experiences for the teachers to also develop that same vision and purpose. The staff development teacher described a situation from a previous school year where the school did not take time for this, and the difference in teacher response this year when they approached the same idea from a different perspective:

> One year they tried to implement student data notebooks. They spent a lot of money purchasing little notebooks, and it lasted a couple weeks and

nobody knew how to use it or how to implement it…what do we put in it? So there was no vision, people didn't see a need for it. As we began to introduce stuff this year, we started with teachers seeing the need for consistency. Then we moved to teachers understanding data. Then teachers were beginning to share that same data with the students. All of a sudden teachers were coming back and saying, 'Wow, you should have seen the way kids responded when they saw their data. We need to do this more often.' Or, 'We're not doing this enough.' And we kept getting the same response. So now, at the end of the year, people are asking us to incorporate data notebooks. As opposed from the top down as something you need to do, lay out a system that creates the need, and once they see the need, it evolves to them asking. (Dawn, 5/07 interview)

Having a posted vision and mission statement is a key component of Baldrige. However, the data from Prescott Middle School seems to suggest that having a clearly articulated vision and mission on a regular basis is more important than a written statement posted on the wall. One teacher describes how she believes the school has worked with the vision and mission.

As a school, we have a level of vision or mission. It's not like we went through a process to come up with that. It's really led by our principal, through the people he hires. It's articulated frequently and often by him. But there was never an official vision and mission process that people engaged in to come up with that. But to me it's been very clear here that it has driven all the things we have done. Whether there was this sitting

down and coming up with it - I have never seen anything like that. But I

think that it would be helpful to document that. But the vision came before

the discussion. So instead of, 'let's just sit and have a discussion and come

up with a vision so that we have a vision that leads us and then we never

use it,' we'd just be formalizing what we already do. So, I see that where

we are now is articulating things that have become a part of our culture

and organization. (Kelly, 5/07 interview)

What happens when there is a lack of a unified vision and shared purpose?

Teachers seem to create their own, and these visions are often fragmented within the

school. At Wilson, the lack of a clearly articulated and unified vision and shared purpose

led teachers to create their own vision and purpose. So instead of having no purpose or

direction, there were many, and often they were not unified and in alignment with one

another. One teacher commented, "I just think you have to prioritize. And Baldrige is

great because there are some reflective things you can get out of it. But I think there are

some things that take priority over it. We just don't have time to do something extra. I'm

working on getting my students to work independently instead" (Dale, 6/07 interview). A

second teacher at Wilson mentioned using time in class to focus on assessing students.

She assessed students formally every Friday, and that, she felt, gave her the most

improvement in her practice. Another teacher described not having time to create a

purpose in the classroom because he "frankly, spent half the time just putting out the little

fires, do this, do that," (Joe, 6/07 interview). The staff development teacher felt frustrated

that her sense of direction, vision, and focus came from the school district, and yet there

were so many that she felt she needed to "just pick one." So she selected equitable

practices. This lack of a unified vision and shared purpose didn't just leave teachers with no direction; it served to foster individual visions that sometimes had no deep foundation or justification. This further splintered the school and hindered any reform, Baldrige, mathematics, and any other, from taking hold.

Accountability

When educators talked about accountability, and they all did to some degree, they spoke of different levels of accountability. The hierarchy of accountability ranged from the state level to the county level to the local school level. Each level played an important role in how teachers and principals chose to implement reform, and to what extent they did so. However, overwhelming teachers spoke about the tremendous influence from state accountability levels that impacted their behavior more than any other factor. This finding is congruent with other research findings. Datnow (2001) reports that accountability systems are the main driver of reform.

<u>State Accountability</u>

The most pervasive response to my questions about where the pressure comes from, about what the single most influential factor was that determined how teachers spent their time in their classrooms, was the state standardized tests. Making Annual Yearly Progress, or as is often called AYP, was without exception the number one reason why teachers from both schools chose to do whatever it was they did in their classrooms. One teacher stated it quite simply, "The pressure on math comes from [state tests] and getting them ready for algebra" (Dale, Wilson teacher, 6/07 interview). A teacher from Prescott spoke about how making AYP became the entire focus of the school:

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Well, we didn't make AYP last year, so our whole school focus is on making AYP this year. So basically all of our instruction has gone toward getting the kids prepared for the [state test], which is kind of unfortunate at times. It has influenced every ounce of everything that we've done this year. I think it's been a terrible detriment to education. We have looked at students as pieces of data. We are well aware of every single kid's score. We name kids as a number. We know every single student's data piece - what they got on the last [state test]. We developed a database so we could see their grades quarterly. I mean, nothing about a student is private, we are judging them on a constant basis of 'well, that kid only went up two points and so now we need to get him to go up five points' And the focus is really on those kids who didn't pass and it's not really about…I mean, you want to keep the kids that are advanced, advanced, and you want to get the kids from proficient to advanced, and you want to get the kids from basic to proficient. And it's been the whole push. It's the only thing we focus on. It comes up in every meeting, every day, every time we have anything. (Sue, Prescott teacher, 5/07 interview)

The focus from the state on improved mathematics performance as measured by increases on state assessment scores has served schools with a clear subject-specific focus on mathematics and reading. This very specific focus on mathematics has driven schools and school systems to act in some way; it has forced changes within mathematics teaching and learning that might not otherwise have occurred. By creating this need for change, schools have responded in one of two ways: Promote more conservative,

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traditional teaching techniques including drill and practice in order for students to "master" the basics of the exams; or act in more radical ways including Prescott's approach of placing all students in higher level courses in order to expose them to high level mathematics and create a need to backfill the missed basic skills. While Wilson was found to be still struggling with which direction to take, and therefore not taking any action as of yet, Prescott opted for creating radical change which created a need for changes in teacher practice. Part of these changes can be attributed to subject specific state standards and accountability measures. When Prescott responded to the state demands for increased student achievement, it forced teachers to search for how to accomplish this goal, whether it is incorporating pieces of Baldrige reform, differentiation, equitable practices, or elements of the mathematics reform movement as articulated in the *Principles and Standards of School Mathematics*.

Even though every teacher had something to say about the impact of increased state accountability on the way they approach their teaching, one interesting finding emerged. It seems that there are some conflicting feelings about this increased accountability. On one hand, teachers were quick to point out the negative impact on students being reduced to numbers and the increased emphasis on passing a test. However, on the other hand, it seems that at least some of the teachers felt that there was a benefit to this increased accountability at the state level. One teacher from Prescott describes this conflict:

> I think it's really turned people away from the profession. I think that
> students feel that they are failing. But then again, I mean, I would say the
> one positive thing is that it probably has made me a better teacher because

I am no longer allowed to just say, 'you know what, I don't feel like teaching today. I'm going to spend 20 minutes on a word search.' You really can't do that. You have to be very well planned, every minute you have to be doing something. And that's the expectation. Every minute you are going to be teaching. Taking that into consideration, I think, 'how can I make instruction so that it doesn't feel like instruction but that we're still learning?' I think these are probably questions I wouldn't have [had] to explore ten years ago because we wouldn't have had a school at risk. So I think that even though I can think of a million and one negative things, it has increased and enhanced my instruction tremendously. (Sue, Prescott teacher, 5/07 interview)

County Accountability

A distant second to state level accountability for the teachers was the county level accountability. And while the county level of accountability seemed to only influence teachers a little bit, it actually played a large role in the two principals' decisions to implement or not implement certain programs. What is interesting about this is that while the state sets the standard for performance, it is the county that institutes the penalty for not meeting the standard, at least for the first several years. Therefore, teachers spoke of the state influencing their behavior, and they spoke in fear of the consequences they would receive from the county if they should fail.

When schools fail to meet state standards for two consecutive years, the school district institutes a committee that oversees the progress of the school on a regular basis. This oversight committee is comprised of leaders from the county, including supervisors,

curriculum writers, and instructional specialists, and also leaders from within the school building. The committee is required to meet monthly to review a school's progress toward increased student achievement with the ultimate goal of meeting standard on state assessments. Both schools mentioned this committee as being influential in their decision-making when talking about accountability. The staff development teacher at Prescott described it as this:

> The fact that there is outside pressure on us lends a little bit of authority or fear, in some cases to institute something. So if we say you need to do x, y, and z, people understand that it's almost as if someone is watching us, looking at us, checking to see if we're doing these things. If someone is expecting that we are doing these things, you better be doing it. That has definitely had an impact on implementation. There has been an accountability piece to it that people feel, even though I'm not sure that anything we've done would have been any different, there's a feeling that because there's this outside group that's supposed to watching us and telling us this needs to be done. So they do it. That has a huge impact on how the resource teachers have communicated to their departments - we have to do this. (Dawn, 5/07 interview)

Wilson teachers had not had first hand experience with an outside supervisory group at their school, but were nervous about the institution of the committee in the upcoming summer. The rumors had already started, and one teacher stated, "We've heard a lot about how if we don't make it we'll have to write up all of our lesson plans and we'll have to produce everything in triplicate. We'll be on watch," (Kate, 6/07 interview).

Wilson teachers also expressed a certain fear from the county when they heard people were going to come in and check on their Baldrige implementation levels when the county was applying for an award. It was out of fear that they felt they needed to learn something about the initiative in case they were confronted by county officials. The "need to know" about Baldrige came because as one Wilson teacher said, "We needed to know what Baldrige was in case someone came to our school and asked us," (Ann, 6/07 interview).

The principals from both schools spoke about the county level accountability as being influential in how they make decisions in their building. However, they spoke of them differently. The principal from Wilson expressed her desire to do a good job and not let people down in the county. She described her thoughts:

> Every thing I do, I choose to do knowing that the county placed me in this position to make a difference. My community superintendent hired me to come and do a job, to fix things, to turn things around. And so even though sometimes it isn't fun, I feel like I am doing what I was hired to do. And if I don't do these things, then the county can find someone to replace me. My number one job is to make sure this school is not a failing school. So making AYP is not negotiable. Getting teachers on board or sending them on their way is part of that process. Getting students to listen and getting students who belong in other schools out of this school are areas that I can have control over. Getting this school to be a Baldrige school, and getting teachers to use quality tools and post mission statements, and getting teachers to use literacy strategies across the

curriculum, these are all priorities, and my community superintendent has said as much. It's a reflection on me if these things don't happen. (Wilson principal, 6/07)

The principal from Prescott spoke at length about the role of county accountability. However, his reaction was quite different from the Wilson principal. While he agreed that county accountability influenced what he did in his building, he focused more on what he was not held accountable for and how that influenced what he didn't do in his building. He described it in this way:

The more those are connected, setting expectations and my evaluation, the better the chance the reform is going to have to mushroom, because you can talk about Baldrige all you want, it's never played a role in my evaluation. Or no one has said your school is successful or not based on Baldrige. Sometimes there will be some superficial evaluation that says well, that school's not really doing Baldrige. Well, ok, but that doesn't mean anything. That's very different from saying that principal's not addressing the suspension rate, or not suspending, the math performance, or literacy, or some kind of student performance measure...those things are clearly tied to my effectiveness as a principal. Whether I do Baldrige or not is simply left up to me and how I can use it to improve those things that are connected to my standards, and if I can't - if there's not a clear connection to the things that are going to improve my school, then it's not going to move forward as quickly, and nor should it. (Prescott principal, 5/07 interview)

<u>School Accountability</u>

When teachers talked about school level accountability, it came from several sources, not just the principal level. Of course, there were several comments from the Wilson teachers in particular who stated that the reason why they didn't implement Baldrige was "no accountability. We weren't made to do it" (Ann, 6/07 interview). And it was expected that teachers from Prescott spoke indirectly of the principal circulating through the school and the staff development teacher creating assignments and due dates as follow-up to professional development training topics. But the most interesting observation at this level of accountability was the idea that teachers believed that their peers were a source of accountability and influence on their behavior. At Wilson, it was an absence of this source that influenced their lack of engagement with the Baldrige reform. One Wilson teacher stated, "Like other schools do walk-throughs. If I knew other people were going to come into my room to check for Baldrige strategies I'd probably make more of an effort to do it and implement them. But I know no one is checking, so why bother" (Kate, 6/07 interview). Another teacher had a similar reaction. He expressed it this way:

> You know, if I had someone here in the building that was doing it, and I
> could talk to that person, I'd probably try it. And I'd try it because I would
> know someone else said it worked. And it would be like going against a
> peer if I then said it didn't. So I'd at least make more of effort to try and
> do something, so I didn't look like I was just being negative to be

negative. But when I don't even have that, then why should I go and recreate the wheel? Why should I make everything up on my own? Nobody else is doing it either. (Joe, Wilson teacher, 6/07 interview)

Each level of the hierarchy of accountability plays a key role in influencing whether or not teachers implement a reform in their classroom, and to what extent they do so. Accountability sources range from state standards to county monitoring to peer influence.

Knowledge

Knowledge building, or building capacity, is a key factor in influencing reform that has been cited in numerous studies (Cross, 2004; Marsh, 2000; McLaughlin & Talbert, 2003; Spillane & Thompson, 1970). Cross (2004) defines capacity as, "the potential or ability of districts, schools, and teachers to undertake transformative school improvement efforts" (p. 114). Spillane (2005) calls this "resources for sense-making" and included human, social, and material resources that helped to create deeper understandings at the district, school, and teacher level.

Many of the educators involved in this study spoke about knowledge as a key factor in whether or not they implemented Baldrige, or any other reform initiative. The role of knowledge about the reform itself, personal academic knowledge from earning advanced degrees, and teachers' knowledge about their content were all components of this knowledge factor.

Knowledge about the Reform

Two of the teachers involved in this study had knowledge of Baldrige from previous career experiences before entering teaching. This knowledge seemed to hinder

the implementation of Baldrige in Education. One teacher exclaimed at the beginning of his interview, "I have a background in the air force and quality management, so I know more about quality tools than I care to" (Dale, Wilson teacher, 6/07 interview). The second teacher who had prior experience with the Baldrige initiative spoke about how he saw it implemented in the business world:

> Well, it was used as a marketing tool to increase sales and also downsizing. By creating efficiencies and economies of scale you are able to do with less people. It makes me second guess the purpose from the county's perspective. The same stuff we're doing now in the schools we were doing then. We were firing people for fudging data. Their salaries were contingent upon sales and numbers being met. So they were making bogus sales. But in reality, if we had given a few extra months, they could've done it and had customer satisfaction. Baldrige upset the customer in my previous experience because the customer realized they were now number two, and hitting the target was number one. They would be pushed to make the sale on a certain date. (Mike, Prescott teacher, 5/07 interview)

Not only did both of these teachers talk about their negative experiences with Baldrige, but they also expressed concerns about the model being old, out-dated, and not appropriate for education. Mike, a teacher from Prescott, explained his thoughts:

> Baldrige is not the right direction. It has some great ideas, but they need tweaked for a school system. It was a program developed in the 80s for the business world. It's old and outdated. We're not a manufacturing economy

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anymore. And Baldrige just doesn't allow for personalization. I saw this first hand in the business world. Where it used to be when one of our customers was on the phone, they'd say, 'oh, I've been dealing with the death of my aunt,' and we'd say, 'oh, when's the funeral?' and we'd go. Now, there's no time for that. Instead, we say, 'oh that's too bad, so do you want the product or not?' It really has hurt the personal relationships and the personalization that we used to have. (Mike, 5/07 interview)

The teacher with previous experience with Baldrige in the air force expressed similar concerns:

Another concern of mine with all this data driven decision making is that this was where the quality movement was in the 80s. And I've seen it go overboard where every decision requires data. And every decision doesn't require data. When my wife is mad at me, I don't need to quantify it and say she's mad at me on a scale of 1 to 6. I know it. I don't need any ranking or survey. Not every decision needs a number to back it up. (Dale, Wilson teacher, 6/07 interview)

Whereas Mike and Dale expressed having almost too much knowledge of Baldrige which served to foster negative feelings and resistance about the initiative, most other teachers talked about not having enough knowledge of the reform in order to implement it at all, implement it correctly, or even know if they are implementing it or not. One teacher explained her limited use: "The question bin could be useful, but some are sitting there with nothing on them. Mine's up but it's empty because I have no idea how to do it. But it's up" (Kate, Wilson teacher, 6/07 interview). Another teacher shared

her similar experience: "The first time I did a consensogram, I overcomplicated it, and then I got on the treadmill and never tried another consensogram again. It really didn't work right. I think I did it wrong, or went way overboard or something" (Ann, Wilson teacher, 6/07 interview).

Knowledge about mathematics reform practices also influenced what teachers chose to do or not do within their classrooms. Wilson teachers expressed concern about how to introduce new ideas to students that couldn't follow directions. They were worried that implementing activities that involved students working in groups and using manipulatives would mean losing control of their classroom. Two teachers had almost opposite thoughts on this idea. While one said she thought her students actually learned more from one another as they conducted small group experiments, another teacher believed the students learned very little and instead spent time talking about things that were not relevant to mathematics. In either case, teachers had very limited knowledge about mathematics reform practices and how to implement them effectively in their classroom.

On the other hand, while teachers at Prescott didn't exude tremendous knowledge about mathematics reform principles and practices, they expressed interest and an overall willingness to learn new techniques that embraced these reform principles. It seemed that their decision to enroll all students in algebra one created a "need to know" about mathematics reform best practices in order to accomplish their goal. Even though Prescott teachers didn't start by seeking best practices in mathematics, they ended up doing it as a result of the algebra push, which was a result of using and analyzing data that could have resulted from implementing the Baldrige initiative.

Knowledge of the reform has two parts – a teacher's own knowledge of what the tools and techniques are, and how to implement those with students. Both of these parts are critical components of the knowledge factor. It is not sufficient that a teacher know the tools. Using the tools effectively and interacting with students around the initiative is a key piece of knowledge that cannot be overlooked when trying to initiate reform. The Prescott staff development teacher elaborates on this idea:

One of the things that get in the way is teacher understanding. What do I do with a data notebook? A second thing is teacher uncertainty of how to communicate that to the students. So on the one hand I may understand data, but what do I say to a kid about their data? And some of things that came up under that were some of the affective pieces of that. What do I say to a sixth grader who is reading on a first grade level? And we'd say, you tell the sixth grader that he's reading on a first grade level. And they'd say, "I do? But they'll feel bad, they'll get discouraged." But we're not stopping there. We're saying we'll do everything we can to get you caught up. But there was this fear of teachers laying the bad or negative news out there. (Dawn, 5/07 interview)

Teachers spoke about the need to use tools in mathematics and how their lack of knowledge about how to use those tools served as a hindrance to them. One teacher explained,

I would like to use manipulatives in my classroom, but I'm not sure how they fit, and I'm not sure what to do when I'm done with them. I mean what if students still don't get it, and they don't, and then I just have to

teach them how to do it anyway. Plus if they don't see it just how it is on the test then they don't get it. So even though I think about using manipulatives it just seems like it's not going to work. (Mark, Wilson teacher, 6/07 interview)

It seemed that not only were teachers reluctant to use tools of mathematics reform because of their skepticism, they also didn't seem to possess the knowledge to use the tools effectively to promote better learning for students. I wondered if increased knowledge in manipulatives and how to use them for specific purposes would have changed teachers' beliefs.

Teachers also expressed this lack of knowledge of how to use the pieces of the Baldrige reform initiative with students. One teacher confessed,

I know that some people have used data competitively but in a positive way. Like, ok, this is where our class is, where do we want to go? And I don't think I've ever learned how to use that in a positive way. If you have a lot of kids that are struggling in your math class and you put the data on the wall, and say ok, this is where we are; now how do we get to the next step? I'm struggling with how to make that a positive message rather than a negative message. (Sue, Prescott teacher, 5/07 interview)

After hearing teachers express their lack of knowledge about reform and how to implement the reform with students, I asked them what would have helped. Almost every time I asked, teachers' responses involved the same components – a colleague modeling how to use the reform in their classroom. One teacher makes it a point to say a colleague, a fellow teacher, not someone who doesn't primarily teach students. She says, "It would

help if people could come in and tell us how they are using it and how it works. Not just the staff development teacher saying we're going to use this. It would be nice to see people who actually do use it talk to us" (Megan, Wilson teacher, 6/07 interview). These comments pertained to mathematics reform practices as well as Baldrige. Another teacher elaborates on what would be helpful in generating knowledge in order to better implement the Baldrige reform:

> I want someone coming in and showing me how to use the little pieces that I know about in an appropriate way. I don't know if I necessarily need to know everything about Baldrige, the entire planning, but I think I would need some modeling and some more instruction about how to use Baldrige in my room besides just giving me the book and talking about it. What I've told you is kind of the extent of my knowledge. (Sue, Prescott teacher, 5/07 interview)

One interesting piece about having or not having knowledge about the reform is that sometimes teachers don't even know enough to know if they're even implementing it or not. While this seems somewhat comical, it was not unusual to hear the phrase, "We probably use it more than we think we do, but we don't know." This comment, or a very close variation of it, was heard almost twelve times throughout the interviews. At first I really gave it no notice. But upon reviewing the interview transcripts, it did strike me that there is something very fundamental about knowing or not knowing enough about a reform to be able to say whether or not you are doing it, or any piece of it. One reason for this could be that there are often generic parts of different reform initiatives that overlap

with other parts of initiatives or even just regular classroom practice. Therefore it becomes difficult to say what pieces of classroom practice come from which reform.

Personal Academic Knowledge

On several occasions, participants in the study made reference to their own academic credentials. These references were always used as sentence starters when they were explaining their decision making process. One teacher, when asked why she chose to implement some things and not others in her mathematics classroom, stated simply, "I have a bachelor's degree in math, so I suppose I don't always agree with the focus of what our curriculum is all the time" (Sue, Prescott teacher, 5/07 interview). It appeared that her degree in mathematics provided her with the knowledge and confidence to play an active role in deciding what to implement and what not to implement. This knowledge and confidence seemed to free many teachers from feeling as though they needed to teach every page of the curriculum guide. While this freedom could in fact have negative consequences, particularly from the district's perspective, it could very well be that because these teachers possessed in-depth knowledge of mathematics they were better able to prioritize important concepts and sacrifice not so important concepts in the interest of the students and their learning.

The power that personal academic knowledge can provide was evident at the leadership level as well. Both the staff development teacher and the principal from Prescott spoke about how having a Ph.D. or being enrolled in a Ph.D. program provided them with the knowledge and confidence to take risks in implementing changes that met with much resistance. When asked where he got his confidence to go against the county and enroll all eighth graders in algebra one, the principal from Prescott explained, "I am

in a doctoral program and have done some reading of studies that talk about back-filling, which is when you expose kids to higher level math and skills and calculators, the back skills - they almost magically start to happen" (Prescott principal. 5/07 interview). Through his comments, it was evident that possessing the knowledge that comes from earning advanced degrees can be an empowering influence on confidence and control of decision making.

Teachers' Content Knowledge

The knowledge that teachers possess about the subject area they teach is a key component of the knowledge factor. Simply stated, when teachers lack the content knowledge that is necessary, it influences scheduling and program offerings which in turn influences the students within the school. The Prescott principal elaborates on this idea:

> So I was fortunate to have - we have an extremely capable math department which is not always the case in middle school. An obstacle for us in the middle school is human resources because they don't care that you're trying to teach higher level math courses in the middle school. They're just trying to place people. And they don't care what they are capable of teaching. This year we got placements of people that aren't even qualified to teach the courses I want to offer next year. A lot of times that drives - the quality of what your teachers can do drives what courses you are able to offer. And that's a backwards way of doing it. (Prescott principal, 5/07 interview)

Teachers' lack of content knowledge and their lack of in-depth understanding of core principles and mathematics concepts limited teachers from using a variety of

teaching methods, using varied approaches, and incorporating meaningful examples and counter-examples. This limited knowledge tied them to only teaching from the curriculum, the textbook, and already made materials and lessons. Teachers from both schools spoke about this problem, but the consequences seemed higher at Prescott given their radical changes in math placement, whereas Wilson was solely focused on passing state assessments.

Another component of teachers' content knowledge has to do with knowledge of specific curricula. Several teachers spoke indirectly about their lack of knowledge with a changing curriculum or a new curriculum. This was often unrelated to their knowledge about mathematics. However, the two became related when teachers felt limited in their teaching practices and decision making about those teaching practices not because of their knowledge of mathematics, but what mathematics was to be taught in which course, in which sequence, and for what measure. These components were critical within the knowledge factor.

Coherence

The Coherence factor has to do with how the Baldrige initiative is aligned with other initiatives and goals – both vertically up and down the levels of the education hierarchy and horizontally within the levels of the education hierarchy. Firestone (1992) reports "an important reason for limited progress in changing what and how well students learn is that the education system is fragmented along two dimensions: the vertical one representing relationships between states and districts; and the horizontal one reflecting articulation among policies at each level. Similar findings emerged in this study, and were categorized into two components: Alignment of Initiatives and Goals; and Cohesive

Implementation. Each of these components serves as important influences on whether or not a reform is implemented and to what extent.

Alignment of Initiatives and Goals

Vertical alignment has to do with how much or how little initiatives from the school level are matched to initiatives at the county level, and how school and county initiatives are matched to the state level. When initiatives and goals from one of these levels are not in alignment with the initiatives and goals from the other levels, reform efforts can be hindered. It was not surprising when teachers spoke about the state standards and making AYP as being at odds with the county reform initiative. For many teachers, it seems these two initiatives are competing for the same space within the classroom, competing for the same time. As one teacher describes, "AYP puts Baldrige on the back-burner. Baldrige can be labor-intensive and very time consuming. The two pushes are definitely at odds. Everyone is trying to have this cause-effect of Baldrige and AYP when in reality, there's only so much time. And this really contributes to the lack of buy-in" (Mike, Prescott teacher, 5/07 interview).

Baldrige was not the only county level initiative that teachers felt was not in alignment with the state. They spoke of their frustration with the disconnect between the grade level state assessments and the knowledge students need to have to enroll in advanced math courses. As one teacher says, "When you get the kids ready for algebra, it's not what the state test covers. And so you spend all this time preparing kids for one thing but it doesn't match with the other," (Mark, Wilson teacher, 6/07 interview).

Teachers talked about the number of different county pushes that are initiated each year and how these initiatives are not directly connected to one another and so when

they reach the school level, they are often disjointed, competing for the same time, and it is left up to the local school educators to either find ways to connect them, pick and choose parts of reforms that seem to be naturally linked, or ignore the initiative all together. As the Prescott principal describes it,

You've got the system initiatives that seem to keep rolling and rolling and rolling. I remember when we were required to go to Baldrige training, we were trying to find a way out of it because there were other things - facilitative leadership training, we were a magnet school which required training. It just seemed like there were multiple things every day that we had to choose what was most important. (Prescott principal, 5/07 interview)

Leaders and teachers that showed some level of engagement in the Baldrige reform initiative did so by selecting parts of the reform program that they viewed as fitting in with the pre-existing direction of the school. They strategically selected the pieces of the initiative that they perceived were in alignment with other goals and accountability measures that were already in place. In connection with this strategy, the principal from Prescott said, "We did not, because of competing demands, try to be a full-fledge Baldrige school, so we focused on only two areas" (5/07 interview). The staff development teacher described this process:

The parts we've chosen to focus on fit very well. With the students taking ownership, using their own data notebooks, the quality tools are just good tools - just good management. We had been using some other tools and these just happen to be good. That's good, but really for AYP, getting the

students involved in their own data is crucial. That is an element of Baldrige that we've been able to bring in and use as one of our AYP strategies. (Dawn, 5/07 interview)

In an attempt to create increased alignment of initiatives and prioritize efforts within the school, Prescott selected one clear focus and funneled all other efforts through that focus. If a certain initiative or parts of it fit with their focus, they implemented it. If a certain initiative or parts of an initiative didn't fit with their focus, they chose not to implement it. Prescott's number one focus, as a result of state accountability, was increased mathematics achievement through exposing students to higher level mathematics. By funneling all other reform initiatives through this very specific focus on mathematics, Prescott was able to create their own alignment and was able to filter out what they considered to be distractions to their goal. Therefore, they only needed to maintain coherence within their focus, thereby adding tools that aided in furthering their focus and no others. Figure 18 illustrates how Prescott prioritized initiatives within the building in order to create coherence through alignment.

Figure 18: Prescott's Alignment Structure
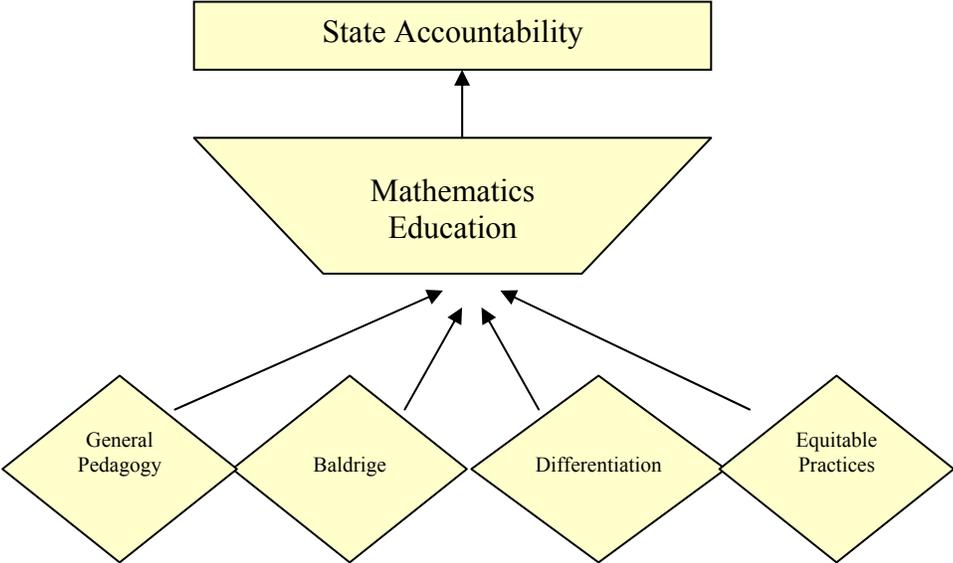
While the leaders at Prescott spoke about consciously selecting only parts of various reform initiatives to implement in order to create a level of coherence within the mathematics reform initiative which served as the focus and filter at the school level, Wilson leaders and teachers who did not engage in reform activity at high levels spoke about initiatives fizzling before they even got started as a result of competing initiatives. One teacher describes the lack of Baldrige use:

> Last year, in the beginning of the year, there was a stress for us to use Baldrige, and basically, that kind of blew over because there were so many things that our school was implementing and it was really intense. The Plan, Do, Study, Act seemed like it was going to be a requirement, but then it wasn't because things just got really intense. (Dale, Wilson teacher, 6/07 interview)

When teachers were asked about what helped or hindered their willingness or ability to implement the reform in their daily instructional program, they spoke numerous times about what I would call horizontal alignment. Horizontal alignment refers to how educators make sense of, blend, and manage the different reforms, responsibilities, expectations, and obligations that land on their desk. This is different from vertical alignment in that it isn't about whether or not the state level matches the county and the county level matches the school. Instead, it addresses all of the pushes and pressures within one level of the education system. In this case, at the teacher level, horizontal alignment examines how the teacher makes sense of, blends, and manages all of the policies, expectations, and initiatives that land on his or her desk. That is, does the reform

fit together naturally with the curriculum? Do the reform and the curriculum fit with state and county expectations? Do these components fit with other initiatives being instituted at the school level? Do all of these pushes fit with what the teacher believes students should know and be able to do? Do these pressures fit with the teacher's classroom management skills and abilities?

Wilson teachers struggled with what to implement because they were confronted with needing to implement everything, and yet not being held accountable for implementing anything. Because of Wilson's inability to prioritize initiatives or set a clear focus for the school, teachers were left to find their own coherence across several initiatives. Figure 19 illustrates Wilson's struggle for focus and horizontal alignment.

Figure 19: Wilson's Alignment Structure
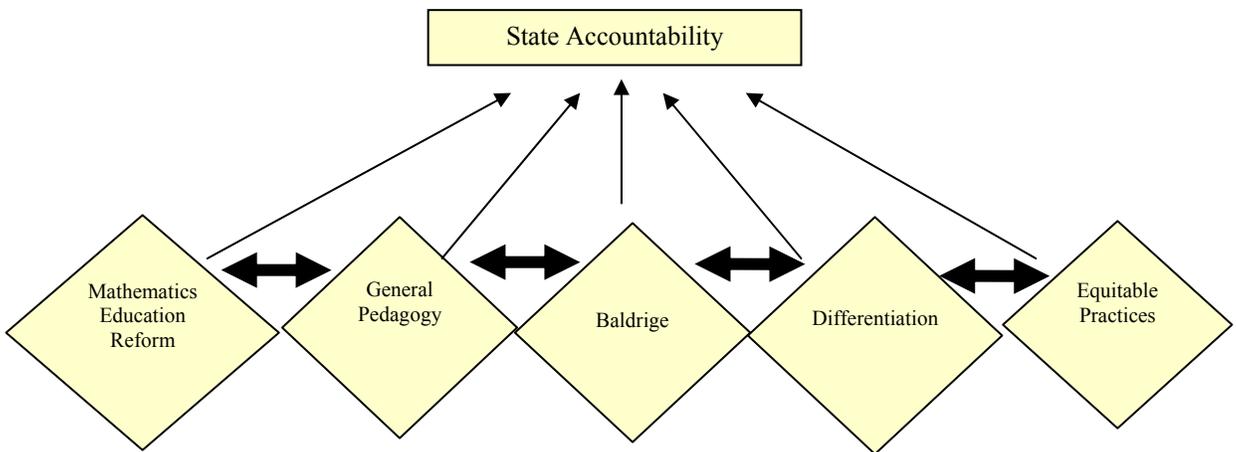
As of yet, Wilson has not created a funneling focus, thereby putting all initiatives in competition with one another, competing for the same time, same attention, and same importance level within the school.

It seems the more these horizontal components are related, the more likely reforms are to actually be implemented and evolve as part of the daily instructional program. One teacher described this idea of alignment like this:

It does fit nicely with the curriculum and in the year, and it's not like you have to really take time out to do it, but you do need to make sure that you are planned for it. Overall, we are pulled in so many different ways, and when it can fit with curriculum and what you're trying to do with the time, that works out nicely. There's other parts of the year, specifically in math, where you do have a focus on statistics, and data, when you're doing the data analysis portion of any unit, whether it's algebra or Math B, and Baldrige lends itself to the data part of it. It's just that then you can use the realistic data instead of made-up data. (Kelly, Prescott teacher, 5/07 interview)

Cohesive Implementation

The second theme that emerged under Coherence was the idea of cohesive implementation. This is in reference to how a school approaches the reform implementation. During this study, two philosophies emerged. The first was to implement the reform in small pieces. The intentions underlying this approach were so that teachers would not be overwhelmed and they could then start to implement some of the tools of the reform without engaging in a total change of philosophy. It was an approach that tried to protect the teachers from too much change at one time. The second approach to initiating the reform was to engage in the thinking and underlying principles of the reform before instituting the tools. The idea behind this approach was that it is much

harder to change teachers' thinking and core beliefs, but if there were some way to challenge those and get teachers to start believing in the same core beliefs of the reform, it would create a need for the tools of the reform.

I asked teachers about these approaches to the initiative and how it worked for them. Interestingly, almost every teacher responded in a similar fashion. One teacher articulated her thoughts in this way:

> Last year I was handed the *My Job, Your Job* book. But I don't think I fully understood how to implement all of Baldrige and I know people have said we want to do it a little bit at a time, but I think that has probably hindered me from using it because I think that you want to use it all together. (Meredith, Prescott teacher, 5/07 interview)

Another teacher stated pretty directly, "I think Baldrige plays a part as an entire program, and not just as little bits and pieces, and when you get all the little pieces without connection, you miss the point," (Joe, Wilson teacher, 6/07 interview). The staff development teacher from Prescott who approached the implementation of the reform using more of the big picture approach spoke of her philosophy and how this approach worked in her school:

> As a school, I would say we don't have a lot of people that understand the linkages chart tool or how to do the linkages chart, and what it means, but I can tell you that every department knows how to look at where they are, set some goals for where to go, and put some things in place to get there. So they now have the thinking skills they would need to do a linkages chart effectively. So instead of teaching the tool first, we've gone through

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the process. So that's my personal belief on how to get true change to occur. What I often hear people talking about as Baldrige misses the core - do you even know the principles that are there? Most people don't know those - they know the book that lists the tools - and so they are missing the principles. And then you're really "doing Baldrige." Whereas people use the tools and then they think "I'm doing Baldrige" because I used x, y, and z tool, not because - typically when I hear about people talk about doing Baldrige, they talk at the level of the little tools that they are using, not the bigger picture perspective of it. And for me, I'm like, let's get on board and then slowly as they get the way of thinking, then - the data notebooks are a good example of that - gotta do data notebooks. No one believed that kids needed to see their data. So until people can see, have a need there, that students really are detached, and one answer to student motivation was as simple as showing kids actual data in terms of how close or how far they were to a particular standard. And when teachers saw that just that simple thing changed perspective and were able to talk about how it was the same for them, then practice changed. (Dawn, 5/07)

Of course, approaching a new reform at 100% comes with some cost. What happens to the other initiatives that are being pushed from either the school, county, or state level? While teachers expressed their belief about implementing a reform with an all or nothing attitude, they expressed concerns with this philosophy as well. One teacher stated it best:

It's one of those things that it's hard to ease in slowly. You either have to jump in with both feet or don't jump in. You need to get the student buy-in and I don't think you can do that half way. I think you need to start right at the beginning of the year and it will require a lot of time taken away from the curriculum to get the system up and running - like any other classroom procedures. The question becomes can the curriculum and AYP prep - all those pressures, survive that? (Mark, Wilson teacher, 6/07)

Time

One of the most prevalent finding when talking with teachers about why are reform has not fully taken hold, or in some cases not taken hold at all, is time. Teachers talk about time as one of the biggest reason why they do or do not do something within their classroom. The factor of time is a complex issue that is important when thinking about school reform because as Cambone (1995) argues, "Without a fundamental change in the ways we conceptualize time, especially for teachers, our best efforts at teacher participation in school reform will probably wither" (p.1). We can gain a better understanding by examining closely how teachers construct the idea of time, and how they communicate their needs through these constructs.

It is interesting to see how teachers spoke of time and what types of time they felt were important to their implementation practices. Three types of time emerged from the teachers' comments. They were: Time of Reform Initiation; Instructional Time for Implementing the Reform; and Time for Implementing the Reform Meaningfully. Each of these is discussed below.

When I started this study, I thought I would find cases where teachers entered the reform initiative after it had begun being implemented in their schools. I thought that where teachers entered a reform would have an impact on their extent of implementation. However, this did not seem to be the case. Instead, what I found was that implementation levels of reform seemed to be influenced more by when the reform entered the teachers. Specifically, when the reform was introduced to the teachers played a role in how prepared the teachers felt to implement it. Further, when the reform was introduced at the start of the school year, or even mid-way through the school year, teachers felt they did not have the time to learn the reform adequately in order to implement it as a seamless, coherent part of their instructional program. Teachers from both schools spoke about how late introduction to reform practices hindered their implementation of the reform. Even teachers at Prescott who were engaged in high levels of reform implementation expressed concern about their lack of knowledge and ability to create meaningful and effective change within their classroom due to insufficient time to learn the reform. Even though they spent significant time during their pre-service days working on how to incorporate mathematics reform practices in order to better meet the needs of the students who had been placed in algebra, they felt they were not adequately prepared to teach in ways that reflected the reform principles. There became a sense of urgency at Prescott for specific content training in mathematics in order to better meet the needs of the students.

One teacher offered a solution to the problem of introducing a reform too late. She says, "And over the summer is when people have time to think about how to do this stuff. Once the school year starts it's too late. You've got to feel like you're ready to walk

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in the door ready to do this" (Kate, Wilson teacher, 6/07 interview). Another teacher

spoke about the importance of being equipped from the first day of school in terms of

student buy-in. She says, "You really need to start at the beginning of the year with

mission and goals. And that's how you get the buy-in," (Megan, Wilson teacher, 6/07

interview). A third teacher was so worried about this idea of being introduced to a new

initiative too late to implement it properly that she began to panic about yet another

initiative coming her way. Her comments illustrate the importance of the timing for

introducing an initiative. She says,

> For me, I'd like to know more about smart boards and how they are used
>
> in math classrooms. I heard we're getting them next year and I'm
>
> supposed to use it every period of every day for at least something.
>
> Because I'm going to have to totally change how I teach, and I'll probably
>
> find all of this out the day I get back and so I'll have very little time to
>
> make all these changes. (Ann, Wilson teacher, 6/07 interview)

Instructional Time for Implementing the Reform

Teachers spoke about not having enough time during their instructional program

to implement something new. They also spoke about taking the time out of their

instructional program for implementing the reform and not getting the student interest

and buy-in they were hoping for. In other words, they felt that the time they spent was not

worth it for the student results they observed. One teacher talked about this issue. He

said,

But it was always a lot of time to make the bar graph and then you'd have
like three kids look at it and be interested. It took a lot of time to get those
graphs made and then for what? The students didn't even care. They
barely even looked at them. This year I've got a lot more students, a lot
more grading, and it fell by the wayside. I didn't get around to it each
week. It just wasn't worth it. (Dale, Wilson teacher, 6/07 interview)

Another teacher explained how she really wanted to incorporate parts of the
reform, and she even made it her professional goal for the school year. However, after
realizing her time constraints she dropped it. She explains,

Originally in one of my professional development plans I wanted to do
weekly surveys so that students would reflect on their own learning - how
do they think they're doing in specific areas. And then I came to
realization that the content was just too much. And I wouldn't have time to
organize that and give the kids time to do that within the classroom. So I
changed my whole plan. (Kate, Wilson teacher, 6/07)

Time for Implementing the Reform Meaningfully

While listening to the teachers, it was interesting to hear how they were not just
talking about time to implement the reform. Instead, many of them were genuinely
concerned about the lack of time for implementing the reform in a meaningful way.
Several teachers felt limited in their effectiveness in implementing the reform because of
time constraints. One teacher says, "Baldrige works for some but not for all because I
don't think we allocate enough time to explain to the students how to do this correctly,

and we don't have any more time to do it. The deadlines are just too close together to do it right" (Mark, Wilson teacher, 6/07). Another teacher describes what he believes as poor quality products as a result of not enough time to implement Baldrige meaningfully. As part of the Baldrige initiative, teachers were asked to hand out student progress reports every two weeks. While on paper the new idea seemed reasonable, and even a good idea in the eyes of most teachers, when it was actually implemented it turned out to not work as well as some had hoped. Mike describes his experience:

We kick out progress reports, and sometimes you are putting one out 3-4 days after the quarter started. So yes, we achieved the benchmark of putting the progress report out, but there are no grades. So you give yourself a black eye to all the parents. We waste time generating a report when there is no data. Just for the sake of doing it. We gave a trashy product just to make the time frame. (Mike, Prescott teacher, 5/07 interview)

While teachers talked about the lack of time to implement the reform in a meaningful way, what was particularly interesting was how they expressed frustration with the lack of time to even implement their curriculum in a meaningful way. One teacher described her lack of time in this way:

Because of the time frame, students that could be learning something that they will use for the rest of their lives are being pushed through it quickly just to meet the time, and the math curriculum is the biggest issue. The county has a twelve week time frame for some of the most important life concepts for math. And in reality, if you gave more time, it could mean

exponential growth for that student. But because it's rushed, students will

not learn it. And I don't have the time to go back over it for them at the

level of what they need. (Kate, Wilson teacher, 6/07 interview)

Another teacher spoke of the same frustration. She says, "I haven't taken a day off this

year and I needed that last day to finish the entire curriculum. I barely finished it. I think

it's the time. There is no time for anything else. There's no time for even what we have to

do. We just don't have enough days" (Meredith, Prescott teacher, 5/07 interview).

When teachers were asked specifically about elements of mathematics reform as

described by *PSSM*, they echoed the same comments as they did before. Because of the

lack of time to implement the use of manipulatives, problem solving, exploration, and

communication of mathematics learning through logs and other methods, teachers saw

little to no benefit of incorporating them. Even the teachers at Prescott who actively

sought new methods for meeting the needs of their students as a result of their program

changes felt they did not have adequate time to implement these new methods in

meaningful ways.

The time factor seems to be an important component that affects the extent to

which teachers engage in reform activities. Three types of time that seem particularly

important to teachers are the time when an initiative is introduced, the limited amount of

time to implement the reform, and the inability to implement the reform in a meaningful

way due to time constraints.

Core Beliefs

Teachers' core beliefs have been a prevalent theme in reform literature (Carter,

1997; Cohen and Lowenberg, 1990; Thompson, 1984; Underhill, 1988) and its surfacing

in this study is of no surprise. Educators' core beliefs seemed to influence their behavior and the choices they made within their schools. In some cases these beliefs influenced entire school programmatic features. In others, they influenced the students within a teacher's classroom. Because the teaching load of a typical middle school teacher is about 150 students, this is not insignificant. Core beliefs showed themselves in teachers' comments as they spoke about students, teaching mathematics, implementing Baldrige, and what they believed to be the purpose of school. Each of these categories is described in this section.

<u>Beliefs about Students</u>

Teachers' beliefs about students fell into two categories: Maturity and Ability. These two categories seemed to influence what teachers chose to implement or not implement, and to what degree. When teachers talked about the Baldrige reform, they often mentioned students' maturity level as one reason why they feel Baldrige doesn't work, or isn't appropriate and therefore they didn't do it. One Wilson teacher describes his beliefs in this way:

Students are young and they don't know what's best for them. And we're experienced and we have experience in our teaching and what's necessary for them to achieve. Sometimes if you give them that freedom to decide what's best for them, that can be a disastrous thing because sometimes it's all in your expectations about what's best for them. (Mark, 6/07 interview)

Students' maturity levels were associated with their ability or inability to take responsibility for their learning and grades. One Wilson teacher explains her beliefs about students and how that influences the degree of Baldrige implementation. She says,

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I think a lot of it depends on the students. In past years, I had the majority

of my students take more responsibility for their learning and their grade.

This year I'm finding I've got students who haven't turned in assignments

from March. And I've given them five or six reminders. I'm constantly

doing things, and they won't do it. A lot of it depends on their basic level

of how much responsibility have they internalized for what needs to be

done. This is by far my worst year. (Megan, 6/07 interview)

Another teacher spoke of similar reasons why she doesn't implement Baldrige. She explained,

I think Baldrige can work when you are dealing with a more experienced

and more mature population. I think that's why it works in business.

Because you're dealing with rational adults who you can get truthful and

honest opinions from and how they reflect upon things. But with kids,

sometimes they are immature and irrational with their thoughts. So with a

student population it's probably not as effective as an adult population.

(Ann, Wilson teacher, 6/07 interview)

Teachers also spoke about students' ability levels as a reason for not implementing parts of the reform initiative. One teacher described altering his behavior because of what he believes are students' limitations. He explains,

I don't stress as much the self-reflection and the writing, and the reason for

that is a lot of the students have trouble writing and a lot of them can't read

at grade level. And that's just due to the population we have. So I don't put

that stress on them when they are already taking additional reading

classes. I try to motivate them in other ways. (Mike, Prescott teacher, 5/07 interview)

Several teachers elaborated on this influence by commenting on how their beliefs about students' ability influenced not just their Baldrige reform implementation levels of engagement, but also their mathematics practices and pedagogy as well. One teacher describes how this belief changes her practice across mathematics classes. She says, "A lot of it is the kids' ability level and what you can do with them. I have one class I use manipulatives with every day and I've got another class I won't even bring them in the room while they're in there. It has a lot to do with the students" (Sue, Prescott teacher, 5/07 interview).

The belief that all students can learn at high levels was one that Prescott teachers needed to develop as they struggled this year to see if they could meet their goal of having all eighth graders pass algebra one. While most of these teachers were not sure if they actually believed this at the beginning of the year, when they participated in this study they expressed strong convictions that indeed all students were capable of high levels of mathematics learning. Having not undergone the same challenges and belief changing experiences that Prescott teachers did, Wilson teachers were left with their unaltered beliefs about students' maturity ability levels.

It appears that teachers use their beliefs about students' maturity and ability levels to rationalize and justify their level of engagement in a reform initiative, particularly when they are not engaged at high levels. This justification serves teachers with a solid reason for not engaging in what they believe is an inappropriate initiative for students or subsets of students.

<u>Beliefs about Mathematics Teaching and Learning</u>

Educators' beliefs about mathematics teaching and learning can influence practice. In particular, these beliefs influence what reform practices are instituted, what components of these reforms are emphasized, and to what degree they are implemented in classrooms. Prior assumptions about learning and children have considerable influence over how a teacher perceives, understands, translates, and ultimately implements the components of a pedagogical, curricular, or organizational reform (Olson & Kirtman, 2002).

The principal from Prescott has very strong beliefs about the teaching and learning of mathematics, so much so that he made the decision to put every eighth grade student in algebra one. He justifies his decision by explaining his personal beliefs about mathematics teaching and learning. He says, "remediation needs to happen; the support needs to happen, the extended day and Saturday school - all that stuff needs to happen. But that can't become the priority. The priority has to be the acceleration - we want this to catch you up but we're also moving you up at the same time. I think that's the priority" (Prescott principal, 5/07).

A teacher describes how her beliefs about mathematics teaching and learning impact her practice within her math classroom. She explains,

> Students need a lot more time learning basic things before we go on to certain abstract thoughts. For example, students really don't have a good idea of integers or just number sense. Students don't have number sense. Students don't know how to solve one-step equations let alone two-step equations. In algebra, there is heavy use of the graphing calculator, which

I despise. When I went through school, I was not allowed to use a calculator, and I think today there are many times we teach using the calculator, and after you've mastered the skills it's ok to use it, but we teach what to put in in order to get this answer. I try and make sure I don't do this. I try to have kids learn the basic computation first before just handing out the calculators that do it for them. (Sue, Prescott teacher, 5/07 interview)

Beliefs about Implementing Baldrige

While it was difficult to separate teachers' beliefs about Baldrige and teachers' knowledge about Baldrige, there were several comments from teachers that spoke to how their beliefs about the Baldrige reform initiative influenced what they did and did not do in their classroom. One expressed belief was about how much or how little Baldrige "fit" with the mathematics curriculum. When teachers believed the reform, or parts of it, fit within their existing ideas of what should be included in mathematics courses, the more likely they were to consider implementing it. According to one Prescott teacher, "The data parts of Baldrige are a natural fit in math. It's perfect for when we get to our data unit because then we can use the tools" (Mike, 5/07 interview). Another Prescott teacher elaborated on this same idea when she explained,

The one thing I think is good is when the parts fit together with what we already have to do. We don't have very much time, and so the more it can just go with our already scheduled lessons, the better off I am to try and do it. Some of the quality tools are just good management ideas, and that can be

really helpful. So yeah, I think Baldrige fits well with math and that makes it easier to do. (Kelly, 5/07 interview)

I was curious to hear more about how teachers decided what "fit" and what "didn't fit" within their ideas of what should be done during mathematics class. I asked teachers to elaborate on how they make the decision of what to include and not include in their instructional program as it relates to reform implementation. Almost every teacher stated that it was the county curriculum that drove what they did. It seems that even though there was concern about parts of the curriculum, teachers still used that curriculum as their filter for all other activity within the instructional period. If the reform initiative fit with the county curriculum, teachers were more likely to try it. If it didn't, they felt free to ignore the initiative and continue with their existing practice.

Another interesting finding about teachers' beliefs about the reform and how that influenced their practice within mathematics classes was that often the actual use of the reform influenced teachers' beliefs about the reform and its appropriateness within their classes. For example, one teacher explained that she wasn't sure she "bought in" to the idea of students setting their own goals and then monitoring their progress toward meeting those goals. She said she tried it because other teachers had been talking about it and she wanted to see if it would work or not. She explained what happened:

> I wasn't sure what would happen when I had them do it [set goals and monitor]. And I really didn't have a whole lot of time to do it. But the kids got really into it. They made some pretty good goals, and then they kept

asking about them. So I had to keep getting them out and we'd look at them. And then we started to think about how to monitor their goals. So the students got their little graphs going, and some were wrong, but some actually were pretty good. And we started charting on the wall every time we took a quiz so they could see how the class was doing. They got so into it that I started making it a bigger part of my day. So then we'd start class sometimes by looking at our data. And I made it fit into what we had to do that day. So, it worked. (Meredith, Prescott teacher, 5/07 interview)

It appears that sometimes when teachers try parts of the reform, how it plays out in the classroom can influence their future implementation of that reform, or part of the reform. In addition, this teacher made an interesting comment. She explained that she was willing to alter her practice in order to "make it fit" because it worked so well in her classroom. This is an interesting insight into teachers' beliefs about reform and how those beliefs can influence practice to the extent that teachers aren't just incorporating it into their existing practice, but are also willing to change their practice in order to incorporate the reform strategy. I believe this is the ultimate goal of so many reform initiatives, and further understanding on how to make this happen is essential if we want to see more success in reform initiatives taking hold and making meaningful change within classrooms.

<u>Beliefs about the Purpose of School</u>

When educators were asked what they chose to emphasize in their classrooms and how that related to the Baldrige initiative, they spoke about their beliefs about the purpose of school. One teacher stated quite simply, "I implement taking pride in yourself

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and determining your own direction, and this fits nicely with Baldrige. That's the most important thing kids can learn" (Kelly, Prescott teacher, 5/07 interview). While some teachers spoke quite directly about what they believed to be the most important purpose of school, others spoke more globally about education and how their philosophical beliefs about the purpose of schooling impacts them and every decision they make. The staff development teacher from Prescott articulates her beliefs in this way:

> I am in this business to do the right thing. So there's my own vision or mission about what I am as an educator. And part of that is because I believe that education can correct some of the injustices that are done in society and it can provide opportunities for kids. If you're going to talk about kids not having opportunities or access, I'm going to have a lot of passion about that - that's why I'm here. I don't want the status quo. I don't want it the way it is. I want to make change. And so if someone else thinks it's not a good idea, they may be looking at it from a different lens or perspective. I'm looking at it as will this help these kids in their life and give them something they wouldn't have had otherwise? Luckily I feel like I am a good philosophical fit for this place, and so in that sense the principal and I have agreed. I've actually pushed different initiatives - like the math initiative was probably one where I felt much more confident saying this alternative was much better than any other alternative. We couldn't lose, and kids couldn't lose. And so even if it totally wasn't successful, some kids that would have never had a chance had the opportunity to succeed. What I can say is that my personality is such that I

am more driven by justice and what I believe is the right thing than whether other people like it or not. So there was clearly pressure on us from content people from within the system saying you can't do this, you shouldn't do this, these kids don't have skills, etc, I have never believed that anyway, and so there's part of me who doesn't care what they think and so I'm willing to take the fact that they might not respect me or think I'm making the right decision. I think in a lot of ways I became the voice also knowing that if they failed I'd be the scapegoat, and I was willing to take that. (Dawn, 5/07)

During her comments, the Prescott staff development teacher spoke about the importance of shared beliefs about schooling and what happens when you have teachers that do and do not share the same beliefs as the leaders in the building. She continued:

There's a fire that ignites in me that says, get out of the way system. I'm going on behalf of the kids. And so I'm going to fight for that even though the institution itself or the system or the procedures in place or the people who have power might not like that particular thing. So a lot of it really has to do with that particular vision or passion. And that's where I feel like here although maybe I don't agree with certain procedures or processes that are in place, I feel that with my administrator, we share that same piece. So even if we couldn't come to agreement on the steps to do something, though we usually can, even if there was a bump along the road, our common core beliefs about the purpose what school is in general and what this school is about, we're aligned. There's agreement there. And it makes it

a little easier to know that you're not alone. That it's a shared belief of vision and leadership. And when people are hired, the goal is to get people who are like that and to pressure those that are not like that to leave. And there's been a lot of pressure on people who are not like that to leave. The disadvantage is it creates an element of negative culture where teachers feel like someone is pushing me out and in a way, someone is. And so you're kind of torn with this, good stuff is going on and good things are moving forward and other people are left behind, and being kind of pushed out. And they should be because in order to go where you need to go, you need people who share that. (Dawn, 5/07 interview)

The principal at Prescott also discussed at length how his personal beliefs about the purpose of schooling and what's right for students influences every decision he makes, even when there are competing and sometimes conflicting demands. He describes his thoughts in this way:

There are so many competing influences, but I think the things that make me go out on a limb are the students. I have a real desire to do right by them. And there are lots of times that you know that doing this is right, but then there's this, and there's that. And it makes it very easy to forget, and I have a desire to ignore, or not ignore because you have to deal with them, but to try to remember that it's the students that I am acting in proxy for - students and parents - I'm acting on their behalf. And there are teacher demands, central office demands, bureaucratic demands, and sometimes you say, oh, it would make my life easier if I would just give in to central

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office, or it would make my life easier if I would just give in to this group

of teachers, you deal with those situations, but the more you can focus on

the reason you are making those decisions to begin with, so I'd like to say

it's the students. (Prescott principal, 5/07 interview)

Perceived Behavioral Control

Perceived Behavioral Control has surfaced in the literature on teacher practices as

well (Bandura, 1993; Ross, 1995; Smith, 1996; Sparks, 1988), but has not been as

prevalent in the reform literature. The factor of Perceived Behavioral Control is

comprised of two components: Self Efficacy and Locus of Control. Each of these sub-

categories within Perceived Behavioral Control is described in this section.

<u>Self Efficacy</u>

Teachers' self efficacy and its impact on student achievement has been

documented in the reform literature (Moore & Esselman, 1992; Tschannen-Moran,

Woolfolk Hoy, & Hoy, 1998; Watson, 1991). This important factor has proven to be

influential in a number of areas of teacher and student performance and so it is not

surprising to see it emerge in this study. One finding that is directly relevant to

educational reform and teachers' responses to it is that self-efficacy beliefs mediated

changes in behavior and in fear-arousal (Bandura, 1986).

Self efficacy speaks to teachers' beliefs that they may or may not be capable of

behaving in a way that will produce the desired result, whether that's implementing a

reform properly and effectively, producing high student achievement results, or teaching

with reform models while maintaining order and structure within the classroom. While

this study did not seek to assess levels of self efficacy within the teachers, comments

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about teachers' self-assessed ability to implement Baldrige emerged as an influence on the extent of their engagement in reform activity. When teachers felt they didn't have the ability to implement pieces of reform effectively, they actively chose not to do it or even try. One teacher stated repeatedly that she tried certain things, but "never did it right" and therefore stopped doing it. Another teacher described how she watched a tool being modeled and went to her classroom to do it, but it flopped miserably. She said she didn't think she really learned how to do it and never tried it again. This level of belief about ability not only influenced level of reform implementation, it influenced other areas of teacher practice as well. Sometimes a teacher's belief of incapability created a certain paralysis of practice. One teacher describes this paralysis in this way:

> I have kids this year that are lower than any other year I've ever taught.
> Quite frankly, I can't do things with them that I could before. And I can't
> reach them, not like any other group I've ever had. I have no idea what to
> do with them. I'm barely surviving, and I'm drowning. I really am. I just
> don't have any answers. (Dale, Wilson teacher, 6/07 interview)

There were other teachers who exhibited high levels of self efficacy. Often when they spoke with confidence about their classroom practices, they cited degrees in mathematics or leadership or curriculum as a tool that gave them the knowledge to be successful. One Prescott teacher described his success as being a source of confidence which influenced future attempts at reform implementation. He says,

> And I also think there's some - it sort of builds. So when you do this once,
> and you're not successful, you're going to have a lot of people beating you
> up over it. But if you are successful, it gives you the courage to try it the

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next time and the next time and the next time. And next thing you know,

other people are coming to you as the expert. (Mike, 5/07 interview)

As will be seen in the next section, whether or not teachers exhibited high or low

levels of self efficacy, they were often unrelated to their beliefs about locus of control.

When teachers expressed low levels of self efficacy, locus of control really didn't play a

factor at all. In most cases, when they felt as though they couldn't do it, teachers actively

chose to stop implementation of Baldrige regardless of whether or not they believed they

had the power to do so. Their beliefs that they couldn't do it surpassed all other factors.

Locus of Control

Locus of Control deals with the extent to which teachers believe they have the

power to influence practices and procedures within their classrooms. Within Locus of

Control, there are two types of people - internals, who attribute events to their own

control; and externals, who attribute events in their life to external circumstances. Both of

these types emerged from the data.

Most of the teachers from Wilson expressed an external locus of control. When

they spoke about the Baldrige initiative and their attitudes toward implementation, they

often used very hostile and negative language. One teacher stated, "It was kind of this is

Baldrige pushed down our throat when they were evaluating the county" (Kate, Wilson

teacher, 6/07 interview). Another teacher said, "Baldrige was being forced on us, and we

had no idea where it was coming from. We were just told we better be doing it" (Joe,

Wilson teacher, 6/07). A third teacher actually made fun of the external forces of the

Baldrige initiative. She joked, "It was like, the Baldrige is coming! The Baldrige is

coming! We had no idea what that meant. Only that we were going to have to do this or

we'd lose our jobs or something" (Megan, Wilson teacher, 6/07). This feeling of external controls forcing teachers' behavior served as a negative influence on teachers' implementation practices of the reform.

Some of the teachers from Prescott expressed this external locus of control as well. One teacher stated,

I have followed the county's process and desire to implement Baldrige. From that perspective, they pay me to do it and so I do it. I guess it's the direction the county wants to go in, and whatever direction they choose, we find that out through staff development. So I use that as an information gathering time and then just go do it. (Meredith, Prescott teacher, 5/07 interview)

One interesting comment came from the Prescott staff development teacher who spoke about actively shifting the locus of control from external to internal. She describes that process and how it influenced practice within the school:

And so we shifted the role of power at that time. And it made a huge difference in what our academic steering committee was because then there were multiple times that people were willing to offer us things that we didn't need, but weren't willing to offer us what we did need. So we went to the next level which was the people overseeing the academic steering committee to say we've asked for this and they are not providing support. And so even in some cases they didn't like what we were doing or they didn't agree, but we had justification for it and were able to explain why we were doing something. And we'd say to them if you give us

another alternative that addresses this issue, we'll hear it. But many times they didn't have it; they just didn't like what we were doing. But we were the ones calling the shots. We were the ones deciding what was going to happen in this building. That was something new. (Dawn, 5/07)

It also appears that in the absence of clear and focused external controls, schools can take that opportunity to shift the power from external to internal. The Prescott principal describes how he did this:

I think a lot of it comes out of necessity. The school was falling apart and they put me here to fix it. So, I've sort of played that card from the aspect of we've assembled the staff and assembled some programs, and we've got some quality people that are in place to do what we need to do. I think some of that comes from the system - because I follow the system's initiatives and system's recommendations for the most part, and I want to follow them, but sometimes I need them explained. And if they are able to explain them then I am able to follow them, but often it's confusing because you may have the superintendent saying these are the goals and this is the priority, but the folks over in the math office saying in contradiction to what the superintendent is saying. So this year, I put them on record - are you telling me not to - and they wouldn't say no, we can't tell you not to, and so if you can't tell me not to, what can you do? So I sort of I felt like I had the choice to choose what was best for my kids because nobody was giving me a firm directive. I do have a strong sense that at the end of the day, I am the one ultimately responsible. So whether

the data is good or bad, whether students are successful or not, I'm the one that has to carry that burden. So I'd like to make the decisions. (Prescott principal, 5/07 interview).

There were key differences in how the principals from each of these schools thought about the power they had to influence change within their schools. Even though both principals were in their second year at their schools, both principals had advanced degrees in leadership, and both principals were placed within their schools in order to make change and increase student achievement, how they saw the power dynamics between them and the school system were very different. While both principals believed they were capable of making changes, and were able to turn their schools around, their beliefs about who influenced the changes they made within their buildings were different.

The principal at Prescott clearly believed that he had the power to decide what he did and did not implement within his school. While he used the system as a resource and a guide for implementing new initiatives, ultimately he believed the choice was his to select the initiatives, or parts of initiatives, that he felt would best help his school. He describes his thoughts in this way:

> Since you ask it, I guess I never thought I didn't have the power. It's not always a good thing, but in this case, I think it's what I'm supposed to do. They put me here to fix the school. So I make the decisions about what needs to be done. I'm not afraid. I've never been afraid of losing my job, so there's some security with that. I joke that I loved teaching reading and English and I can always go back and do that again. So I'm not going to

pull up short if I think it's in the best interest of the kids. (Prescott

Principal, 5/07 interview)

While the principal at Wilson believed she was capable of making changes within

her building, she believed that the power to choose which changes should be made rested

with the people that hired her. This external locus of control directed the principal's

actions in terms of what she chose to implement or not implement within her building.

She describes this influence in this way:

The county has certain expectations for their schools. It is up to me to make

sure that gets done. That's what they expect of their leaders they put in

place. Sometimes I don't even like what I need to do, but I need to do it.

That's the expectation. And once we start being successful, other people

will see that we needed to do it. Right now I don't think there's a lot of

support, there's a lot of resistance to the changes I'm making. But what

people don't sometimes understand is that the county has had these

expectations for awhile, and we haven't been doing them here. So now we

are. And it will take awhile to catch up, but we will. I'm here to see that

that happens. If I don't then I guess the county will find someone else to do

it here. (Wilson principal, 6/07)

What is particularly interesting about these principal differences is that in some

cases an external locus of control might be more desirable. Specifically, from a reform

initiator's perspective, if a school leader has external locus of control, they are more

likely to implement what is expected from the outside and less likely to decide to not

implement, or only implement pieces of, the reform. This seems to be the case with

Prescott only choosing to implement parts of Baldrige that fit with their local school vision and mission. And this seems to be the case with Wilson, although the Baldrige initiative has yet to take hold. However, there is something very empowering and attractive about Prescott's approach to school change.

Not only were there key differences in the principals' beliefs about locus of control, there were also differences between the staff development teachers' beliefs about power and who has control to influence what is done within the school. The staff development teacher at Prescott played an active role in switching the power from external to internal. She also played an active role in influencing the decision to place students in algebra one even when she knew they were advised not to do so. She actively chose to only implement parts of Baldrige and instead focus on what she believed the school needed. In contrast, the staff development teacher at Wilson expressed frustration in the lack of direction provided by the county in terms of a staff development focus. She tried to implement all of the county initiatives and ended up not doing any of them at high levels. She looked toward the county for direction instead of assuming control herself to set the direction of staff development for her school.

While the two components of Self Efficacy and Locus of Control don't necessarily need to be related, in some cases they were. There were occasions where teachers felt they had the ability to implement Baldrige but the power to choose whether or not to implement it was in someone else's hands. And there were cases where teachers believed they could implement the reform and they also had the power to choose whether or not to implement it. This combination is particularly interesting. While a few of the teachers who exhibited high self efficacy and internal locus of control chose to implement

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Baldrige at high levels, several of these teachers used their ability and influence in ways they felt were better suited for their students. Often in these cases, the feelings of self efficacy helped to foster this internal locus of control. One teacher describes this interaction in this way:

> Because you know what, this is really what I believe in. I'm giving up my reputation with people who construct the math curriculum. But it's also different because I have a Ph.D. in curriculum development and I have been teaching graduate courses and it's not just a gut feeling - I also have a foundation in research and background to support my view. And so they see things one way and I see things another way. I feel like my way can be justified even more so than their side, and that's my opinion (laugh). But it has had an impact. I realize I had to make a decision. Do I make an internal decision that goes against the higher system people in order to meet the needs of our particular students, or do we say they're telling us we have to do this? (Dawn, Prescott teacher, 5/07)

The math department chair from Prescott had similar thoughts about the influence of her ability and her power on the level of Baldrige implementation within her department. She says:

> In terms of the impact of the steering committee on my role - do I just take direction - they will tell us what to do and we'll do it - or say, we're here, we know this building. We know what we are doing well, what we're not doing well; we know where we need help. So our job is to communicate to you where we need help. And you offer us help that doesn't match that, we

turn to you and say we don't need that help. We did that and it was a

systematic choice. We had a meeting and we had a choice - are we

obligated to do something just because they say it or is it our internal call?

And that's where the principal said it's your task to listen to what they say

and figure out what works for us best. (Amanda, 5/07 interview)

Perceived Behavioral Control emerged as a key factor that influenced teachers'

willingness and ability to implement the Baldrige reform initiative. The two components,

self efficacy and locus of control, both played a role in developing teachers' perceived

control over their behavior to implement the reform.

<div align="center">The Influence of General Reform on Mathematics</div>

Through this study, it was my hope to better understand how reform efforts

specific to mathematics education align with and inter-relate with the efforts of the school

system to promote a more comprehensive, systemic reform initiative at the school level.

This issue of coherence among reform initiatives, and the role that coherence, or lack of

coherence, played in implementing reform initiatives seems important so that we can

better understand the influence, or lack of influence, of general reform initiatives on

mathematics teaching and learning. Specifically, did the attention to Baldrige ever get to

the mathematics classroom where it changed practice? Did it lead mathematics teachers

to do different things within their classrooms? Did this general reform get mathematics

teachers to the same place that they perhaps could have gotten with a more subject-

specific reform effort? What was the influence of this general reform on mathematics

teaching and learning within these two schools? These questions are central to this study

and are addressed in this section.

Wilson Middle School, selected because of reported low Baldrige implementation levels and below standard performance in mathematics, continues to struggle with coherence across initiatives and the many demands being placed upon the school. Like many other schools, Wilson feels the impact of the pressure to meet standards and at the same time institute multiple reforms in order to do so. These reforms stem from the state level with the voluntary state curriculum and the district level with Baldrige, literacy, equitable practices, subject-specific curriculum, and differentiation. When these pushes enter the school, there is no mechanism yet in place at Wilson to sort through these reforms, prioritize the initiatives, and systematically and systemically implement any of them in a cohesive manner. This lack of coherence has created a kind of practice paralysis among the mathematics teachers within the building. Teachers feel overwhelmed with the demands placed upon them and are willing to implement things in order to alleviate that pressure and find success in meeting state standards. However, often what they try is disjointed, poorly communicated, and not sustained. As a result, there has been little to no impact on changing the teaching and learning of mathematics. The Baldrige general reform, and any other reform, has yet to take hold and create any kind of meaningful change within Wilson Middle School.

On the other hand, more promising results and interesting insights can be found when we look closely at what has occurred at Prescott Middle School. Prescott was selected for this study because of reported high levels of Baldrige implementation and below standard performance in mathematics. However, Prescott had set a school-level initiative to focus on mathematics. This made them an interesting site for this study. How did the county's focus on general reform affect mathematics teaching and learning at

Prescott given that Prescott's focus was improved students' mathematics performance through increased access to higher level mathematics content? The answer to this question was not as obvious as I had thought it might be.

Before I arrived at Prescott, I had images of Baldrige quality tools and practices being implemented everywhere. I thought I'd see vision and mission statements posted around the school and in classrooms, and I looked for consensograms, Plan, Do Study Act charts, plus/delta charts, and data walls. Much to my surprise, I didn't find what I had been looking for. I didn't see any vision and mission statements. I didn't see any consensograms or plus/delta charts. And while I saw a handful of data walls, they weren't nearly what I was expecting. So, where was the Baldrige? I had to search deeper in order to answer that question.

As I listened to teachers, the staff development teacher, and the principal speak about their focus on mathematics and how that has driven everything in the building in order to meet state standards, I began to hear a common theme across all educators that were interviewed. They all spoke about how they first looked at the data. After analyzing school performance and placement data, they identified what they believed to be the core of the problem at Prescott, and then set on a course of action to change it. It was through the data analysis process that they arrived at their algebra initiative. This close attention to data and getting to the core of the issue about why data looks the way it does can be attributed in part to the Baldrige initiative. One key component of Baldrige in Education is to create data-driven decision making. Through the in-depth analysis of data, teams of people can become better informed about what is really happening, or not happening, and can better make change in order to alter the data. Prescott engaged in this data-driven

decision making by analyzing mathematics performance and participation data. This practice was new to the teachers at Prescott. By engaging in this practice, they were able to identify how their placement practices were perpetuating their achievement gap. They also were able to participate in the decision to place students in higher level mathematics courses, a decision that had large ramifications for the teaching and learning within the building. The school's engagement in the Baldrige process contributed to the creation of the school's focus on mathematics, the focus that served as a funnel and filter for all other initiatives within the building, including the other components of Baldrige.

The use of Baldrige in order to make the algebra decision did not alter practice. However, the decision to place students who had never been exposed to higher level mathematics into algebra one did. For the first time, teachers at Prescott were faced with more diversity in terms of student knowledge and ability within one classroom. They were faced with students needing to understand and work with abstract concepts when they hadn't mastered some of the basic material that teachers believed was essential for success in algebra. The algebra decision forced teachers to examine their practice and seek resources and knowledge in order to better meet the needs of students and accomplish their goal.

Teachers began asking for support, professional development, and materials that they could incorporate into their practice in order to become better mathematics teachers. This "need-to-know" led the mathematics teachers to study best practices from the mathematics reform initiative. Teachers spent time after school, time on weekends, and their own planning time learning how to better incorporate problem solving, group work, manipulatives, and technology into their mathematics instructional program. Even though

the professional development at the school level addressed more general, universal skills such as planning and assessing, the mathematics teachers felt they needed more content-specific training in how to better meet students' needs. They sought this professional development on their own, and helped each other better understand how to create conceptual learning opportunities while at the same time continuing with mastering the basics necessary to pass the standardized tests. The teachers realized that they needed to incorporate both aspects within their program because these students not only needed to pass state standardized tests, but also they needed to pass the algebra exam. Often teachers felt these two assessments were in conflict with one another. However, they recognized the goal and began to incorporate the changes in their practice they felt were necessary in order to be successful.

Interestingly, these changes in practice may or may not have included the Baldrige tools. In some cases, teachers felt some of the tools of the Baldrige reform were a natural fit within their program and so they used them. However, in other cases, teachers saw no natural fit or benefit from incorporating the Baldrige tools, and therefore didn't use them. What is interesting about this is that while teachers engaged in the Baldrige process of analyzing data in order to make decisions, decisions that had major ramifications for how teachers thought about their practice, these same teachers actively chose to filter the other components of Baldrige through their new focus. In other words, they actively chose to use parts of the Baldrige reform and not others. They engaged in the Baldrige process but in many cases opted out of implementing the Baldrige tools. This active selective engagement in parts of the reform and not other parts of the reform is an attempt on the teachers' part to create coherence across their actions and behaviors.

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By creating their own coherence, teachers were able to maintain their focus and add tools that help them advance that goal, while at the same time filtering out tools that they felt did not help them advance their goal.

These changes in teachers' practice that resulted from the algebra initiative eventually influenced teachers' beliefs about teaching and learning mathematics. Where once there was resistance, as reported by the teachers, now there was a newly developed belief about students and how almost all of them are capable of learning at high levels. Teachers felt more confident about their own abilities to teach students so that they understood some of the fundamental concepts in algebra. While teachers reported feeling as though they still had so much to learn and improve in, they also believed they had grown since the start of this process. This change in teachers' beliefs now provides teachers with a new lens for which to re-examine the algebra initiative and its data, and continue their involvement in key programmatic decision-making about the mathematics program perhaps through a more informed perspective.

This cycle of influence of the Baldrige general reform on mathematics teaching and learning, as illustrated in Figure 20, is an example of how a more universal reform can have impact on a subject-specific reform.

Figure 20: Cycle of Influence of General Reform on Mathematics

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                    ┌─────────────────────┐      ┌─────────────────────┐
                    │  Performance Data    │      │    Focus on data     │
                    │  from these changes  │      │  created Algebra One │
                    │  created changes in  │      │      Initiative      │
                    │  Teachers' Beliefs   │      │                      │
                    └─────────────────────┘      └─────────────────────┘
                              ┌─────────────────────┐
                              │  Algebra One         │
                              │  Initiative created  │
                              │  change in Teaching  │
                              │  Methods             │
                              └─────────────────────┘
```
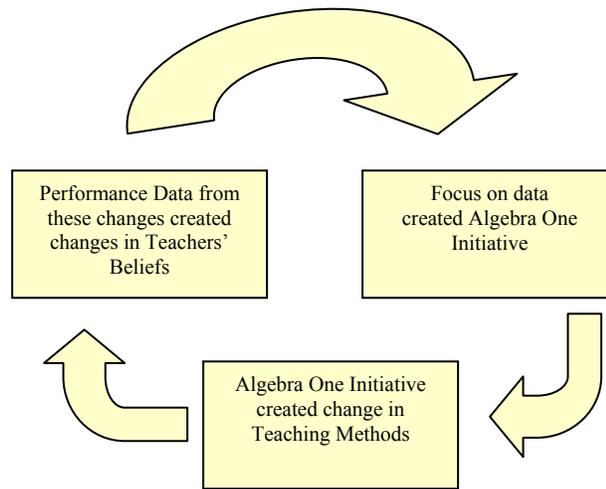
Whether or not teachers would have arrived at the same place had they participated in a mathematics-specific reform is beyond the scope of this study. Perhaps this cycle of influence is more happenstance, in that the school could have examined their data and decided to engage in a literacy initiative instead of one in mathematics. What would have happened to mathematics in this building? My guess is there would have been little, if any, change in teachers' practices and beliefs. My thoughts are that this possibility is a reality in many school buildings faced with similar circumstances, and my concern is that as a result of different decision-making, the state of mathematics teaching and learning stays stagnant and untouched by the more general reform initiative being implemented within schools.

What Made Things Work

When I first began thinking about this study, I had in my mind that there would be clear distinctions between a high and low reform implementation school, and I believed

that the factors that would emerge would be clearly delineated within each school.

However, after spending time in both case study sites, and after talking with the

mathematics teachers, staff development teachers, and principals involved in this study, I

have come to a different understanding about the influence of each of these factors, and

how they interact within a building in order to help foster or hinder a reform from taking

hold. It is through this complex interaction that these factors influence leaders' and

teachers' behaviors and how the implement or not implement any reform practice,

whether it's a general reform such as Baldrige or more subject-specific such as

mathematics. These same factors seemed to influence teachers regardless of the reform

focus.

The Leadership factor, while on the surface seemed similar across schools, ended

up being very different in each of these schools. On paper, both principals seemed alike:

each relatively new in the position; each struggling with schools not meeting standard;

and each possessing advanced degrees that would perhaps influence their behavior.

However, these surface similarities played a limited role in this factor, and other deeper

characteristics of leadership proved more important in influencing behavior.

One fundamental difference between the two principals was the issue of perceived

behavioral control. While both principals had a strong sense of self efficacy, only the

Prescott principal seemed to possess an internal locus of control. This internal locus of

control allowed him to construct a unified vision for his school, prioritize initiatives

around this vision, and clearly communicate the expectations for teachers and students

within his building. Conversely, the principal at Wilson seemed to possess more of an

external locus of control. She was profoundly influenced by the county mandates and in

some instances seemed to fear the consequences that would occur if she didn't act in certain ways that were in alignment with the school district. This external locus of control gave the power of influence to a force outside of the school building and therefore hindered her ability to create a unified vision, prioritize initiatives, and communicate clearly the expectations for staff and students within her building. The differences in the Leadership factor across schools help to explain some of the differences in reform implementation.

When it came to the Accountability factor, both schools spoke about the same pressures. Both schools felt the pressure of state standards. Both schools felt the need to perform on standardized test scores. And both schools felt that this pressure was the single most important area of focus. There were virtually no differences across schools within the factor of Accountability.

The influence of Knowledge was similar in both buildings. Teachers in both middle schools talked about the importance of needing to know about the reform in order to implement it, and they all talked about how their knowledge of mathematics either helped or hindered their ability to do different things within their classroom. However, one fundamental difference between schools was that because of increased communication and a more unified vision, Prescott teachers were able to more clearly articulate what it was they were expected to do within their classrooms, and were able to say they at least tried it. Even when teachers weren't as confident about their knowledge about implementing Baldrige correctly, they placed blame on themselves as "not doing it right" instead of finding fault with professional development, distrust with the school system, or lack of vision and direction. In other words, the teachers at Prescott believed

that their limited knowledge about the reform was their fault and not the fault of limited access to or communication about the knowledge of the reform. This was very different from what the teachers at Wilson expressed. Not only were they unable in most cases to identify a specific part of the initiative that they had tried to implement, but they also openly expressed distrust, skepticism, and doubt about the initiative itself. They faulted lack of vision, lack of training, and lack of time for their low levels of implementation.

With respect to the Coherence factor, teachers in both schools spoke about the same conflicting pressures within their classrooms. However, how these teachers made sense of these sometimes overwhelmingly competing priorities was different. While teachers at both schools admitted struggling with this issue of coherence, the Prescott teachers felt a sense of direction and purpose that had been provided by clear leadership and communication of expectations. Through these factors, teachers felt as though they could better prioritize what they chose to implement within their limited instructional time. It was almost as if their sense of self efficacy increased because they were excused from needing to implement "everything" and instead could focus on what they had determined was most important. Wilson teachers, on the other hand, lacked this benefit of a unified vision and clear direction. They were left to make sense of all of the conflicting priorities. And to further complicate things, they were often lacking the knowledge to fully understand the priorities in order to try and make sense of them. The result for Wilson teachers included feelings of learned helplessness, feelings of inadequacy, and a kind of paralysis of practice. Where the Prescott teachers seemed motivated to accomplish the goal of increased student achievement, the Wilson teachers felt as though they were defeated before they even got started.

Every teacher talks about Time as an influential factor on behavior. The teachers in this study were no different. Almost every teacher in both schools spoke about the frustration of too little time for teaching, for learning, for implementing the things they'd like to implement. The one difference between schools seemed to be that at Prescott, because of better communication from the leadership, teachers were better able to prioritize how they spent their time. Otherwise, teachers in both schools expressed similar frustrations.

The factor of Core Beliefs was an interesting finding from this study. While it could very well be that teachers from both schools held similar core beliefs about students, teaching, and learning, it was clear from this study that they now hold very different ideas about the role of the teacher and the student within the teaching and learning process. The Prescott leaders spoke in depth about how they have worked to challenge traditional beliefs that seemed to be at odds with their vision for the school. They actively engaged teachers in discussions that challenged long-held assumptions, engrained practices, and automatic reactions to aspects of teaching and learning. Through this active engagement, Prescott teachers were put in the position of needing to actively reconstruct their ideas about what it means to teach and what it means to learn. This process enabled teachers to rethink long-standing core beliefs, and begin to develop a more cohesive, unified vision about how to teach and support students, particularly struggling students. The Wilson teachers did not speak of any experiences that engaged them in this process, and so were left struggling with how to prioritize and implement different initiatives while lacking the necessary knowledge for implementation and the belief that students could do it in the first place. Because Wilson teachers had not

engaged in discussions about their beliefs about teaching and learning, it seemed they were unable to find a clear purpose for implementing a new reform.

The factor of Perceived Behavioral Control is one that has been talked about in conjunction with other factors in this section, but it is important to touch on the differences in teachers between the two schools as related to this factor. Perhaps teachers' levels of self efficacy were similar at one time, but it appears that the unified vision and clear communication helped to increase levels of teacher efficacy at Prescott. Teachers at Prescott spoke with confidence about their ability to at least try new things, implement the Baldrige reform, and experiment within their classroom. Wilson teachers weren't as confident. Often mentioning exhaustion, lack of knowledge, lack of time, and lack of belief that students could actually achieve at high levels, Wilson teachers expressed the belief that somehow it was partly their own inadequacy along with their lack of power to change things that led to this dismal state.

Whether or not teachers exhibited high or low levels of self efficacy, they were often unrelated to their beliefs about locus of control. When teachers expressed low levels of self efficacy, locus of control really didn't play a factor at all. In most cases, when they felt as though they couldn't do it, teachers actively chose to stop implementation of Baldrige regardless of whether or not they believed they had the power to do so. Their beliefs that they couldn't do it surpassed all other factors.

By comparing and contrasting a high and a low reform implementation school, and by examining the inter-play between the influential factors that emerged, along with the influence of general reform on mathematics teaching and learning, we can better

understand the conditions necessary in order to foster or hinder a reform from taking hold.

Summary

The primary research question for the qualitative portion of this study was: What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative? In order to answer this question, two schools were identified using student performance data and questionnaire results. Mathematics teachers, the staff development teacher, and the principal from each school were interviewed, and a case study of each school was conducted.

The chapter began with a description of how the two cases were selected. Following this section was a description of each of the two cases. The next section of this chapter described the seven influential factors that emerged from the data. These factors are: Leadership, Accountability, Knowledge, Coherence, Time, Core Beliefs, and Perceived Behavioral Control. These factors showed themselves in varying degrees in both school and they served to help foster reform practices in some cases, and hinder reform practices in other cases. The influence of this general reform on mathematics teaching and learning was discussed in the third section of this chapter. A discussion on what worked and what didn't with respect to the role that the influential factors played across both schools was discussed in the last section of this chapter.

CHAPTER SIX: CONCLUSIONS

The purpose of this study was to describe the conditions under which educational reform can be implemented and sustained, and the conditions under which educational reform is hindered and restrained. Specifically, this study sought to identify the key factors that influence such reform implementation and the practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative. In addition, this study sought to determine the impact of this reform implementation on student achievement over time.

There were three research questions for this study, and the purpose of this chapter is to summarize and discuss the findings for those questions, along with discussing the implications of the findings and suggesting areas for future research. The chapter begins with a brief summary of the findings of each research question with a discussion of those findings. Following this section are implications of these findings. This chapter ends with recommendations for future research and concluding remarks.

Summary and Discussion of Findings

This section contains a summary and discussion of the findings for each of the research questions of this study along with their sub-questions.

Research Question One Summary and Discussion

Research Question One: What factors contribute to the variability of teachers' reform practices?

In order to collect the data used to answer the first question of this study, a questionnaire was distributed to 260 middle school mathematics teachers across all 36 middle schools in the school district. Of the 260 questionnaires distributed, 179 teachers

responded representing 29 different schools. Each participating teacher's questionnaire responses were linked to his or her school, which was linked to its years of implementation of the initiative through its cohort number. Findings for the first research question in this study were derived from the analyses conducted on the questionnaire data.

In order to answer this question, four HLM analyses were run to determine the significant factors that influence teachers' reform implementation levels, teachers' concerns about the reform, teachers beliefs that they are better teachers as a result of the reform, and teachers' beliefs that their students learn more as a result of the reform. These aspects of reform practices comprise each of the four sub-questions for this question. The findings for each individual sub-question are summarized below.

a. What factors contribute significantly to the variability of teacher implementation levels of the Baldrige in Education reform initiative?

Two variables contributed significantly to the variability in teachers' reported levels of implementation of the Baldrige reform initiative. They are Cohort and Students Learn More.

According to the teacher self-reported questionnaire data, the cohort to which teachers were assigned influenced their variability in reported reform implementation levels. This is important because cohort assignment denotes how many years a school has been involved in implementing the reform. This finding is positive because reformers would hope that the longer you implement a reform, the more you would implement it, at least within the first few years of implementation. Teachers' self-reported data seems to suggest this is in fact the case, at least with this reform initiative.

The variable Students Learn More was the second factor that contributed significantly to the variability of teachers' reported reform implementation levels. This is an interesting finding because it appears that if teachers believe their students are learning more as a result of the reform, they tend to implement the reform at higher levels. This positive reinforcement that students provide teachers seems to be an influential factor in teachers' behaviors with respect to reform implementation.

b. What factors contribute significantly to the variability of teacher concerns about the Baldrige in Education reform initiative?

There was only one significant factor that influenced teachers' concerns about implementing the reform initiative. That factor was how many years a teacher had been teaching. It appears that the more years a teacher has been teaching, the lower the teachers' concerns were about implementing the reform. A lower score on the concerns questionnaire can signal non-use of the reform, or resistance to the reform. This finding is congruent with some of the literature on teacher change. Guskey (1989) found that often the teachers with more teaching experience expressed resistance to change and were the least likely to embrace reform initiatives. These teachers were in need of more persuasion and convincing of positive benefits for implementing the new proposed change.

An interesting thought about this finding is that sometimes there is a common belief that how many years a teacher has been teaching plays a role in *implementing* different initiatives. While the findings from this study show that how experienced a teacher is influences his or her *concerns* about an initiative, teachers' years of

experience had no significant impact on their levels of reform *implementation*. This is a departure from the literature on career stage and the role it plays on reform.

There is a considerable literature on career stage in general (e.g., Super, 1957, 1984) and specifically for teachers (e.g., Fessler & Christensen, 1992; Huberman, 1993). Career stage, more than any other measure, is an indicator of development within schools and classrooms. It has been found that teachers at different stages have differing attitudes to reform (Huberman, 1988), with experienced teachers sometimes considered to be most resistant to change (Guskey, 1989). Drake (2002) found that teachers at different career stages differed significantly in their approaches to reform. In particular, they differed in their willingness and ability to teach in reform-oriented ways, in their understandings of reform, and in how they integrated reform ideas into their current practices. Drake found that early career teachers needed more tangible and practical supports to help them implement many aspects of the reforms, especially the more conceptual and principled aspects; late-career teachers needed to be convinced of the overall coherence of the vision of instruction presented by the reforms; and it was the mid-career teachers that came the closest to understanding the theory and implementing the practice of the reforms she studied. While it was beyond the scope of this study to investigate implementation practices at different career stages of teachers, the finding that levels of Baldrige reform implementation were not impacted by years of teaching is one that warrants additional exploration.

c. What factors contribute significantly to the variability of teachers' beliefs that they are better teachers because of the Baldrige in Education reform initiative?

The one significant factor that contributed significantly to the variability of teachers' beliefs that they are better teachers was Students Learn More. In other words, when teachers believed their students learned more, they believed that they were better teachers because of the reform. Once again, we see this recurring theme of students' behavior, or teachers' beliefs about students' behavior, influencing teachers' beliefs and actions about a reform and their beliefs about their effectiveness as teachers.

d. What factors contribute significantly to the variability of teachers' beliefs that students learn more as a result of the Baldrige in Education reform initiative?

The two variables, Total Level of Implementation and Beliefs of Being a Better Teacher, were factors that contributed significantly to the variability of teachers' beliefs that their students learn more as a result of the Baldrige reform. When teachers implemented the reform at high levels, the more likely it was that teachers believed their students learned more. Also, if teachers felt they were better teachers as a result of the reform, they also believed their students learned more. This is a positive finding for Baldrige advocates because it indicates that as teachers implement the Baldrige reform at higher levels, their belief that students learn more increases.

Summary of Research Question One

Teachers' beliefs about whether or not their students learn more was a significant factor across every aspect of teachers' implementation practices, either directly or indirectly. It directly influenced teachers' implementation levels and teachers' beliefs about whether or not they are doing a good job. This influence of teachers' beliefs about students' learning has emerged as a central factor in this research question.

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One of the most interesting observations from these analyses of this research question is what was not found to be significant contributors to teachers' reform implementation practices. A school's poverty rate played no significant role in influencing teachers' practices. Similarly, a school's performance on standardized mathematics tests before Baldrige implementation was not a significant factor in reform implementation practices. This was a little surprising because often teachers describe their actions as being greatly influenced by this accountability measure. However, the findings from this study indicate that a school's passing rate on standardized achievement tests played no significant role in teachers' Baldrige implementation practices.

One final interesting observation is that Cohort, or years of reform implementation, only influenced teachers' implementation levels, and had no significant influence on the variability of teachers' beliefs about their own effectiveness or their beliefs about students learning more. In other words, time in the reform created no significant changes in teachers' beliefs about the reform and its impact on themselves and their students. This is interesting because I would have expected time and exposure to a reform playing a significant role in teachers' beliefs, but it didn't.

An in-depth discussion on the implications of these findings, along with the findings from the other research questions, and how the findings from this study connect to the existing literature can be found in the Implications section of this chapter.

Research Question Two Summary and Discussion

Research Question Two: What is the impact of the Baldrige in Education reform initiative on schools' student achievement in mathematics?

In order to answer this research question, along with its sub-questions, public data sources were accessed in order to gather each school's cohort identification, which determines years of implementation of the reform initiative; each school's educational load, which is the poverty rate; and the percent passing rate on the state mandated standardized tests for each school for the years 2003 through 2007. Because individual student data was not accessible for this study, school level data on the percent of students passing standardized mathematics assessments was used instead.

Four separate split-plot Analyses of Covariance, each with different numbers of levels of the repeated measure, were conducted in order to determine the impact of Baldrige on student achievement over time, as measured by schools' percent passing the state standardized achievement tests. All four ANCOVAs used the same variables. Cohort (with 3 levels) was the Between Subjects Variable, Time (with 2 to 5 levels) was the Repeated Measure, and Educational Load (poverty rate) was the Covariate. The results from these ANCOVAs were used to answer each of the following sub-questions.

a. Does mathematics achievement differ over years of implementation of the Baldrige in Education reform initiative?

The main effect of Time was shown to be significant only during the fourth ANCOVA analysis involving only Cohort 1. While it is true that the student achievement levels increased for all cohorts over time, these increases are not significant when the test data is organized by years of involvement in the Baldrige in Education reform initiative.

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One reason that this main effect could show itself for the first time during this analysis is because Cohort 1 started the reform initiative one year after the first administration of this version of the state standardized tests. Cohort 1's pre-test scores are the scores from the first exposure to the newest version of the state tests. After that point, Cohort 1 entered the reform initiative. So each year of Cohort 1's post-test data is not only each additional year of a reform implementation, but it is also each additional year of experience with the state test. Therefore, we cannot attribute the increase in student achievement to involvement in the Baldrige reform initiative alone, especially since the main effect of Time was not significant in any of the other three analyses run involving the other cohorts. Instead, we can also attribute the main effect of time on student achievement to increased exposure to the expectations, format, and experience with the state tests.

Further, significant changes in student performance over time occurred between the pre-test and after year four of implementation of the reform. We would hope that regardless of any reform implementation, schools would show significant improvement in student performance on standardized test scores over a four year period – especially when those years coincide with experience and exposure to the state test.

The finding from this study that there is no significant increase in student achievement that can be attributed to Baldrige alone creates more questions than answers for educators. First, is the reform initiative even worth doing if there is no significant impact on student achievement? Second, is the reason why there is no significant impact on student achievement because the reform was not implemented at high levels

systemically? These questions and others can't be answered from this study, but the ramifications of these findings are important to consider.

   b. Does mathematics achievement differ by cohort?

There was no main effect of Cohort on student achievement for any of the analyses. Therefore, a school's involvement with a particular cohort had no impact on the student achievement levels of their students as measured by standardized test scores.

   c. Does the effect of years of implementation of the Baldrige in Education reform initiative on schools' students' mathematics achievement depend on which cohort a school is assigned?

There was an interaction effect of Time and Educational Load and Time and Cohort after two years of implementation of the Baldrige reform initiative. Students that attend schools within Cohort 2 showed an increase in their achievement levels at a steady rate across both the first and second years of the reform implementation, surpassing the other two cohorts. While Cohort 1 and Cohort 3 also showed gains in their student achievement levels, those gains were not at the same rate as Cohort 2.

   Educational load had a significant effect on the cohort achievement and therefore proved to be a significant covariate for all four analyses. However, when looking across two years of involvement in the reform initiative, the interaction of Time and Educational Load had a significant effect on student achievement. Because Cohort 1 was relatively less impacted by heavy educational loads, it is interesting to note that even when accounting for this adjustment, Cohort 1 performed at the same level as Cohort 3, who has a similar educational load as Cohort 2. In other words, over time, student achievement for one of the two cohorts most heavily impacted by educational load

(Cohort 2) increased at a faster rate than the student achievement rate for the other two cohorts, one of which was the least impacted by poverty (Cohort 1). While we would expect schools with lower test scores to increase at a faster rate over time than those schools with higher test scores, the finding that a particular cohort would increase more than another is an interesting finding and one that requires further investigation.

Summary of Research Question Two

While the data on students' mathematics achievement was limited to school level data, the findings of research question two seem to indicate that there was no evidence that Baldrige implementation alone impacts students' mathematics achievement. In order to more fully address this question, it is recommended that further analyses be conducted using individual student data. However, this finding leads to interesting questions and implications that will be further discussed in the implications section of this chapter. Specifically, how do findings such as these influence and further the discussion on professional development and the dichotomy between content and pedagogy that often exists at the school level? This question is addressed with respect to the literature later in this chapter.

Research Question Three Summary and Discussion

Research Question Three: What are some of the key factors that influence reform implementation practices of middle school mathematics teachers as they implement the Baldrige in Education reform initiative?

In order to answer this question, two schools were identified using student performance data and questionnaire results. Case studies were conducted on the two middle schools that reported different levels of reform implementation and different

levels of concerns about the reform. Mathematics teachers, the staff development teacher, and the principal from each school were interviewed, and factors that influenced reform implementation practices emerged from the data analysis.

Seven factors that influenced teachers' reform implementation practices emerged from the data. They are: Leadership, Accountability, Knowledge, Coherence, Time, Core Beliefs, and Perceived Behavioral Control. These factors showed themselves in varying degrees in both schools. They served to help foster reform practices in some cases, and hinder reform practices in other cases. While each factor has its own influence, most often it was the inter-relationship between these factors that educators shed light on as they talked about their reform practices. Each factor influenced and was influenced by the others, often simultaneously. A brief summary and discussion of each factor follows. In some cases, two factors have been clustered together because they were inter-related.

Leadership and Accountability

The factors that emerged in this study have surfaced before in the literature on reform and on teacher change, particularly the factor of leadership. The influence of leadership on reform implementation is well documented (Elmore, 2004; Fullan, 1991; Leithwood, 2002; Teddlie and Reynolds, 2000). The findings from this study about the influence of leadership on teachers' implementation practices are interesting in that according to teachers, leadership not just influences how much of something gets done, but what the something is that gets done. Elmore (2004) had similar conclusions in his studies where he found that having the right focus of change is central to improving schools. According to Elmore, "Knowing the right thing to do is the central problem of school improvement" (p. 9). Additional findings from this study suggest that a leader's

perceived behavioral control, another factor that influences teachers' reform

implementation practices, influences the decisions that leaders make about implementing

various reforms at different degrees. This tricky factor will be discussed later in this

section.

The factor of Accountability has also surfaced in the literature on school reform

(Datnow, 2001; Edmonds, 1979; Malcolm et al., 2005; Spillane, 2005; Teddlie &

Reynolds, 2000). Most research findings involving accountability include the importance

of frequent monitoring and checking to make sure teachers are implementing the

expected reform. The findings from this study add to the literature on Accountability with

respect to the new power dynamic created by No Child Left Behind expectations for

schools. Today, states have more influence than ever before in instituting state standards

and assessments to measure those standards. Whereas, before this new legislation, states

incorporated suggested standards and assessments for informational purposes, today these

standards and assessments are the criteria for schools' success or failure.

While the "rules of the game" have been set at the state level, the job of

monitoring those rules is in the hands of the school district. Teachers are very much

aware of this new game, and to them, it's no trivial matter. More than any other factor,

teachers overwhelming spoke of the influence of state expectations on what they chose to

implement and how they chose to spend their instructional time. According to the

teachers in this study, the fear of not meeting state standards outweighed any local school

accountability measures, including the principal and other local school leaders.

This profound influence on teachers served to both help and hinder individual

reform efforts. Some teachers spoke about how they were willing to try anything,

including the Baldrige reform initiative, in order to meet these standards. Other teachers felt that because of so much pressure coming from this expectation, they had no time for "extra stuff" or for incorporating something that didn't fit within the scope of what they believed their job was. Whereas other studies have found that increased accountability leads to better results, and lack of accountability leads to low levels of reform implementation, this study highlights some of the cons to high levels of accountability. While accountability leads teachers into action, if those teachers believe the proposed reform is not in alignment with accountability expectations, they opt not to implement the reform and feel justified in doing so. This type of reaction to accountability serves as a barrier to reform implementation instead of a driver.

Coherence and Time

Coherence relates to how the Baldrige initiative is aligned with other initiatives and goals – both vertically up and down the levels of the education hierarchy and horizontally within the levels of the education hierarchy. Coherence has two components: Alignment of Initiatives and Goals; and Cohesive Implementation. Each of these components serves as important influences on whether or not a reform is implemented and to what extent. Leaders and teachers both spoke about how the parts of the Baldrige initiative that fit with other expectations and practices were the ones that were chosen to be implemented. One interesting finding from this study is that both principals and teachers spoke about how what they chose to implement from a reform initiative package was an active decision. In other words, these educators were acutely aware that they were not implementing the entire reform, and could justify to themselves and others why this was the case. This finding is in contrast to other studies that report unintentional

fragmentation of reform implementation (Fullan, 2000). One of the most common justifications for why the entire reform was not chosen to be implemented at the school level was the issue of time.

Teachers talked about time as one of the biggest reason why they do or do not do something within their classroom. Three types of time emerged from the teachers' comments. They were Time of Reform Initiation; Instructional Time for Implementing the Reform; and Time for Implementing the Reform Meaningfully. While teachers did not speak about the influence of time in terms of when they entered the reform (Olsen and Kirtman (2002), they did speak about the influence of time in terms of when the reform entered them and their classrooms.

Specifically, a common theme that emerged around the time factor was the expectation that teachers would be introduced to a reform only days before the expectation was that they'd implement it. They spoke about receiving training on Baldrige only two days before they were expected to not only know it themselves but also implement seamlessly into their instructional program the very next week. Sometimes this training occurred at the start of the school year. Other times, it was during a mid-year workshop. What they were expected to implement didn't even seem to match any instructional activity they were currently working on. For example, some teachers said they were asked to implement student goal setting starting in the month of November. This didn't seem logical to them given that they were in the middle of teaching units. To them, goal setting fit better at a different time of the year. Because of time constraints, and this lack of coherence, teachers actively chose not to implement the Baldrige reform.

Core Beliefs

Educators' core beliefs seemed to influence their behavior and the choices they made within their schools. In some cases these beliefs influenced entire school programmatic features. In others, they influenced the students within a teacher's classroom. Core beliefs showed themselves in educators' comments as they spoke about students, teaching mathematics, and what they believed to be the purpose of school. Teachers' core beliefs have been a prevalent theme in reform literature (Carter, 1997; Cohen and Lowenberg, 1990; Thompson, 1984; Underhill, 1988) and its surfacing in this study is of no surprise.

What was interesting about the influence of teachers' core beliefs was Prescott's attempt to change them by helping teachers struggle through complex and structured decision-making processes, particularly in the area of placing students in mathematics courses. By placing teachers in the driver seat for making mathematics placement decisions, teachers were forced into thinking deeply about such issues as equity, social justice, and what it means to teach and learn algebra. Once these teachers worked through these fundamental core issues of education, and more specifically mathematics education, they were able to better articulate their core beliefs about such topics, make decisions that reflected those beliefs, and then act on those decisions with strong conviction and commitment because the decisions were ultimately theirs. This model of shared decision making proved powerful at Prescott, and was one of the tools used in influencing teachers' core beliefs and ultimately changing behavior.

Knowledge and Perceived Behavioral Control

Knowledge and Perceived Behavioral Control often went hand in hand when educators spoke about the influences on their reform practices. Much of what teachers spoke about in terms of knowledge about the reform and how to implement it has been discussed in previous literature (Cross, 2004; Marsh, 2000; McLaughlin & Talbert, 2003; Spillane & Thompson, 1970). Perceived Behavioral Control has surfaced in the literature on teacher practices as well (Bandura, 1993; Ross, 1995; Smith, 1996; Sparks, 1988), but has not been as prevalent in the reform literature.

However, one interesting finding from this study that adds to the research on knowledge is the role of advanced degrees on teachers' level of empowerment. Six educators in this study spoke at length about their credentials and how those degrees provided them with knowledge, and consequently power, to make decisions about what to implement or not implement within their schools and classrooms. Not only did teachers with this knowledge feel capable of implementing a variety of reform practices, be it specific to mathematics or more pedagogical (Baldrige), but they also felt more empowered to decide what they would implement and to what extent.

Teachers' self efficacy and its impact on student achievement has been documented in the reform literature (Moore & Esselman, 1992; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998; Watson, 1991). As a result, several studies attempting to increase teachers' self efficacy have been conducted successfully (Swars, 2005; Palmer, 2006; Utley, Bryant, & Moseley, 2005). This important factor has proven to be influential in a number of areas of teacher and student performance and so it is not surprising to see it emerge in this study.

What was surprising to see emerge from this study was the influence of locus of control on teachers and leaders which attributed to the greatest behavioral differences between the two schools involved in this study. Because of strong feelings of internal locus of control, the leaders and teachers of Prescott were able to create a strong, internal, unified vision for their school. They were able to create meaningful programs and implement initiatives that supported this unified vision without worrying about teacher buy-in. Wilson, on the other hand, struggled with direction, vision, and unified action because of this lack of internal locus of control. There was an underlying feeling of learned helplessness that emerged when talking with the teachers in this building. This feeling came from the belief that outside influences, often disjointed, poorly communicated, and lacking meaning, controlled every aspect of what they did in the building. Their choice to not implement Baldrige was more of an act of defiance and lack of know-how instead of the belief that it wasn't a meaningful contribution to the shared vision and direction that they had established internally as Prescott did.

The implications for self efficacy and locus of control are tricky. While on one hand it is desirable to have leaders and teachers who feel they are capable and able to make informed decisions about best practices, it is not necessarily desirable to have those same empowered individuals opting out of reform initiatives that the larger educational system is trying to incorporate. Similarly, while it is not desirable to have leaders and teachers always looking to outside influences for direction and goal setting, there is something pleasing about those individuals who quickly adopt outside reform initiatives and conform to the desires of the larger education system. So what is it that we want? Is it possible to have both, or walk between these two extremes? When a school produces

positive results, as Prescott did, does it matter? These questions and others are important issues for reformers and researchers to consider when thinking about school and teacher change.

Summary for Research Question Three

Seven factors emerged as being influential on teachers' Baldrige implementation practices. These factors included Leadership, Accountability, Knowledge, Time, Coherence, Core Beliefs, and Perceived Behavioral Control. These factors, and often the inter-relationship of these factors, served as both drivers and restrainers in implementing reform. In some cases, while producing positive results in some ways, they simultaneously produced unintended consequences that seemed at odds with the initial goals of the reform. A more in-depth exploration of these findings can be found in the next section of this chapter.

Implications

There is tremendous pressure on schools and school systems to perform at higher levels than ever expected before. Pressures from international assessment performance, federal legislation, state standards and accountability measures, the business sector, and all of the many curriculum and instruction special interest groups continue to bombard the education system with reform initiatives targeted at improving teaching and learning. These proposals for reform are aimed at solving the problems of education. However, the very concept of reform is problematic and a source of conflict from the start. From the minute a reform is introduced, even when it looks fantastic on paper, it is met with immediate conflict. This conflict is naturally occurring because to reform something means to change. A new change is immediately competing with existing cultures, pre-

established beliefs, engrained routines and habits, sacred traditions, and entrenched practices. In addition, any individual proposed reform is likely to be competing with other reforms being instituted at the same time. Although there have been numerous attempts over the last two decades to change schools, the one common finding among the studies conducted on these change attempts is this: To engage in and sustain change is very difficult. Despite these difficulties, educators, legislators, and the general public agree that change is critical if we want to improve the teaching and learning in our classrooms. Since most of what we do in education seeks to initiate change, it is important to try to better understand the nature of change and how it can occur within the school setting. The findings from this research study help us to better understand the factors that can influence teacher change and contribute to the existing literature on how change can occur, what type of change can be most effective for mathematics education, and what it means to implement a reform in the classroom.

Making General Change

Why is it that even when two schools exposed to the same reform expectations, training, and challenges, there can be such differences in their level of implementation of that reform? This was one of the core questions of this study, and one that can be examined by looking at the factors that influenced change in one school but not in the other. One of the factors that emerged from this study as a key difference between the schools is teachers' core beliefs. Teachers' core beliefs have been a prevalent theme in reform literature (Carter, 1997; Cohen and Lowenberg, 1990; Thompson, 1984; Underhill, 1988). Educators' beliefs about students, mathematics teaching and learning, and the purpose of school influence their practice. Prior assumptions about learning and

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children have considerable influence over how a teacher perceives, understands, translates, and ultimately implements the components of a pedagogical, curricular, or organizational reform (Olson and Kirtman, 2002). In particular, these beliefs influence what reform practices are instituted, what components of these reforms are emphasized, and to what degree they are implemented in classrooms.

While it could very well be that teachers from both schools held similar core beliefs about students, teaching, and learning, it was clear from this study that they now hold very different ideas about the role of the teacher and the student within the teaching and learning process. The Prescott leaders spoke in depth about how they have worked to challenge traditional beliefs that seemed to be at odds with their vision for the school. They actively engaged teachers in discussions that challenged long-held assumptions, engrained practices, and automatic reactions to aspects of teaching and learning. Through this active engagement, Prescott teachers were put in the position of needing to actively reconstruct their ideas about what it means to teach and what it means to learn. This process enabled teachers to rethink long-standing core beliefs, and begin to develop a more cohesive, unified vision about how to teach and support students, particularly struggling students. The Wilson teachers did not speak of any experiences that engaged them in this process, and so were left struggling with how to prioritize and implement different initiatives while lacking the necessary knowledge for implementation and the belief that students could do it in the first place. Because Wilson teachers had not engaged in discussions about their beliefs about teaching and learning, it seemed they were unable to find a clear purpose for implementing a new reform.

The professional development that Prescott purposely initiated in order to actively engage teachers in reflecting on their beliefs about teaching and learning is pervasive in the literature on professional development and teacher change. According to Richardson (1998), the purpose of professional development should be focused on helping teachers acquire a "change orientation" rather than just adopting new techniques. Professional development should have as its goal increased reflectiveness and an inquiry stance among teachers, rather than simply the adoption of new practices. Adoption of new practices comes about as teachers reflected and systematically tested what works in their own context (Richardson & Anders, 1994). The staff development teacher in the high implementation school spoke about her philosophy as being in alignment with Richardson and others in terms of how to create lasting teacher change. It appears from this study that schools that do not engage in having teachers reflect on their beliefs, and instead only address changing teacher behavior, do not see the levels of reform implementation that schools engaged in this reflective practice do.

The literature on organizational change addresses this idea of change through the concepts of single-loop thinking verses double-loop thinking (Argyris & Schon, 1974). In single-loop thinking, organizations analyze their current state, compare this state with current standards, and then make adjustments to behavior so that standards are met. This cycle seems to be occurring at Wilson, and seems to not produce the deep lasting change results that reformers and educators would like to see. Conversely, Prescott engaged in double-loop thinking, which involves reshaping the underlying patterns of teachers' thinking and behavior so they were capable of doing things differently. This type of professional development and teacher engagement goes beyond single-loop learning in

that it allows teachers to see themselves as active participants in the change process instead of passive recipients of others' ideas. By engaging in active discourse and reflection about individual beliefs and purposes, as well as behaviors, actions, and consequences, teachers are able to create a shift in their context or point of view about themselves. Therefore, perhaps one area of focus for reformers and educators wanting to initiate reform that is meaningful and lasting is to direct resources at engaging teachers in this reflective practice in order to address core beliefs about students, teaching and learning, and the purpose of school. It would appear from the findings in this study that this factor could have tremendous influence on the levels of reform implementation within schools.

Change in Mathematics Education

The focus of this study was on the factors that influenced middle school mathematics teachers' implementation levels of a general reform. This study also examined the impact of this general reform on students' mathematics achievement as measured by state standardized assessments. A broader question that comes to bear from this study is: Can general reform have the same impact or better on mathematics education and student achievement as a specific mathematics education reform? While this question is beyond the scope of this study, the findings from this study lend themselves to developing some direction in terms of thinking about this question.

In times of greatly needed and demanded change, school districts are faced with how to best create the most and best change with limited resources. Do they focus their limited time and money on a content specific reform initiative, or do they embrace the "rising tide lifts all boats" mentality and seek to adopt a more general, comprehensive

reform in order to better spread the influence of reform across the educational system? This dichotomy between content and pedagogy surfaces at the school level and seems to be a key factor in what reform actually takes place. The school district involved in this study chose to invest many dollars in materials and professional development on implementing a general comprehensive reform initiative in hopes of achieving better results. One way of measuring improvement is by analyzing standardized test scores, specifically in the area of mathematics.

While the data availability for this study was limited to school level data as individual student data was not accessible, the results from the analyses in this study showed that while it is true that schools increased in student mathematics achievement over time, these increases were not significant when the test data was organized by years of involvement in the Baldrige in Education reform initiative. Therefore, we cannot attribute the increase in student mathematics achievement to involvement in the Baldrige reform initiative alone. Instead, we need to also attribute these increases over time to increased exposure to the expectations, format, and experience with the state tests.

Perhaps if individual student data were used to analyze the impact of this reform on students' mathematics achievement, we might see more promising results. However, the findings from this study lead us to wonder if a more content-focused reform initiative within the area of mathematics would be more beneficial and more influential in improving students' mathematics performance.

Research on professional development has generated many lists of best practices, but there has been very little research on the effects of professional development on improvements in teaching and student learning. The studies that have been conducted in

this area have all reported similar conclusions. Garet et. al (2001), in a large scale study involving over 1000 mathematics and science teachers, found that professional development that focuses on specific mathematics and science content and the ways in which students learn that content, is particularly helpful to mathematics and science teachers charged with improving their students' performance. Further, Kennedy (1998) and Cohen and Hill (1998), after conducting studies comparing the relative effectiveness of different forms of professional development, concluded that professional development focused on the teaching and learning of specific mathematics and science content is more effective than general professional development. The findings from this study seem to suggest that there is little to no impact on mathematics performance from initiating this general reform, and perhaps a more mathematics-specific reform could indeed be more influential in impacting student achievement; however more exploration in this area is needed.

Evidence of Change

In order to identify the factors that helped to contribute and hinder reform practices of middle school mathematics teachers, it was essential to first determine what, if any, parts of the reform teachers were implementing. Through self-reported questionnaire data and also through in-depth interviews, teachers from the different schools revealed different ideas about what it meant to implement this reform. Specifically, teachers that reported high levels of implementation seemed to also embrace and articulate the principles and spirit of the reform, whereas teachers that reported relatively lower levels of implementation made more reference to the individual tools of the reform and how they were or were not being used within the school. Teachers that

were engaged in reportedly higher levels of reform implementation seemed to understand and support the underlying philosophy of the proposed change and therefore were able to engage in the reform process in a deeper, more meaningful way than the teachers within the lower implementation school. This finding leads to the larger question of how can we help teachers and educators capture the spirit and meaning of a reform, and not just the tools with which to implement parts of the reform.

This issue of superficial reform, where teachers implement some of the tools of the reform without embracing or understanding the tenets of the reform, is well documented within the literature on fidelity of reform implementation. For example, many studies on mathematics curriculum reform implementation and practices indicate that teachers often believe they are implementing the reform because they have incorporated some of the strategies, when in fact they are not implementing the spirit of the reform at all (Ball & Cohen, 1996; Battista, 1999; Kilpatrick, 2003; TIMSS, 1993). In addition, studies on more pedagogical reforms such as cooperative learning have found that teachers incorporate superficial groups of students and believe they are incorporating this reform when in fact they have not changed the essence of the activity students are working on (Slavin, 1991). Even studies conducted on more structural reform initiatives such as block scheduling have found that often the reform in instituted and yet teachers continue to teach using the same methods as they did within a more traditional schedule, therefore causing the reform to occur at the surface only. Whether it be the implementation of a content-specific reform based on the *Principles and Standards of Mathematics*, a pedagogical reform such as cooperative learning, or a structural reform such as block scheduling, research has consistently shown that teachers sometimes

believe they are implementing the reform when in fact they have only made superficial changes to their instructional program (Battista, 1999; Kilpatrick, 2003; Rettig and Canady, 1996; Romberg, 1992; Slavin, 1991). This type of reform at the margins is a critical issue for educators and reformers attempting to implement meaningful and lasting change.

Teachers with reported high levels of implementation that were involved in this study illustrate what can happen when the philosophy of the reform being implemented penetrates every aspect of professional development and is driven by leaders that not only understand the philosophy but fully embrace it as well. When this is missing, as was the case at Wilson Middle School, a reform implementation can result in nothing more than a checklist of strategies from which teachers can choose to implement or not. This "dumbing down" of a reform initiative, while perhaps well-intended in an attempt to simplify the reform, can lead to action without purpose, fragmented implementation, or lack of implementation due to the missing underlying foundation of the intentions of the reform. Without a deeper understanding of the reform, teachers are limited in what they can do, how they can do it, and whether or not they even want to implement it.

While it was beyond the scope of this study to assess the fidelity of Baldrige implementation, this issue surfaced as a result of teachers' comments about what they chose to implement and why, as they spoke about influential factors contributing to their behavior. This finding has implications for the education community at large and warrants more research on how we can help teachers and educators capture the spirit and meaning of a reform. As Batista (1999) states,

Great care must be taken in evaluating school districts' "implementations of reform." Just because a particular implementation fails does not mean that one can reasonably conclude that the theory and the research are wrong. One can conclude only that mechanisms for putting theory into practice -teacher preparation, in-service training, textbook creation, and teaching - may be flawed (p. 6).

The findings from this study seem to suggest that where there was reportedly low implementation of the reform initiative, there was also a disconnect between the spirit and the tools of the desired reform. Similarly, where there were reportedly higher levels of implementation, teachers spoke of the deeper philosophical meaning of the reform and how their beliefs were in alignment with those. However, more exploration in this area is needed.

<center>Recommendations for Future Research</center>

This study was limited to one reform initiative in one school district. It was beyond the scope of this study to look for common factors across multiple school districts implementing the Baldrige reform initiatives. Therefore, future research on common factors across several districts struggling to implement the same reform would be beneficial to the literature on reform.

The impact of reform efforts on student achievement is an area that needs further investigation in the literature on reform. This study was limited to school level data and therefore was unable to assess the impact of reform efforts of individual teachers on individual students. Future studies on this specific impact could be beneficial in assessing

individual teachers' implementation levels of an initiative and that impact on students' achievement.

This study did not seek to conduct a full Concerns Based Adoption Model assessment on the schools involved in this study. Future research using all three components of the CBAM model would lend insight into teachers' concerns, teachers' levels of use, and teachers' thoughts about the reform.

Because the factors that emerged from this study are factors that have surfaced in other research studies, it would be beneficial to better understand how certain practices can leverage the individual factors. For example, self efficacy has emerged from many studies as an influential component on teacher behavior. Research on increasing teacher efficacy would be helpful for future reform efforts.

<div align="center">Concluding Remarks</div>

For over fifty years, researchers, politicians, policymakers, and educators have struggled with the issue of education reform. The various constituencies have approached the issue of education reform from many perspectives, including changing the curriculum, writing standards, passing legislation, creating new schools, mandating assessments, incorporating business practices, and revising the image of professional development. While all of these efforts have made some mark on the field of education, none of these efforts has succeeded in changing the teaching and learning that goes on in classrooms at the level we would like to see.

Education reform has become the vehicle for improved quality of teachers and better learning for students. However, while some of the results of educational reform movements have been promising, new initiatives continue to struggle with sustainability

and full levels of implementation. These hurdles cannot be overcome until researchers

better understand the factors that help to influence leaders' and teachers' implementation

practices of these reforms. It is in this area of research that this study hoped to make

contributions.

Invitation to Participate in Doctoral Research Study

Dear Middle School Principal:

I am currently a doctoral student at the University of Maryland. I am now entering the dissertation phase of my program and am conducting a research study on the impact of Baldrige in Education. Specifically, I hope to describe the conditions under which educational reform can be implemented and sustained and to determine if years of involvement in the Baldrige in Education reform initiative affect teachers' level of implementation, teachers' concerns, and student achievement. This is an invitation for your school to participate in this research study that I will be conducting, and will be overseen by my advisor, Dr. Anna Graeber, at the University of Maryland, College Park.

Participation in this study involves a forty five minute interview with me and the completion of a questionnaire. During the interview and questionnaire, you will be asked questions about implementing Baldrige in your school and about your concerns about this initiative. The questionnaire should take approximately 20 minutes to complete.

If you agree to participate in this study, it will be important to capture the viewpoints of key staff members that were and are involved in the Baldrige implementation process. This may include other administrators and the staff development teacher. Also, since this study has a focus in mathematics education, I would like to invite the mathematics teachers to participate in this study as well. Their participation would be voluntary, and would include a forty five minute interview and the completion of a questionnaire.

Participation in the study is completely voluntary. You and your school may withdraw from participating in the study at any point during the interview or while completing the questionnaire (particularly if you or your staff experience distress). You will not be asked to write your name or your school name on the questionnaire. Instead, I have assigned a code to your name so that all data attached to this questionnaire will not be directly linked to you. Only I will have access to these data. At no time will individual responses be made available to any personnel from your school or personnel from the school system. Returning the completed questionnaire indicates that you understand the nature of the research and freely consent to participating in the study.

If you have any concerns about participating in this study, or during or after the completion of the interview or questionnaire, you are encouraged to discuss these at any time with me by either email – kbk2@aol.com or by phone – 240-602-5375.

A detailed summary of the results will be available upon completion of the study. If you are interested in receiving this, please indicate this on your completed questionnaire.

Thank you for your time and consideration in participating in my doctoral research study.

Sincerely,
Kara Trenkamp

PRINCIPAL INTERVIEW CONSENT FORM

Project Title	An Investigation of Key Reform Implementation Practices of Middle School Mathematics Teachers and the Schools in which They Teach: Cases of High and Low Levels of Implementation of the Baldrige in Education Reform Initiative.
Purpose	This is a research project being conducted by Kara Trenkamp, a doctoral student at the University of Maryland, College Park as a dissertation study under the direction of her advisor, Dr. Anna Graeber. The purpose of this research project is to describe the conditions under which educational reform can be implemented and sustained and to determine if years of involvement in the Baldrige in Education reform initiative affect teachers' level of implementation, teachers' concerns, and student achievement.
Procedures	The procedures involve being interviewed by the researcher for approximately forty five minutes. The interview will be audio taped and include questions regarding Baldrige implementation. During the interview, you will be asked to complete a questionnaire that allows you to provide additional information about the Baldrige implementation process.
Confidentiality	This research project involves making audiotapes of you. I will do my best to keep your personal information confidential. The following procedures will be used to maintain your confidentiality: (1) you will be assigned another name (a pseudonym) in all written records of this research; (2) transcripts of the interview will be stored on a password-protected personal computer at my home; (3) all print data and audiotapes will be stored in locked filing cabinets in my home; and (4) only my dissertation committee and I will have access to the audio tapes and transcribed data. After fifteen years, all computer files containing transcripts will be deleted and all audiotapes will be destroyed by breaking the case and cutting the tape. If I write or present a report or article about this research project, your identity will be protected to the maximum extent possible. The information that I collect will only be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if I am required to do so by law.

Please check next to the appropriate statement below:
__ I agree to be audio taped during my participation in this study
__ I do not agree to be audio taped during my participation in this study |
Risks and Benefits	The interview questions may prompt you to reflect on or recognize possible tensions in your work. This may lead to dissatisfactions you might not otherwise have considered. While this research is not designed to help you personally, it will give you the opportunity to be involved in professional research and to voice your thoughts and opinions. I hope that in the future, other people might benefit from this study through an improved understanding of issues related to implementing a reform initiative.
Freedom to Withdraw	Your participation in this interview is completely voluntary. You may choose not to take part at all. If you decide not to participate in this interview you will not be penalized. If you decide to participate in this interview, you may refuse to answer any question.
Contact Information	If you have any questions about this research study, please contact Kara Trenkamp (kbk2@aol.com; 240-602-5375) or Dr. Graeber (annagrae@umd.edu; 301-405-7060) at 2226F Benjamin Building, Department of Curriculum and Instruction, University of Maryland, College Park. If you have questions about your rights as a research subject or wish to report a research-related injury, you can contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678. This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.
Statement of Age of Subject and Consent	Your signature below 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.
Signature and Date	**NAME OF SUBJECT:** _____ **SIGNATURE OF SUBJECT:** _____ **DATE:** _____

APPENDIX C: TEACHERS' INVITATION TO PARTICIPATE IN THE STUDY

Invitation to Participate in Doctoral Research Study

Dear Middle School Teacher:

I am currently a doctoral student at the University of Maryland. I am now entering the dissertation phase of my program and am conducting a research study on the impact of Baldrige in Education. Specifically, I hope to describe the conditions under which educational reform can be implemented and sustained and to determine if years of involvement in the Baldrige in Education reform initiative affect teachers' level of implementation, teachers' concerns, and student achievement. This is an invitation to participate in this research study that I will be conducting, and will be overseen by my advisor, Dr. Anna Graeber, at the University of Maryland, College Park.

Participation in this study involves a forty five minute interview with me and the completion of a questionnaire. During the interview and questionnaire, you will be asked questions about implementing Baldrige in your classroom and about your concerns about this initiative. The questionnaire should take approximately 20 minutes to complete.

Participation in the study is completely voluntary. You may withdraw from participating in the study at any point during the interview or while completing the questionnaire (particularly if you experience distress). You will not be asked to write your name on the questionnaire. Instead, I have assigned a code to your name so that all data attached to this questionnaire will not be directly linked to you. Only I will have access to these data. At no time will individual responses be made available to any personnel from your school, including your principal, or personnel from the school system. Returning the completed questionnaire indicates that you understand the nature of the research and freely consent to participating in the study.

If you have any concerns about participating in this study, or during or after the completion of the interview or questionnaire, you are encouraged to discuss these at any time with me by either email – kbk2@aol.com or by phone – 240-602-5375.

A detailed summary of the results will be available upon completion of the study. If you are interested in receiving this, please indicate this on your completed questionnaire.

Thank you for your time and consideration in participating in my doctoral research study.

Sincerely,

Kara Trenkamp

APPENDIX D: TEACHERS' CONSENT FORM

TEACHER INTERVIEW CONSENT FORM

Project Title	An Investigation of Key Reform Implementation Practices of Middle School Mathematics Teachers and the Schools in which They Teach: Cases of High and Low Levels of Implementation of the Baldrige in Education Reform Initiative.
Purpose	This is a research project being conducted by Kara Trenkamp, a doctoral student at the University of Maryland, College Park as a dissertation study under the direction of her advisor, Dr. Anna Graeber. The purpose of this research project is to describe the conditions under which educational reform can be implemented and sustained and to determine if years of involvement in the Baldrige in Education reform initiative affect teachers' level of implementation, teachers' concerns, and student achievement. I am inviting you to participate in this research project because your school has agreed to participate in this study.
Procedures	The procedures involve being interviewed by the researcher for approximately forty five minutes. The interview will be audio taped and include questions regarding Baldrige implementation. During the interview, you will be asked to complete a questionnaire that allows you to provide additional information about the Baldrige implementation process.
Confidentiality	This research project involves making audiotapes of you. I will do my best to keep your personal information confidential. The following procedures will be used to maintain your confidentiality: (1) you will be assigned another name (a pseudonym) in all written records of this research; (2) transcripts of the interview will be stored on a password-protected personal computer at my home; (3) all print data and audiotapes will be stored in locked filing cabinets in my home; and (4) only my dissertation committee and I will have access to the audio tapes and transcribed data. After fifteen years, all computer files containing transcripts will be deleted and all audiotapes will be destroyed by breaking the case and cutting the tape. If I write or present a report or article about this research project, your identity will be protected to the maximum extent possible. The information that I collect will only be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if I am required to do so by law.

Please check next to the appropriate statement below:
 __ I agree to be audio taped during my participation in this study
 __ I do not agree to be audio taped during my participation in this study |
Risks and Benefits	The interview questions may prompt you to reflect on or recognize possible tensions in your work. This may lead to dissatisfactions you might not otherwise have considered. While this research is not designed to help you personally, it will give you the opportunity to be involved in professional research and to voice your thoughts and opinions. I hope that in the future, other people might benefit from this study through an improved understanding of issues related to implementing a reform initiative.
Freedom to Withdraw	Your participation in this interview is completely voluntary. You may choose not to take part at all. If you decide not to participate in this interview you will not be penalized. If you decide to participate in this interview, you may refuse to answer any question.
Contact Information	If you have any questions about this research study, please contact Kara Trenkamp (kbk2@aol.com; 240-602-5375) or Dr. Graeber (annagrae@umd.edu; 301-405-7060) at 2226F Benjamin Building, Department of Curriculum and Instruction, University of Maryland, College Park. If you have questions about your rights as a research subject or wish to report a research-related injury, you can contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678. This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.
Statement of Age of Subject and Consent	Your signature below 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.
Signature and Date	NAME OF SUBJECT: _____ SIGNATURE OF SUBJECT: _____ DATE: _____

#	Question
1.	Why don't you tell me a little bit about Baldrige in your classroom.
2.	How do you choose which parts of Baldrige you're going to implement or not implement?
3.	Did you ever try a part of Baldrige that didn't go too well, and what did you do?
4.	I am wondering if there is something that is particularly "mathy" about Baldrige that you feel is easier to implement or more natural to implement, and does that have an impact on whether or not you do it? The flipside is, are there things that aren't particularly "mathy" but you feel they would be useful to do?
5.	What would you say was the single most important factor in you deciding whether or not you were going to use any part of Baldrige at all? Was it an option? Did someone come say you're going to do this? How did that work and how did that influence what you decided?
6.	What would you say were some of the things that helped you to implement Baldrige in your classroom?
7.	What would you say were some of the things that hindered Baldrige implementation in your classroom?
8.	What role did other math teachers play in helping or not helping to implement Baldrige? Was it ever a topic in your department meetings?
9.	What role did staff development play in whether or not you implemented parts or any of Baldrige?
10.	How about the role of the principal?
11.	What was the role of not making AYP - what role has that played in your life as a teacher in this building, teaching math and teaching students, implementing Baldrige, and all the decisions you have to make about how you spend the limited time that you have?
12.	Is there anything about Baldrige that just doesn't fit - with you, your vision of teaching and learning, with math, instruction, anything that you think is not worth the time to implement in the classroom, and if there is, what is it?
13.	If you didn't have any constraints, no AYP pressures, you could pick staff development topics, your kids are here ready to learn, how would your instruction change, or you as a teacher change? How you think about how you pick and choose what to do or not do in the classroom - how would that change? And would you do Baldrige in your ideal math class?
14.	Is there anything else you'd like to share about your implementation of Baldrige and the factors that influence what you do?

APPENDIX F: THE QUESTIONNAIRE

Baldrige Questionnaire

Background Information

of Years Taught: _____   # of Years Taught in this School: _____

List the courses you taught during the school year 2005-2006: _____

_____

Circle the response that best represents you:

How long have you been implementing Baldrige?   Not at all   0-1 year   2-3 years   4-5 years

To what extent have you been implementing Baldrige?   Not at all   Somewhat   Regularly

Describe the amount and types of training you have received on the Baldrige Initiative:

_____

_____

_____

_____

Researcher Codes:

School Code: _____

Teacher Code _____

Baldrige Questionnaire

Part I: Baldrige Implementation

The purpose of this part of the questionnaire is to determine what people who are using Baldrige in Education are implementing, like mission statements and data folders, at various times during the process of integrating Baldrige in their classrooms. The items were developed from several different Baldrige checklists and implementation guides. Therefore, some of the items may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those components of Baldrige that you are implementing, in varying degrees of intensity, and should be marked higher on the scale, according to the explanation at the top of each of the following pages.

For example:

I *regularly* incorporate this as part of my instructional program.	0 1 2 3 4 ⑤
I *usually* do this as part of my instructional program.	0 1 2 3 ④ 5
I *sometimes* incorporate this as part of my instructional program.	0 1 2 ③ 4 5
I *rarely* incorporate this as part of my instructional program.	0 1 ② 3 4 5
I *have not* incorporated this yet into my instructional program.	0 ① 2 3 4 5
This statement seems irrelevant to me.	⓪ 1 2 3 4 5

Remember to respond to each item in terms of your present implementation of Baldrige in the classroom or having your students use Baldrige as part of their classroom experience.

0	1	2	3	4	5
Irrelevant	Not Yet	Rarely	Sometimes	Usually	Regularly

Leadership

1. I have a classroom mission statement and incorporate it into my instructional program. 0 1 2 3 4 5

2. I involve students in developing and reviewing our classroom mission statement. 0 1 2 3 4 5

3. My students create their own individual mission statements and refer to them throughout the school year. 0 1 2 3 4 5

4. I post classroom expectations and goals. 0 1 2 3 4 5

0	1	2	3	4	5
Irrelevant	Not Yet	Rarely	Sometimes	Usually	Regularly

5. I involve students in developing and reviewing classroom expectations, goals, and progress.　　0　1　2　3　4　5

6. I monitor and communicate classroom progress to students and parents.　　0　1　2　3　4　5

7. My students monitor the progress of the class and their personal progress using the classroom data center.　　0　1　2　3　4　5

8. My students monitor the progress of the class and their personal progress using their personal data notebook or folder.　　0　1　2　3　4　5

Strategic Planning

9. I involve students in writing classroom goals that are aligned with the school improvement plan.　　0　1　2　3　4　5

10. My students develop their own action plans and personal goals.　　0　1　2　3　4　5

Student and Stakeholder Focus

11. I analyze student data in order to determine the needs of my students.　　0　1　2　3　4　5

12. I monitor student and parent satisfaction through the use of surveys.　　0　1　2　3　4　5

13. I provide for students and parents to give their input in the development of objectives for the classroom.　　0　1　2　3　4　5

14. My students know what the grade-level and next-level expectations are.　　0　1　2　3　4　5

Information and Analysis

15. I collect and use classroom data and information to monitor progress toward meeting our goals.　　0　1　2　3　4　5

16. I use data to compare class performance to other classes in my school and other schools.　　0　1　2　3　4　5

17. My students have personal data folders or notebooks where they record and monitor their progress.　　0　1　2　3　4　5

18. I have a data center displayed in my classroom that I use to track class progress.　　0　1　2　3　4　5

0	1	2	3	4	5
Irrelevant	Not Yet	Rarely	Sometimes	Usually	Regularly

19. I use quality tools such as plus/delta, consensograms, and force field analysis in order to gather information and make decisions in the classroom. 0 1 2 3 4 5

20. My students use quality tools such as plus/delta, force field analysis, and affinity diagrams in order to gather information and make decisions about their progress. 0 1 2 3 4 5

Faculty and Staff Focus

21. I systematically recognize student contributions toward meeting class goals. 0 1 2 3 4 5

22. My students know where to locate resources in the room and know how to use those resources for learning. 0 1 2 3 4 5

23. I monitor the level of student involvement, well-being, and satisfaction. 0 1 2 3 4 5

Process Management

24. I use the PDSA cycle to design and improve teaching and learning in my classroom. 0 1 2 3 4 5

25. My students use the PDSA cycle to help them make continuous progress with their goals. 0 1 2 3 4 5

26. I use quality tools in my instructional program (fish bone, affinity diagram, issue bin). 0 1 2 3 4 5

27. I use a plus/delta to evaluate the classroom work and use the information to make improvements. 0 1 2 3 4 5

28. My students use a plus/delta to evaluate their own and each other's work and use the information to make improvements. 0 1 2 3 4 5

Performance Results

29. I use summative assessment data to track progress over time. 0 1 2 3 4 5

30. My students and I compare our results with other classrooms. 0 1 2 3 4 5

31. My students and I communicate and display our results for parents and other people in the school. 0 1 2 3 4 5

32. My students analyze their progress of the class and individual goals. 0 1 2 3 4 5

Part II: Baldrige Concerns

The purpose of this part of the questionnaire is to determine what people who are using or thinking about using Baldrige in Education are concerned about at various times during the process of integrating Baldrige, like mission statements and data folders, into their classrooms. The items were developed from typical responses of teachers who ranged from no knowledge at all about using Baldrige in the classroom to many years of experience in using it. Therefore, a good part of the items may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale, according to the explanation at the top of each of the following pages.

For example:

This statement is very true of me at this time.	0 1 2 3 4 5 6 (7)
This statement is somewhat true of me now.	0 1 2 3 (4) 5 6 7
This statement is not at all true of me at this time.	0 (1) 2 3 4 5 6 7
This statement seems irrelevant to me.	(0) 1 2 3 4 5 6 7

Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with using Baldrige in the classroom during your teaching, or having your students use Baldrige as part of their classroom experience. Whenever the following set of questions refers to "the innovation", this is what is meant.

0	1	2	3	4	5	6	7
Irrelevant	Not true of me now		Somewhat true of me now		Very true of me now		

1. I am concerned about students' attitudes toward this innovation. 0 1 2 3 4 5 6 7

2. I now know of some other approaches that might work better. 0 1 2 3 4 5 6 7

3. I don't even know what this innovation is. 0 1 2 3 4 5 6 7

4. I am concerned about not having enough time to organize myself each day. 0 1 2 3 4 5 6 7

5. I would like to help other teachers in their use of this innovation. 0 1 2 3 4 5 6 7

6. I have very limited knowledge about this innovation. 0 1 2 3 4 5 6 7

7. I would like to know the effect of reorganization on my professional status. 0 1 2 3 4 5 6 7

0		1	2		3	4		5	6	7
Irrelevant		Not true of me now			Somewhat true of me now			Very true of me now		

8. I am concerned about conflict between my interests and my responsibilities.
    0 1 2 3 4 5 6 7

9. I am concerned about revising my use of the innovation.
    0 1 2 3 4 5 6 7

10. I would like to develop working relationships with teachers here and elsewhere who are using this innovation.
    0 1 2 3 4 5 6 7

11. I am concerned with how the innovation affects students.
    0 1 2 3 4 5 6 7

12. I am not concerned about this innovation.
    0 1 2 3 4 5 6 7

13. I would like to know who will make the decisions in the new system.
    0 1 2 3 4 5 6 7

14. I would like to discuss the possibility of using this innovation.
    0 1 2 3 4 5 6 7

15. I would like to know what resources are available when my school adopts this innovation.
    0 1 2 3 4 5 6 7

16. I am concerned about my inability to manage all the innovation requires.
    0 1 2 3 4 5 6 7

17. I would like to know how my teaching is supposed to change.
    0 1 2 3 4 5 6 7

18. I would like to familiarize other departments or people with the progress of this new approach.
    0 1 2 3 4 5 6 7

19. I am concerned about evaluating my impact on students.
    0 1 2 3 4 5 6 7

20. I would like to revise the innovation's instructional approach.
    0 1 2 3 4 5 6 7

21. I am completely occupied with other things.
    0 1 2 3 4 5 6 7

22. I would like to modify our use of the innovation based on the experiences of our students.
    0 1 2 3 4 5 6 7

23. Although I don't know about this innovation, I am concerned about things in the area.
    0 1 2 3 4 5 6 7

24. I would like to excite my students about their part in this approach.
    0 1 2 3 4 5 6 7

25. I am concerned about time spent working with nonacademic problems related to this innovation.
    0 1 2 3 4 5 6 7

0		1	2		3	4		5		6		7
Irrelevant		Not true of me now			Somewhat true of me now				Very true of me now			

26. I would like to know what the use of this innovation will require in the immediate future.   0   1   2   3   4   5   6   7

27. I would like to coordinate my efforts with others to maximize the innovation's effects.   0   1   2   3   4   5   6   7

28. I would like to have more information on time and   0   1   2   3   4   5   6   7

29. I would like to know what other teachers are doing in this area.   0   1   2   3   4   5   6   7

30. At this time, I am not interested in learning about this innovation.   0   1   2   3   4   5   6   7

31. I would like to determine how to supplement, enhance, or replace the innovation.   0   1   2   3   4   5   6   7

32. I would like to use feedback from students to change this program.   0   1   2   3   4   5   6   7

33. I would like to know how my role will change when I am using the innovation.   0   1   2   3   4   5   6   7

34. Coordination of tasks and people is taking too much of my time.   0   1   2   3   4   5   6   7

35. I would like to know how this innovation is better than what we have now.   0   1   2   3   4   5   6   7

36. I believe I am a better teacher because of this initiative.   0   1   2   3   4   5   6   7

37. I believe my students learn more and better as a result of participating in this initiative.   0   1   2   3   4   5   6   7

Part III: Additional Information

In the space below, please feel free to provide any additional information or comments about your involvement with the Baldrige in Education reform initiative.

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